New Zealand Wastewater Surveillance Programme COVID-19

Monthly Report: January 2024

Weeks ending 08 January to 04 February 2024
Report prepared 12 February 2024

Key Trends & Insights

In January 2024, SARS-CoV-2 levels in wastewater averaged 5.97 million genome copies per person per day (GC/p/d) compared to 5.81 GC/p/d in December. During this period, SARS-CoV-2 levels were highest in the week ending 07 January at 8.45 million GC/p/d.

100%	40 – 67%	JN.1
Sites (45/45) where SARS-CoV-2 was detected.	NZ population covered by wastewater testing in January	Most prevalent variant detected (92%)

- In January 2024, 294 samples were collected across Aotearoa. SARS-CoV-2 RNA was detected in 291/294 (99%) of samples from 45/45 sites (100%).
- Due to the holiday period, samples were collected from a reduced number of sites in the week ending 7 January 2024, resulting in population coverage dropping to 40% that week.
- Following a sustained increase in SARS-CoV-2 RNA quantities in wastewater since August 2023 through to December 2023, there was an overall downward trend in January 2024.
- The estimated national percentage of JN.1 steadily increased through January from 61% in week 52 to 92% in week 4. This includes all lineages with a JN.1 spike protein, including several recombinant lineages.

National Results

National SARS-CoV-2 levels in wastewater and reported cases

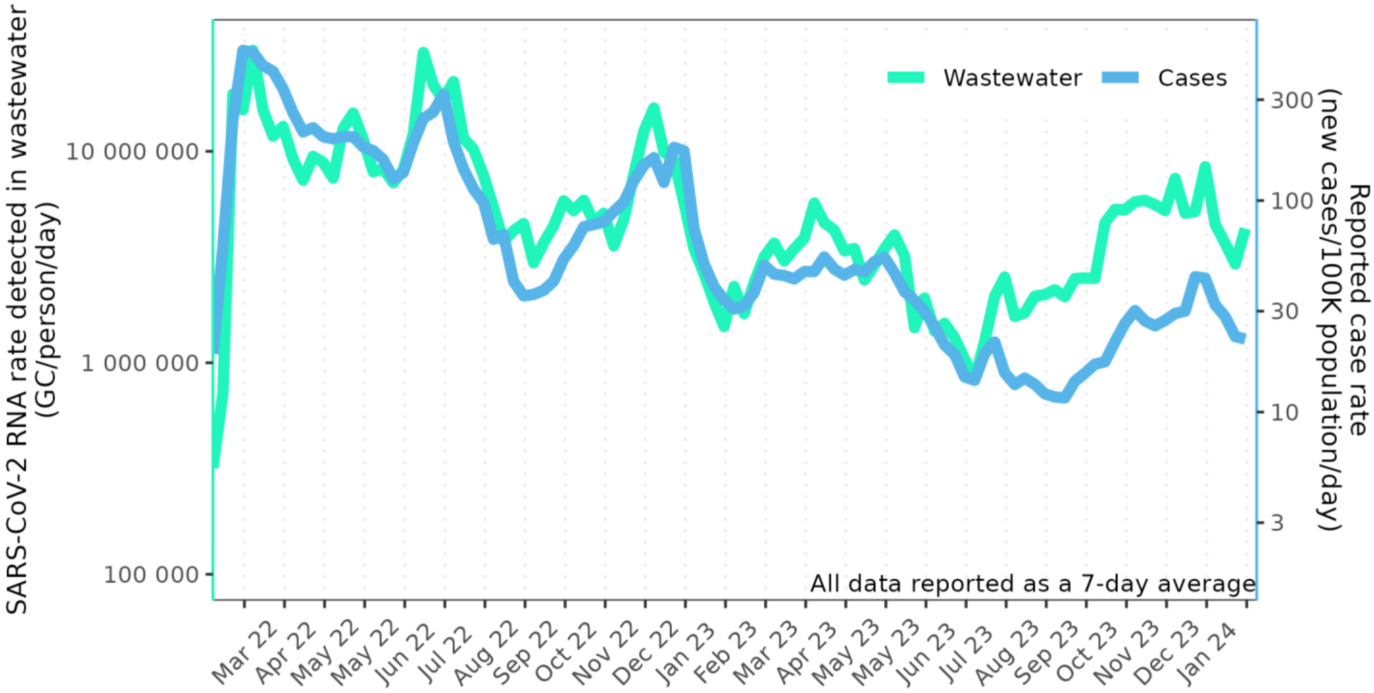

Figure 1. National timeseries of estimated SARS-CoV-2 wastewater rate (GC/person/day, green line) and reported case rate (new cases/100,000 population/day, blue line) on a $\log_{10}$ scale.

