PUBLIC HEALTH COMMUNICATION CENTRE AOTEAROA

Aotearoa New Zealand's fourth wave of Covid-19 and why we should care

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Summary

Aotearoa New Zealand (NZ) is experiencing a fourth wave of Covid-19 infection. This conclusion is supported by the increase in self-reported Covid-19 infections, hospitalisations, and virus detections in wastewater. This wave is potentially driven by a rise in the XBB subvariant which has become dominant in the past two months and may also reflect other factors, notably waning immunity and more time spent indoors in autumn.

Extrapolating from hospitalisations and deaths in the last 12 weeks would imply 12,000 Covid-19 hospitalisations this year and around 1,000 deaths.

This new wave of infection is an opportunity for health authorities to remind New Zealanders about the benefits of vaccination and the value of measures for reducing transmission to others, notably through self-isolation when sick and ventilation improvements.

The SARS-CoV-2 virus that causes Covid-19 has been circulating widely in Aotearoa New Zealand (NZ) since the arrival of the Omicron variant in January 2022. The rate of infection has not reached a stable plateau of cases. Instead, case numbers have fluctuated as a series of waves (see figures below).

This article aims to summarise current Covid-19 surveillance trends, comment on the evidence for there being a fourth wave of infection, and the implications for enhancing control measures.

Covid-19 surveillance

NZ has multiple systems for surveillance of Covid-19. These systems were established to provide information to support prevention and control of this infection. We give an overview of these systems in an appendix below.

Here we present surveillance data provided by the Ministry of Health (MoH) and Institute for Environmental Science and Research (ESR).

Covid-19 cases – Self-reported cases in 2023 reached their lowest 7-day moving average of 1132 cases per day on 11 February 2023. The numbers subsequently rose reaching a moving average of 2143 per day on 17 April before decreasing again.

Hospitalisations – The weekly number of people hospitalised increased over the past eight weeks, from 149 for the week ending 19 February 2023 to 368 for the week ending 16 April 2023.

Deaths – Deaths within 28 days of being reported as a case averaged 28 per week over the 4 weeks ending 23 April 2023. This number was a small increase from the 24 per week for the previous 4 weeks up to the 26 March. For deaths attributable to Covid-19, the average per week over the 4 weeks ending 23 April 2023 was 16, also slightly increased from the preceding 4 weeks which averaged 13 per week.

Wastewater testing – This testing showed a rise in SARS-CoV-2 RNA levels in wastewater from a low point of 1,170,995 genome copies per person per day on 5 February 2023 to 4,222,493 genome copies per person per day on 16 April 2023.

Genomic surveillance – Whole genome sequencing results are regularly updated on the ESR COVID-19 Genomics Insights Dashboard (CGID). These data show that multiple Omicron subvariants are currently contributing to the Covid-19 pandemic in NZ. This mix is increasingly dominated by XBB, which in the three weeks up until 31 March accounted for 52% of sequenced cases. XBB was also dominant in wastewater samples.

Implications for New Zealand

Combined surveillance data provide a consistent picture of an increased incidence of Covid-19 infection starting in early February, which can be reasonably described as our fourth wave since Covid-19 began circulating widely in NZ in early 2022. It is coinciding with a rise of the XBB subvariant which may be a major contributing factor. This subvariant has been associated with waves of infection overseas, notably in Singapore[1]. Other factors potentially contributing to the increase include waning immunity (post-infection and post-vaccination), reducing controls on transmission, and seasonal factors (the typical increase in respiratory virus infections as people spend more time indoors).

To date, this fourth wave appears much smaller than the previous three waves, but it is still too early to say if it has peaked. This pattern of small to moderate-sized waves may indicate what we can expect to see with Covid-19 in the future – unless there are substantial improvements in vaccine effectiveness.

There are multiple reasons to be concerned about any increase in Covid-19 infections:

- Covid-19 is now a leading cause of death in NZ. It resulted in 2,419 deaths in 2022, which was 6.3% of the 38,574 total reported deaths that year. If the current pattern continues it could cause a total of 1,300 deaths in 2023 (based on an average of 25 deaths per week within 28 days of diagnosis, over the past 12 weeks) or 700 deaths (based on Covid-19 attributed deaths).
- Covid-19 is a major cause of hospitalisation, resulting in 22,404 hospitalisations in 2022. If the current pattern continues (based on an average 233 hospitalisations per week for the past 12 weeks) for the remainder of 2023 that would represent around 12,000 hospitalisations this year.
- Infection also results in prolonged symptoms (long Covid/post-acute sequelae of Covid-19) for some cases [2]. A distinguishing feature of Covid-19 is that reinfections are common, and can also cause severe illness, long Covid, and death, though the frequency of these outcomes appears to be lower than for initial infections [3].
- Covid-19 remains an important source of inequalities, with Māori and Pasifika markedly more likely to be admitted to hospital and die from this infection [4]. This pattern of higher death rates among Māori has been seen in three previous pandemics [5].

