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2022 ACUTE RESPIRATORY ILLNESS SURVEILLANCE REPORT

PREPARED FOR: Ministry of Health

CLIENT REPORT No: FW23023

PREPARED BY: Health Intelligence and Surveillance Team, Health Group
Institute of Environmental Science and Research Limited

PUBLISHED: 24 July 2023

This report is available at https://www.esr.cri.nz/our-research/nga-kete/infectious-disease-intelligence/influenza-and-respiratory-surveillance/

First published: July 2023

Suggested citation:

The Institute of Environmental Science and Research Ltd.

2022 Acute Respiratory Illness Surveillance Report

Porirua, New Zealand

Client Report FW23023

ACKNOWLEDGEMENTS

This report was prepared by Andrew Anglemyer, Anna Mooney, Hannah Cooper, Giles Graham, Andrea McNeill and Sarah Jefferies from the Health Intelligence and Surveillance Team at ESR. Virology data were provided by the WHO National Virology Centre at ESR. Maritza Marull formatted the report.

We would like to thank the staff and participants from the sentinel general practices and hospitals who contribute data for acute respiratory illness surveillance. We also acknowledge the New Zealand Ministry of Health as funders of acute respiratory illness surveillance in New Zealand.

Disclaimer

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EXECUTIVE SUMMARY

This report provides an overview of priority viral respiratory illnesses in New Zealand in 2022, including those causing influenza, respiratory syncytial virus (RSV) illness and COVID-19. Please note, most viral respiratory illnesses are not legally notifiable diseases in New Zealand. COVID-19 is a notifiable disease. Further information about surveillance of viral respiratory illnesses in New Zealand can be found here: https://www.esr.cri.nz/our-research/nga-kete/infectious-disease-intelligence/influenza-and-respiratory-surveillance/about-our-influenza-and-other-acute-respiratory-illness-surveillance-systems/

- The COVID-19 pandemic had significant impacts on respiratory virus disease dynamics and acute respiratory illness (ARI) surveillance systems in 2022. These factors should be taken into consideration when interpreting these data and making comparisons to pre-pandemic years.
- Influenza-like illness (ILI) indicators generally showed two distinct high peaks in illness during 2022, corresponding with surges in COVID-19 with the arrival of the omicron variant in summer and the return of influenza in winter, followed by a low to moderate level of various viral illnesses in the later third of the year.
- Virological sampling in the community showed influenza A(H3N2) was the dominant virus between May and July, followed by a combination of non-influenza viruses for the remainder of 2022.
- Hospital-based surveillance in the Auckland region showed that severe acute respiratory infection (SARI) was moderate in 2022, with three waves of illness over the year. Those under 5 years and over 65 years of age had the highest rates of SARI hospitalisation. Māori and Pacific peoples were hospitalised for SARI at greater rates than people of other ethnicities.
- The virology of hospital-based SARI showed three distinct waves, with an initial wave due to COVID-19 in February and March, an influenza-driven peak in June, followed by a prolonged wave in the latter third of 2022 driven by multiple non-influenza viruses. The predominant virus detected by SARI surveillance differed by age group. Among those under 5 years, rhinovirus, RSV and human metapneumovirus were common. Influenza was common among all other age groups, and the proportion of SARI cases with SARS-CoV-2 detected increased with increasing age.
- Influenza-associated SARI hospitalisations in the Auckland area were very high in 2022, peaking in June at a rate roughly two times higher than observed in 2018 and 2019. Influenza A(H3N2) tends to affect older people more severely and the June peak is particularly seen in these populations (Figure 17). This indicates influenza spread rapidly with a high acute impact, perhaps due to reduced baseline immunity following the absent circulation of these viruses in previous years. However, the cumulative incidence of influenza across the season was lower in 2022 than 2019. Relative to pre-pandemic years, the seriousness of influenza illness (measured by the ratio of influenza-associated ICU SARI admissions to influenza-associated SARI hospitalisations) was low in 2022.
- Among 319 influenza-positive specimens from SARI patients in 2022, 318 were influenza A (99.7%). Of the influenza A-positive specimens, 139 were subtyped further (43.7%), of which 137 were A(H3N2) (98.6%) and two were A(H1N1)pdm09 (1.4%).

NATIONAL ACUTE RESPIRATORY ILLNESS SURVEILLANCE OBJECTIVES

The overarching goal of ARI surveillance is to minimise the impact and health inequities of these illnesses by providing useful information to public health authorities and communities so they may better plan appropriate health promotion, disease protection and control measures.

The specific objectives of acute respiratory illness surveillance are to:

1. Actively monitor and better understand the patterns of activity (e.g. seasonality, severity) of influenza, SARS-CoV-2 and other respiratory viruses;
2. Describe the burden of ILI- and SARI-associated influenza, SARS-CoV-2 and other respiratory viruses in New Zealand, including among priority populations;
3. Describe characteristics of locally circulating influenza, SARS-CoV-2 and other respiratory viruses;
4. Inform influenza and COVID-19 vaccination policy and treatment decisions to reduce the burden of disease and support equity of outcomes;
5. Facilitate decision-making for pandemic influenza risk management nationally and globally.