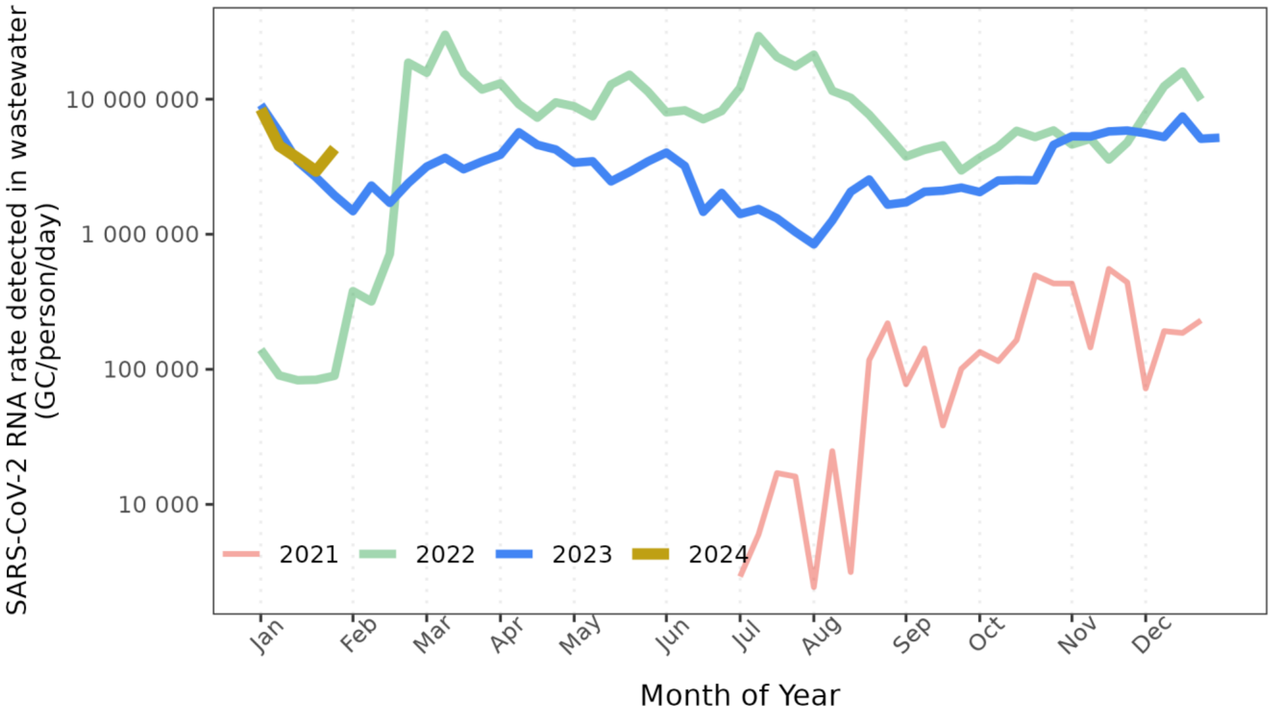

Figure 2. National timeseries of estimated SARS-CoV-2 wastewater rate (GC/person/day).

Figure 3. Comparison of SARS-CoV-2 levels for the week ending 4 February 2024, compared to levels measured: A) 1 week ago; B) 2 weeks ago; C) 4 weeks ago; D) 12 weeks ago. Only sites with results for both time points are included. When the viral quantity is 30% or more higher this is labelled as increased (red up arrow on map). When the viral quantity is 30% or more lower, this is labelled as decreased (blue down arrow on map). If viral levels have changed less than this in the compared weeks, this is labelled as no change (yellow circle on map). Interactive map of weekly results available publicly at https://www.poops.nz/

Variant Analysis

Results from five weeks of sampling (week 52, 2023 and weeks 1 to 4, 2024) from up to 20 sentinel wastewater sites (Table 1) across New Zealand are reported.

The percentage of JN.1 (a descendant lineage of BA.2.86) increased from weeks 52 (2023) to week 4 (2024). The estimated national percentage of this variant was 61% in week 52, 72% in week 1, 81% in week 2, and 92% in weeks 3 and 4 (shown in purple in Figures 4 and 5, Table 1). This includes all lineages with a JN.1 spike protein, including several recombinant lineages. The percentage of BA.2.86 ranged from 10% in week 1 to 4% in week 4.

The XBB family of lineages (which includes EG.5, HK.1.2, HK.3 and JD.1.1) continued to decline throughout the month. The estimated national percentage of this group collectively was 30% in week 52, 16% in week 1, 10% in week 2 and 3% in weeks 3 and 4 (variants shown in shades of green, Figures 4 and 5, Table 1).

XBC recombinant lineage comprised approximately 1% of sequences in week 52 and week 1, and was not detected in weeks 3 and 4.