Control measures still needed

Identifying new waves of infection is important for public health. It is an opportunity to remind people that this infection is still having a large health impact and there are actions to minimise those effects. Such reminders can help combat complacency now that the

pandemic no longer requires an emergency response. Important control measures include the following:

- **Vaccination and boosters** – The new bivalent booster provides increased protection against serious illness and death compared with the previous monovalent vaccine [6]. Uptake of boosters remains quite low with only half (50.5%) of eligible 50+ having received a second booster.
- **Improving indoor ventilation** – Ventilation improvements can reduce the risk of Covid-19 and other respiratory infections [7]. Better air quality may also improve learning at school and worker productivity [8].
- **Self-isolation** – NZ requires a 7-day self-isolation period for people with Covid-19. This remains an important measure for reducing transmission to workplaces, education settings, and social events. It may be possible to reduce this period to 5-days with a test and release approach [9].
- **Mask use in high-risk indoor environments** – Masks are still required for most visitors to health care, aged care, and disability care facilities. They would also be useful for public transport, where passengers often spend prolonged periods in an environment where ventilation is poor [10].
- **Limiting transmission in shared environments like schools** – We know that schools are an important setting for transmission of multiple respiratory agents and NZ needs a more systematic approach to infection control [11].

Now that Covid-19 is an established threat, the NZ Government should consider funding applied research to determine the public acceptability and cost-effectiveness of ongoing Covid-19 control measures. For example, to explore the public acceptability of mask requirements on public transport at peak commuter times. And the cost-effectiveness of suitable ventilation systems in schools and offices.

As much as we want Covid-19 to disappear from our lives, it is still here and still requires a strong, evidence-informed response. Like the road toll, tobacco deaths, and influenza, we should not become complacent to the large health impact of Covid-19, just because it has now become a familiar threat.

What is new in this Briefing

- NZ is experiencing a fourth wave of Covid-19 infection based on cases (self-reported and hospitalised) and wastewater testing.
- So far, this wave is smaller than previous waves, but still represents a large increase in the risk of infection compared with baseline levels with a correspondingly large health impact.

Implications for public health

- Waves of infection provide an opportunity for health authorities to reinforce the importance of vaccination, ventilation improvements, self-isolation when sick, and other measures to reduce transmission of respiratory infections.
- NZ needs to transition to a useful, sustainable, and enduring surveillance system for Covid-19 and other respiratory pathogens which can provide information critical for managing both endemic and pandemic infections.

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Appendix – Overview of Covid-19 surveillance

- **Disease surveillance** – These systems provide data on different categories of Covid-19 infection. Results are presented on the MoH website and also graphically on other sites, such as RNZ:
  - **Case reporting** – Anyone testing positive for Covid-19 is required to report their case status on-line. Positive results will almost invariably be based on Rapid Antigen Tests (RATs) that are self-administered or administered by caregivers. Covid-19 is also a notifiable condition for diagnosing doctors, which will include laboratory-based PCR testing in some instances.
  - **Hospitalisations and ICU admissions** – Hospitals report diagnosed cases to the MoH, including admissions to intensive care units (ICUs). There is an international system for coding Covid-19 cases.
  - **Deaths** – Deaths linked to Covid-19 are reviewed by coding staff in the MoH who distinguish those that are attributed deaths (where Covid-19 was considered the underlying or contributing cause of death), and unrelated cases which are removed [12]. The MoH also reports all deaths within 28 days of Covid-19 infection as a separate category.
- **Wastewater testing** – Specimens are collected from sewerage systems at sites across NZ and tested for SARS-CoV-2 RNA [13]. These data are presented on the ESR Wastewater Surveillance Dashboard.
- **Genomic surveillance** – Specimens obtained from cases and from wastewater undergo whole genome sequencing and analysis [14]. Results are regularly updated on the ESR Genomics Insights Report site.
- **Other systems** – There are multiple additional forms of surveillance data collection

and analysis that can provide information to guide prevention and controls actions. Excess mortality for example is a valuable way of measuring the combined effect of the pandemic and response on deaths.

Limitations of surveillance systems: It is important to recognise the limitations of these surveillance systems and act to improve them. Self-reported illness is likely to become a less valid way of measuring disease rates in the community as people become more complacent about Covid-19. High quality sentinel surveillance for respiratory infections would have a useful role [15]. Hospitalisations may provide a better indicator of trends than self-reported cases. Covid-19 attributed deaths are based on those where Covid-19 was considered the underlying or contributing cause of death [12]. This measure may underestimate mortality which is substantially raised for at least the 12 months following Covid-19 infection [16 17].

Limitations of projecting future trends: There are major limitations with projecting the future course of the pandemic based on current surveillance trends. The estimates for numbers of hospitalisations and deaths for 2023 are entirely based on recent disease trends so final numbers could be very different. A particular area of uncertainty is viral evolution which could produce new subvariants with greater or lesser immune evasion properties, with corresponding increases or decreases in the intensity of the pandemic.