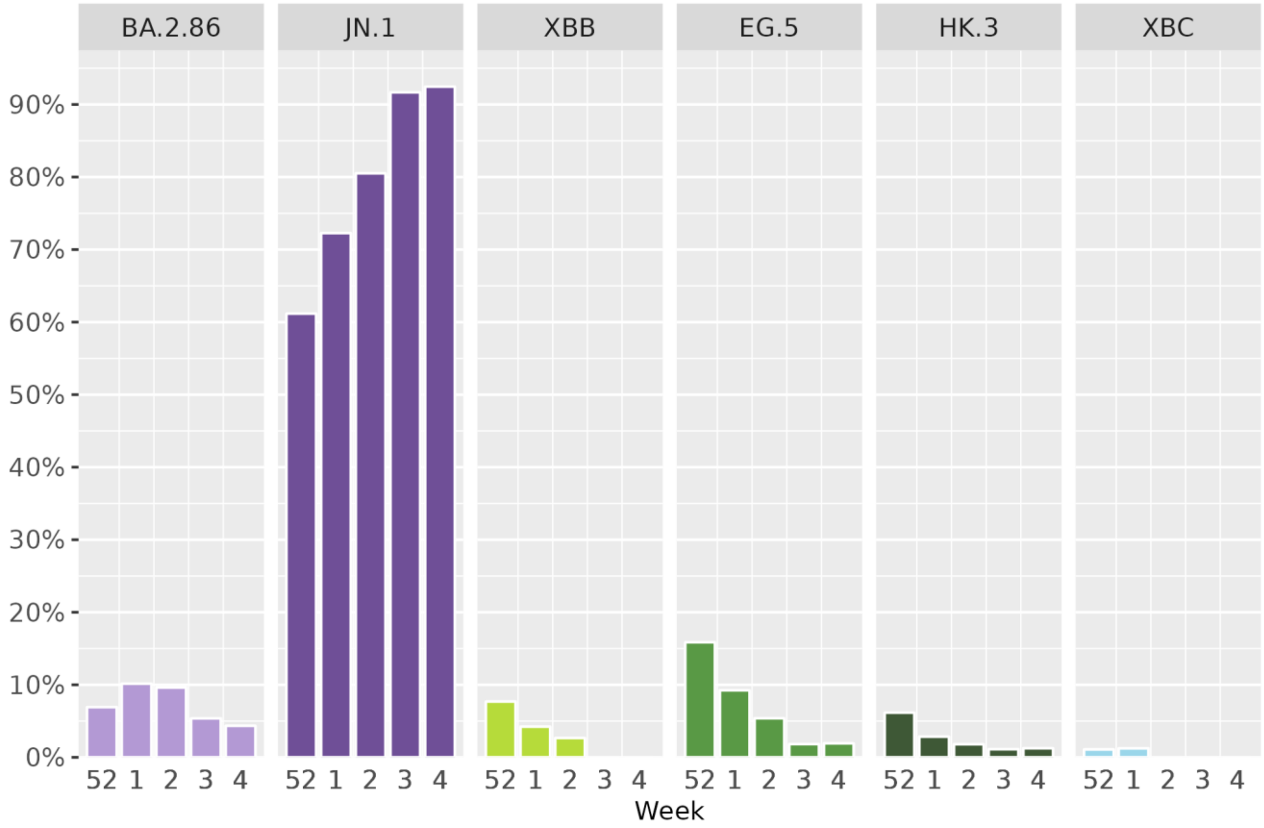

Figure 4. National percentage of each variant for week 52 in 2023 (ending 31 December) to week 4 in 2024 (ending 28 January).

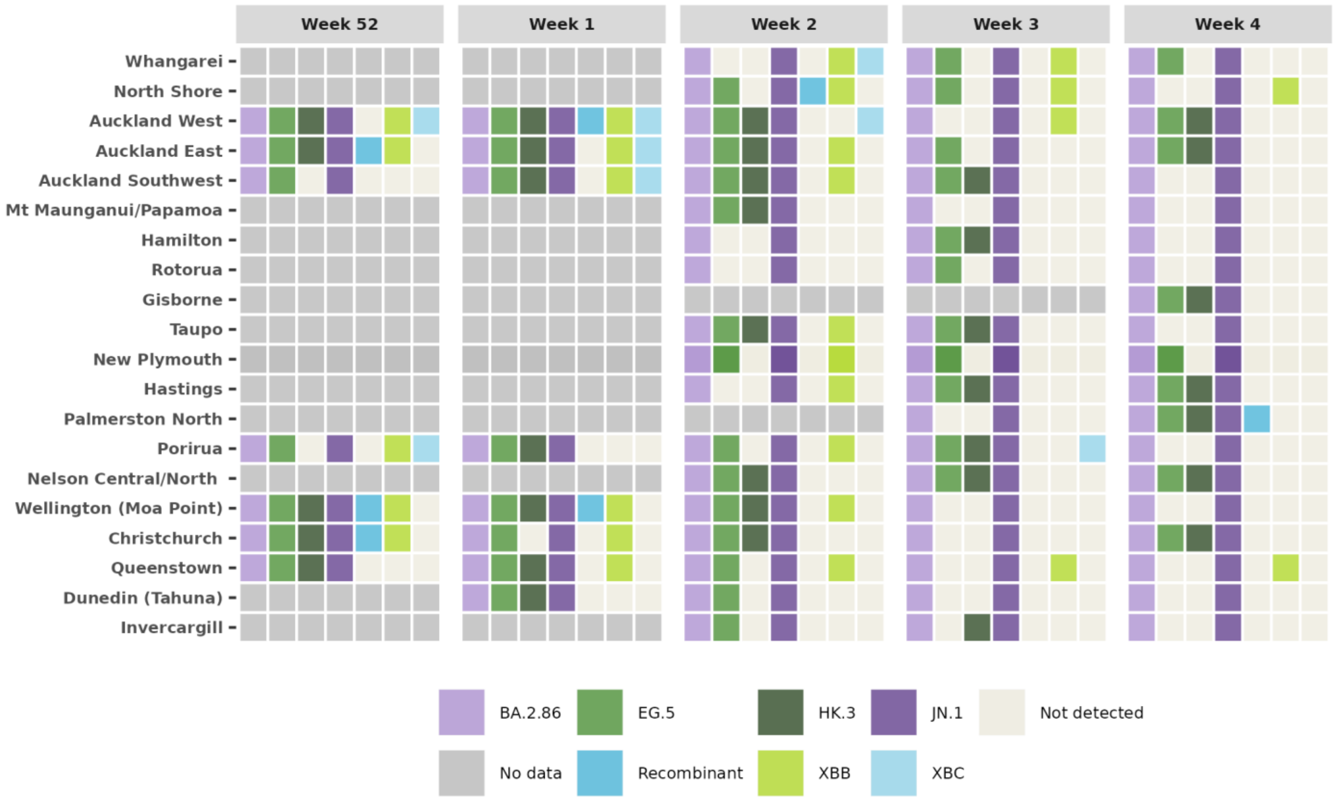

Table 1. Data from 20 wastewater sentinel sites sampled between week 52 (ending 31 December 2023) and week 4 (ending 28 January 2024). Coloured box denotes that the variant was detected at that site that week, cream box denotes that the variant was not detected, and grey box denotes site was not sampled (labelled as 'no data') that week.

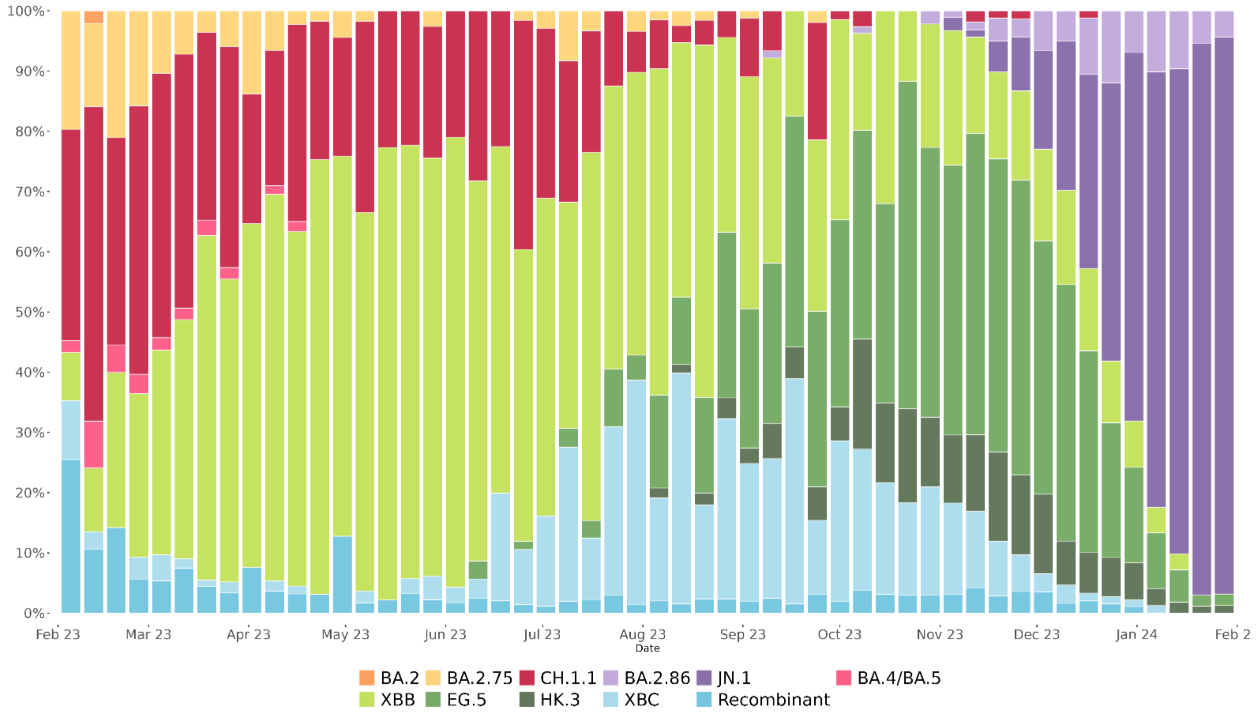

Figure 5. Estimated variant percentage over time at a national scale (average). Data are collected from ~20 sentinel sites each week.

Instantaneous Reproduction Number

Daily wastewater and case data up to 04 February 2024 was used for the modelling. The uncertainty in these measures is denoted with 95% credible intervals (shown in green in Figure 6).

Instantaneous reproduction number: The estimate of the instantaneous reproduction number for 04 February 2024 (in week 4) was 1.00 (95% credible interval 0.73 – 1.38, Figure 6).

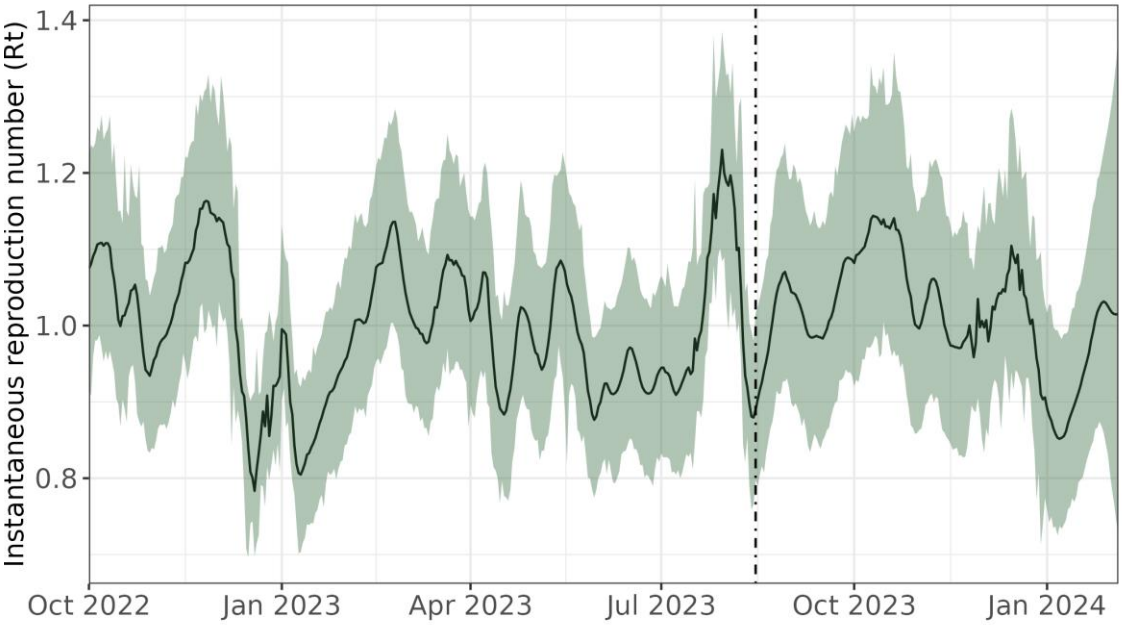

Figure 6. Estimates of instantaneous reproduction number. Black vertical lines represent when COVID-19 restrictions were lifted on 15 August 2023. Black solid lines represent central estimates. Shaded regions show 95% credible intervals on the value of the hidden states.