There is potential for case numbers to fall if accumulated immunity from vaccination and infection reduces the severity of infection with a decline in symptomatic cases, hospitalisations, deaths, and post-acute sequelae of Covid-19. Conversely, the high propensity for Covid-19 to reinfect people (currently 43% of new cases are documented reinfections) may sustain a high burden of disease. The measured burden of disease may also increase as we become better at recognising and quantifying the long-term effects such as post-acute sequelae of Covid-19 and the increase in delayed mortality (noted above).

Future development of surveillance systems: The systems described here have served NZ well, but it is now time for a transition to a sustainable and enduring surveillance system for Covid-19, preferably one that also covers other respiratory pathogens[18]. This shift might mean some rationalisation eg, focusing wastewater testing on just a few selected cities. But it will also mean expansion in critical areas, notably at the community level. This need has become more critical with the MoH announcing on 27 April that the proposed Covid-19 prevalence surveys will now not go ahead. A potential alternative is establishing sentinel surveillance of respiratory infections. For example, routinely testing a random sample of people attending specific health care settings such as general practices and emergency departments or community sites such as schools. This approach could build on successful community-based models such as the WellKiwis cohort.

References

1. Goh AXC, Chae S-R, Chiew CJ, et al. Characteristics of the omicron XBB subvariant wave in Singapore. *The Lancet* 2023;401(10384):1261-62.
2. Davis HE, McCorkell L, Vogel JM, et al. Long COVID: major findings, mechanisms and recommendations. *Nature Reviews Microbiology* 2023:1-14.
3. Deng J, Ma Y, Liu Q, et al. Severity and Outcomes of SARS-CoV-2 Reinfection Compared with Primary Infection: A Systematic Review and Meta-Analysis.

International journal of environmental research and public health 2023;20(4):3335.
4. Public Health Agency. COVID-19 Trends and Insights Report. Wellington: Ministry of Health, 2022.
5. Wilson N, Barnard LT, Summers JA, et al. Differential mortality rates by ethnicity in 3 influenza pandemics over a century, New Zealand. *Emerging infectious diseases* 2012;18(1):71.
6. Lin D-Y, Xu Y, Gu Y, et al. Effectiveness of bivalent boosters against severe omicron infection. *N Engl J Med* 2023;388(8):764-66.
7. Stevenson A, Freeman J, Jermy M, et al. Airborne transmission: a new paradigm with major implications for infection control and public health. *The New Zealand Medical Journal (Online)* 2023;136(1570):69-77.
8. Bennett J, Shorter C, Kvalsvig A, et al. Indoor air quality, largely neglected and in urgent need of a refresh. *The New Zealand Medical Journal (Online)* 2022;135(1559):136-39.
9. Harvey EP, Looker J, O'Neale DR, et al. Quantifying the Impact of Isolation Period and the Use of Rapid Antigen Tests for Confirmed COVID-19 Cases: COVID-19 Modelling Aotearoa, University of Auckland, 2022.
10. Matheis C, Norrefeldt V, Will H, et al. Modeling the airborne transmission of SARS-CoV-2 in public transport. *Atmosphere* 2022;13(3):389.
11. Kvalsvig A, Tuari-Toma B, Timu-Parata C, et al. Protecting school communities from COVID-19 and other infectious disease outbreaks: the urgent need for healthy schools in Aotearoa New Zealand. *The New Zealand Medical Journal (Online)* 2023;136(1571):7-19.
12. Public Health Agency. COVID-19 Mortality in Aotearoa New Zealand: Inequities in Risk. Wellington: Ministry of Health, 2022.
13. Gilpin BJ, Carter K, Chapman JR, et al. A pilot study of wastewater monitoring for SARS-CoV-2 in New Zealand. *Journal of Hydrology (New Zealand)* 2022;61(1):45-57.
14. Geoghegan JL, Ren X, Storey M, et al. Genomic epidemiology reveals transmission patterns and dynamics of SARS-CoV-2 in Aotearoa New Zealand. *Nature communications* 2020;11(1):6351.
15. Huang QS, Wood T, Jelley L, et al. Impact of the COVID-19 nonpharmaceutical interventions on influenza and other respiratory viral infections in New Zealand. *Nature communications* 2021;12(1):1001.
16. Wang W, Wang C-Y, Wang S-I, et al. Long-term cardiovascular outcomes in COVID-19 survivors among non-vaccinated population: a retrospective cohort study from the TriNetX US collaborative networks. *EClinicalMedicine* 2022;53:101619.
17. One-Year Adverse Outcomes Among US Adults With Post–COVID-19 Condition vs Those Without COVID-19 in a Large Commercial Insurance Database. JAMA Health Forum; 2023. American Medical Association.
18. Kvalsvig A, Barnard LT, Summers J, et al. Integrated Prevention and Control of Seasonal Respiratory Infections in Aotearoa New Zealand: next steps for transformative change. *Policy Quarterly* 2022;18(1):44-51.

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