Trends in Ministry of Health Regions

Regional analysis of the wastewater data is shown in Figure 7.

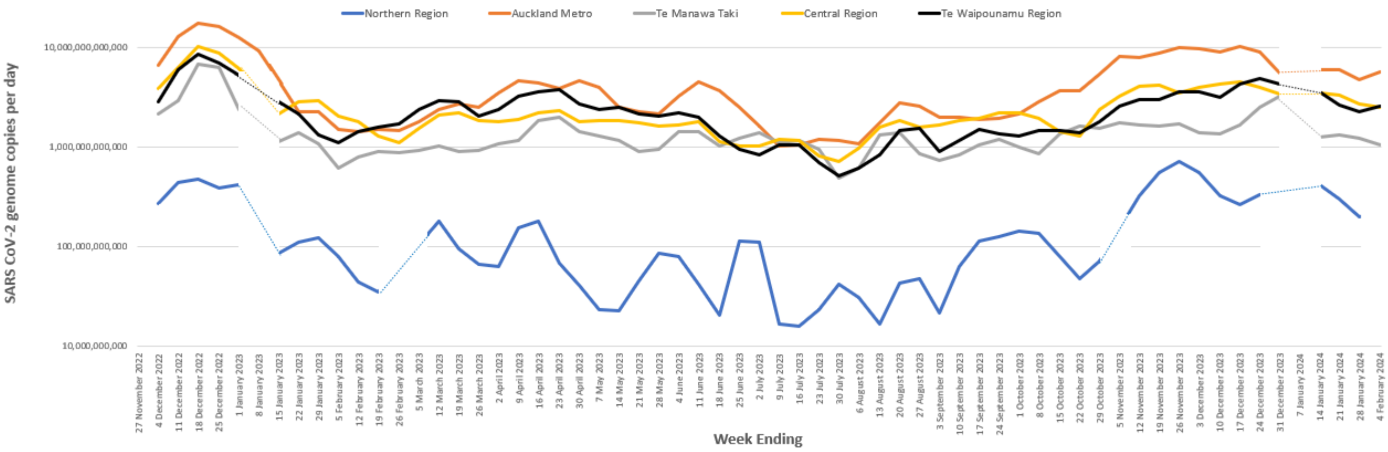

Figure 7. Two week rolling average of total SARS-CoV-2 genome copies detected per day in the five Ministry of Health regions. Dashed lines are inferred levels during periods when samples were either not collected (Christmas period) or insufficient numbers collected (for example, due to weather impacts) for the region.

Acknowledgements

This work represents the combined efforts of many individuals and organisations.

We thank the teams across the country who are collecting the wastewater that underpins this work.

The wastewater analysis has been undertaken at ESR by a team including laboratory staff, data scientists, bioinformaticians, and other staff. Ongoing support for this work from the Ministry of Health and ESR management is appreciated.

Notes

Sites and frequency of sample collection: The catchment population sites selected for the surveillance range from approximately 400 to over 1,000,000 individuals. The sites cover all regions of the country. Most major towns and all cities, as well as many smaller communities, are included. In early 2023, the wastewater catchment areas cover over 75% of the population connected to wastewater treatment plants. The sites from which samples have been collected have varied over the last 12 months. New sites may be added over time, and/or sampling may reduce in frequency or cease for other sites. The selection and frequency of sampling vary depending on the local population, access to wastewater collection points, staff availability to collect samples and risk factors. When included, samples are collected at least weekly, with twice weekly sampling being common.

Sampling method: The preferred option is to automatically collect a 24 hour ‘composite’ sample. This is where a pump automatically collects a small volume of wastewater every 15 minutes over 24 hours using a composite sampler. These samplers are available in some wastewater treatment plants. When composite samplers are not available, ‘grab’ samples are collected. These range from a sample being taken at a single point in time, to 3 samples taken over 30 minutes, to samples collected over a day. Grab samples represent only the composition of the source at that time of collection and may not be as representative as a 24-hour composite sampler. More variation may be expected with grab samples.

Laboratory analysis of wastewater samples: Samples are sent from each wastewater treatment plant to ESR. Processing of each sample commences within an hour or two of receipt. Processing involves the concentration of virus from 250 mL sample to approx. 1 mL using centrifugation and polyethylene glycol. Viral RNA is then extracted from a small volume of 0.2 mL concentrate to give a final volume of 0.05 mL The presence of SARS-CoV-2 RNA is determined using RT-qPCR. SARS-CoV-2 is considered detected when any of the RT-qPCR replicates are positive.

RT-qPCR: Reverse transcription (RT) to convert RNA to complementary DNA (cDNA), followed by quantitative PCR (qPCR). RT-qPCR is used for detection and quantification of viral RNA.

Method sensitivity: The protocol used to concentrate SARS-CoV-2 from wastewater allows for the sensitive detection of SARS-CoV-2 by RT-qPCR. ESR has shown that when 10 individuals are actively shedding SARS-CoV-2 RNA in a catchment of 100,000 individuals, there was a high likelihood of detecting viral RNA in wastewater (https://doi.org/10.1016/j.watres.2021.118032). Shedding by one individual may be detected in wastewater, but it does depend on many factors including the amount and duration of shedding. Very low levels in wastewater may be not able to be quantified (i.e., less than the limit of quantification- see below).

SARS-CoV-2 RNA detected (positive result): A positive detection in the wastewater indicates that at least one person has been shedding SARS-CoV-2 into the wastewater at some point during the time period that the sample was being collected. In some cases, detections could also be due to the shedding of low levels of SARS-CoV-2 RNA by a recently recovered case. The detection of SARS-CoV-2 RNA does not indicate that infectious virus is present.

SARS-CoV-2 RNA not detected (negative result): A negative result can occur because there are no active 'shedding' cases in the catchment or because the SARS-CoV-2 RNA concentration is too low to be detected, most likely because there are a very low number of cases in the wastewater catchment. Therefore, negative finding does not necessarily guarantee the absence of COVID-19 in the community.

Viral loads and normalisation: When detected, the SARS-CoV-2 RNA concentration is calculated as genome copies per L of wastewater. This is then converted to a viral load of genome copies/day/person. This conversion considers the flow rate of wastewater entering the treatment plant (the influent) and the population in the catchment. The flow rate is the total volume (m3 per day) recorded at the inlet of the wastewater treatment plant over 24 hours. This is a population-normalised viral load. Currently, the flow rate is the average annual flow rate, but will be replaced with daily flow rate when available (note that rainfall may significantly increase the flow rate at the inlet, diluting the sample, and may result in lower concentrations and a false negative result).

Limit of quantification: The lowest concentration of the target that can be reliably quantified is referred to as the limit of quantification. For those samples where SARS-CoV-2 is detected but cannot be quantified, a value of 5 genome copies/mL wastewater is used. While a standard method is being used, virus recovery can vary from sample to sample, and this may affect the quantitation.

Wastewater Data Modelling: *Instantaneous reproduction number (R_t):* The instantaneous reproduction number (R_t) represents the average number of secondary cases that will arise per primary infectious case. The effective reproduction (R_{eff}) number can be measured as either the instantaneous reproduction number (R_t), which measures transmission at a specific point in time; or the case reproductive number, which measures transmission for a specific cohort of individuals. The models described measure the instantaneous reproduction number (R_t). In general terms, an R_t above 1 would typically indicate an increasing number of infections in the population. The instantaneous reproduction number is calculated using a semi-mechanistic model that is fitted to (i) case numbers and (ii) wastewater quantitation, and incorporates information about shedding rates, infection generation times, and case ascertainment. Instantaneous reproduction number is estimated take into account any delays in self-reporting of cases. It should be noted that there is uncertainty in this measure, which is denoted with the 95% credible intervals.

Data subject to change: Data generated for the New Zealand Wastewater COVID-19 Surveillance Programme should be considered provisional and may be subject to change.

Data not shown: Results from certain samples may not be shown, as the result was either deemed invalid, or the sample could not be tested (e.g., leaked in transit, not labelled).

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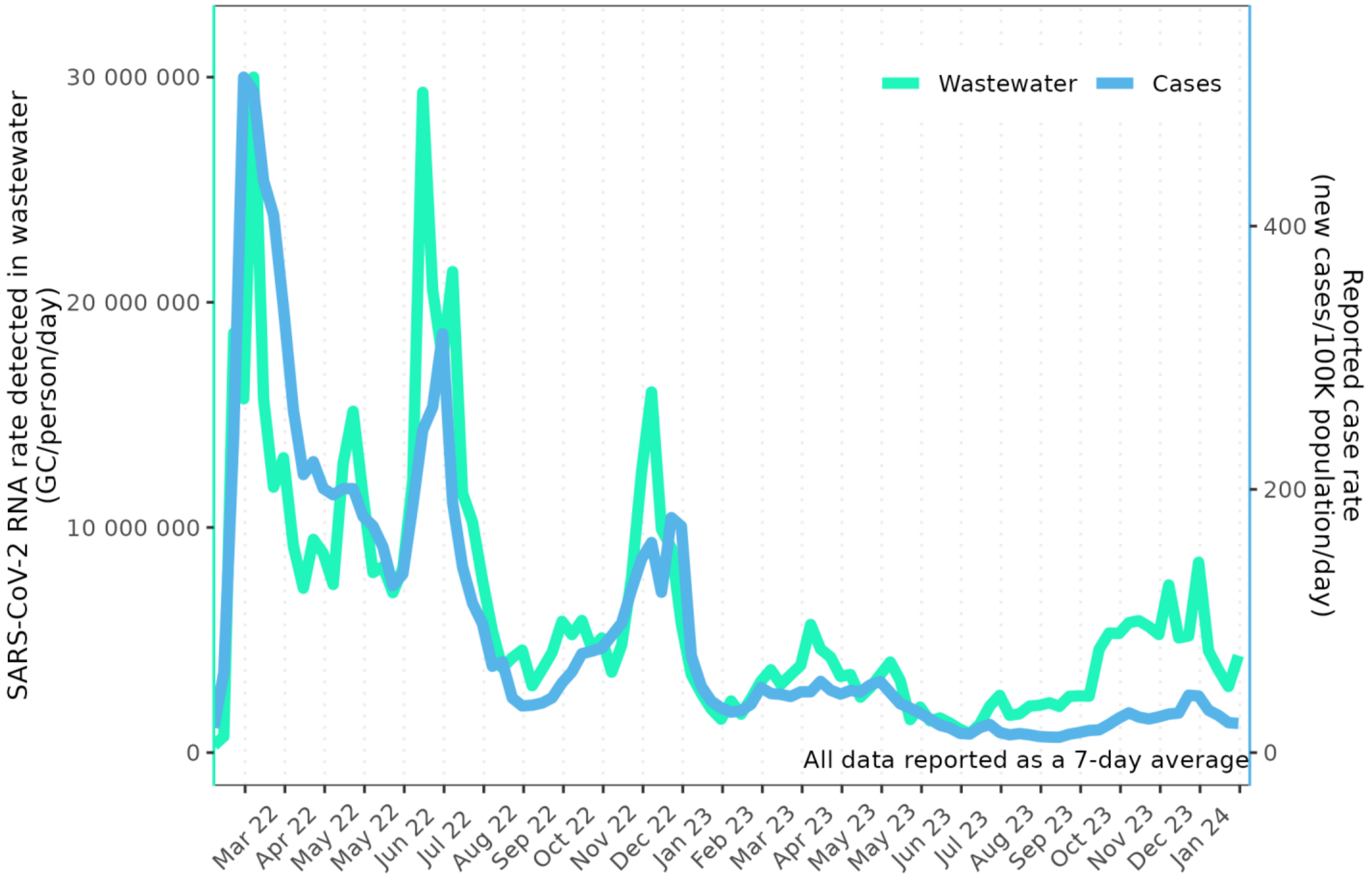
Appendix A. National Results

Time series plotted on linear scale

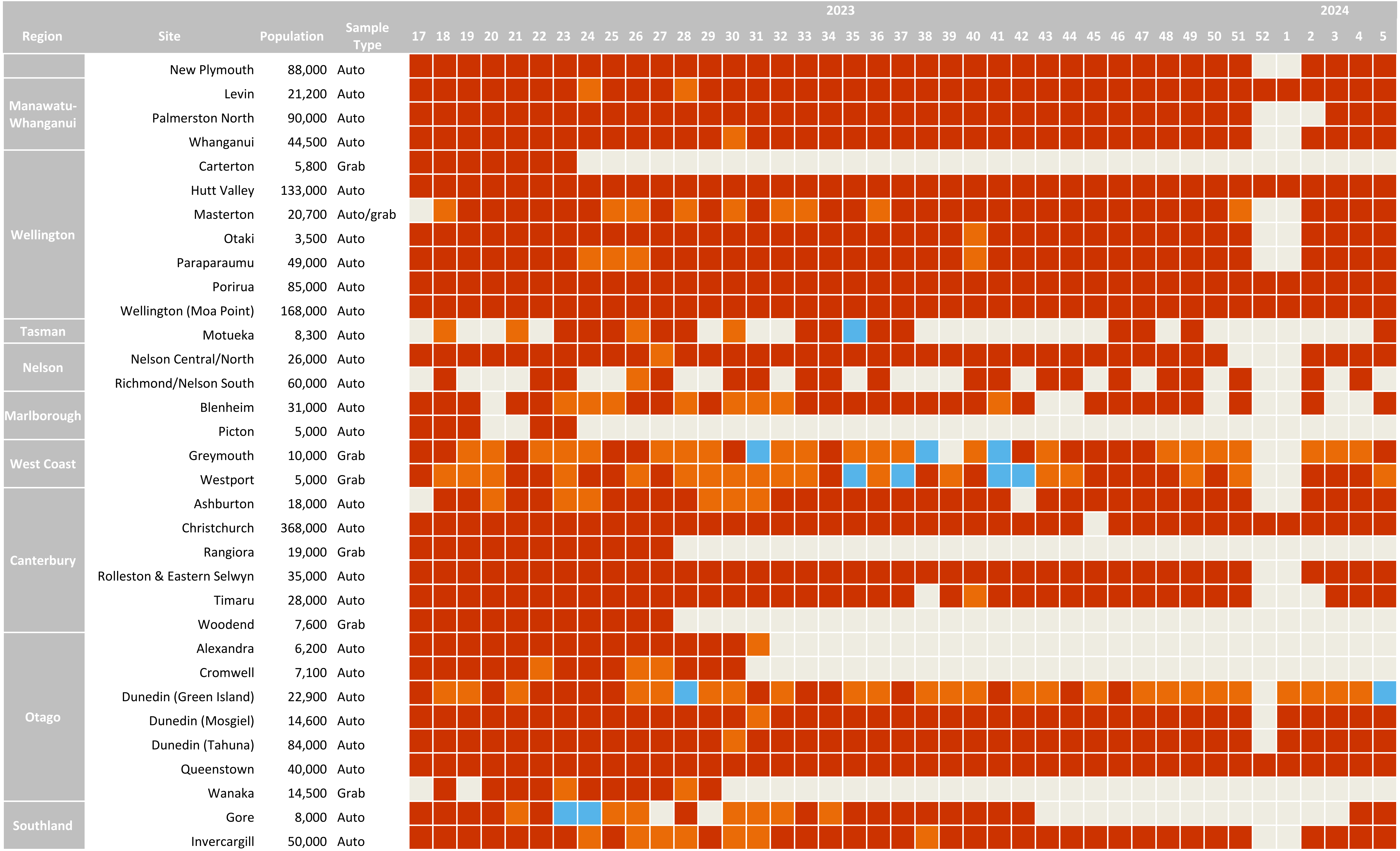


Appendix B. Site Results Weekly Summary

Table 2: Weekly Summary of Wastewater Sampling Results for SARS-CoV-2

Key: Detected 🟥 **Detected (not quantified)** 🟧 **Not detected** 🟦 **Not tested** ⬜

Region	Site	Population	Sample Type	2023																																				2024				
				17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	1	2	3	4	5
Northland	Dargaville	5,000	Grab	🟥	⬜	⬜	⬜	🟥	🟧	🟧	🟥	🟥	🟥	🟧	🟧	🟧	⬜	🟧	🟦	🟧	⬜	🟧	⬜	⬜	🟦	🟧	🟧	🟥	🟦	🟥	⬜	⬜	⬜	🟥	⬜	⬜	🟥	⬜	⬜	⬜	🟥	🟧	🟧	⬜
	Mangawhai	1,100	Grab	🟥	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟦	🟥	⬜	⬜	🟧	⬜	⬜	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	Maungaturoto	1,300	Grab	🟧	🟧	🟥	🟧	🟥	🟦	🟧	🟥	🟥	🟦	🟧	⬜	⬜	🟦	⬜	⬜	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	Whangarei	65,000	Auto	🟥	🟥	⬜	🟥	🟥	🟥	🟧	⬜	🟥	🟥	🟧	🟥	🟧	🟥	⬜	🟥	🟥	🟥	⬜	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	⬜	🟥	🟥	🟥	🟥
Auckland	Auckland East	680,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥
	Auckland Southwest	120,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥
	Auckland West	315,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥
	Beachlands	6,760	Grab	🟧	🟧	🟧	🟥	🟥	🟥	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	North Shore	240,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥
	Pukekohe	20,900	Auto	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	🟥	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥	🟥
	Warkworth	3,500	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
Waikato	Cambridge	20,100	Auto	🟥	🟧	🟥	🟥	⬜	🟥	🟥	🟥	🟥	⬜	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	Hamilton	169,000	Auto	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟧	🟥	🟥
	Taupo	23,000	Auto/grab	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥
	Te Awamutu	13,100	Auto	🟧	⬜	🟥	🟥	⬜	🟥	🟥	🟧	🟥	⬜	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	Whitianga	6,600	Auto	⬜	⬜	🟥	🟥	🟥	⬜	🟥	🟥	🟧	⬜	⬜	⬜	⬜	⬜	⬜	⬜	🟥	🟥	🟥	🟦	⬜	🟧	🟧	🟧	🟧	🟥	⬜	🟥	⬜	🟥	🟥	🟧	⬜	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜
Bay of Plenty	Katikati	5,500	Auto	🟥	🟥	🟥	⬜	🟥	⬜	🟥	⬜	⬜	⬜	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	Kawerau	7,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	🟥	🟥	🟥	🟥
	Mt Maunganui/Papamoa	65,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥
	Opotiki	3,800	Auto	🟥	🟥	🟧	🟥	🟥	🟧	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	Rotorua	59,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥
	Tauranga	50,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥
	Te Puke	9,700	Auto	⬜	⬜	⬜	⬜	⬜	🟥	🟥	🟥	⬜	⬜	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	Whakatāne	21,020	Auto	🟥	🟧	🟥	🟥	🟥	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥
Gisborne	Gisborne	37,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟧	🟧	🟥	🟥	🟥	🟧	⬜	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟧	⬜	🟥	🟥	🟥	⬜	🟧	⬜	🟥	🟥	⬜	⬜	⬜	⬜	🟥	🟥
Hawke's Bay	Hastings	80,000	Auto	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥
	Napier	55,000	Auto	⬜	⬜	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟥	🟥	🟥	🟥
Taranaki	Eltham	2,007	Auto	🟥	🟥	🟥	🟧	🟥	🟥	🟥	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜	⬜
	Hawera	12,000	Auto	🟥	🟥	🟥	🟧	🟧	🟥	🟧	🟥	🟥	🟧	🟥	⬜	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟧	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	⬜	⬜	🟧	🟥	🟥	🟥



Region	Site	Population	Sample Type
	New Plymouth	88,000	Auto
Manawatu-Whanganui	Levin	21,200	Auto
	Palmerston North	90,000	Auto
	Whanganui	44,500	Auto
Wellington	Carterton	5,800	Grab
	Hutt Valley	133,000	Auto
	Masterton	20,700	Auto/grab
	Otaki	3,500	Auto
	Paraparaumu	49,000	Auto
	Porirua	85,000	Auto
	Wellington (Moa Point)	168,000	Auto
Tasman	Motueka	8,300	Auto
Nelson	Nelson Central/North	26,000	Auto
	Richmond/Nelson South	60,000	Auto
Marlborough	Blenheim	31,000	Auto
	Picton	5,000	Auto
West Coast	Greymouth	10,000	Grab
	Westport	5,000	Grab
Canterbury	Ashburton	18,000	Auto
	Christchurch	368,000	Auto
	Rangiora	19,000	Grab
	Rolleston & Eastern Selwyn	35,000	Auto
	Timaru	28,000	Auto
	Woodend	7,600	Grab
Otago	Alexandra	6,200	Auto
	Cromwell	7,100	Auto
	Dunedin (Green Island)	22,900	Auto
	Dunedin (Mosgiel)	14,600	Auto
	Dunedin (Tahuna)	84,000	Auto
	Queenstown	40,000	Auto
	Wanaka	14,500	Grab
Southland	Gore	8,000	Auto
	Invercargill	50,000	Auto