NATIONAL ACUTE RESPIRATORY ILLNESS SURVEILLANCE SYSTEMS

ARI surveillance systems collect information that together builds a picture of the burden of disease from influenza and other acute respiratory illnesses in New Zealand and allows us to assess how well important public health protective measures, such as vaccination, are working. These surveillance systems operate in the community, primary care, hospitals and laboratories to capture disease presentations at different levels of severity and are detailed below:

1. **HealthStat sentinel general practice (GP) surveillance of influenza-like illness (ILI) consultations** – This system monitors the number and characteristics of people who have presented to their GP with ILI in the past week. ILI is defined by the World Health Organization (WHO) as an acute respiratory infection with a history of fever or measured fever of ≥38°C, and cough. Consultation information is extracted from around 300 participating GP clinics nationally. More information on HealthStat is available here.
2. **HealthLine** – This system monitors the number and characteristics of people calling Healthline (the free, national, 24-hour telephone health service) for ARI advice each week. Calls are triaged using electronic clinical decision support software. Those coded as cold/flu, cough, croup, fever, general aches, headache and/or sore throat are counted as ILI. Non-symptomatic calls (30% of HealthLine calls) are excluded.
3. **FluTracking** – This system relies on voluntary participation by the public to self-report illness online. It was launched in New Zealand in 2018 and is used to monitor community-level ILI trends. In 2022, there were over 64,700 people who completed at least one FluTracking survey and an average of 37,200 responses were received per week. Participants are given the option to opt-out outside of the influenza season (October to April), accordingly sample size will be smaller at this time. Those who record experiencing a fever and cough are counted as ILI. More information on FluTracking is available here.
4. **Sentinel GP virological surveillance** – ESR works with a network of 50-100 sentinel GP clinics around the country who take a respiratory swab from a subset of patients presenting to their clinic each week with ILI. These patients are tested for a range of respiratory viruses at the ESR laboratory. This system provides information on the different viruses that are circulating and causing illness in the community.
5. **Sentinel hospital surveillance** – This system monitors patients admitted to hospital overnight who meet the WHO case definition of SARI in the four hospitals of the Auckland and Counties Manukau districts. The case definition is an ARI with a history of fever or measured fever of ≥38°C, and cough, and onset within the past 10 days, and requiring inpatient hospitalisation. Research nurses collect information on SARI patients in general wards and intensive care units (ICUs). Nasopharyngeal swabs are offered to patients if not already taken as part of clinical care and are tested for influenza and other respiratory viruses. Which viruses are tested for varies and is dependent on several factors, including clinical decision making, laboratory capacity and patient characteristics. The system operates from April to October in general wards and year-round in ICUs, though has been extended year-round since 2020.
6. **COVID-19 notifiable disease reporting** – COVID-19 is a notifiable disease and reported through EpiSurv, New Zealand's notifiable disease reporting system. Since 25 February 2022, most testing has been through self-administered rapid antigen test (RAT) which require self-reporting of results. Therefore, it is likely that many infections are not detected or reported, and the case ascertainment may differ by age, ethnicity, deprivation, or other demographic factors. The case ascertainment has declined from peak ascertainment in March.[1]

IMPACT OF COVID-19 PANDEMIC ON SURVEILLANCE SYSTEMS

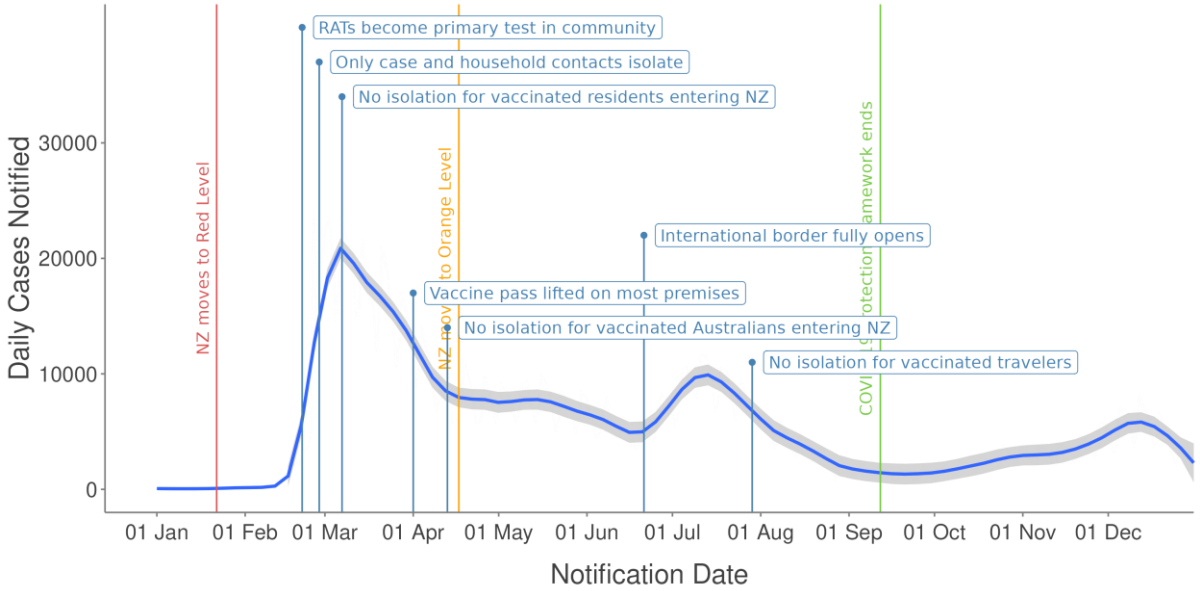
The COVID-19 pandemic has had significant impacts on ARI surveillance systems. These impacts should be taken into consideration when interpreting these data and making comparisons to pre-pandemic years. Over the course of 2022, numerous public health measures and policies were introduced and relaxed, which had implications for disease dynamics and detection in various ways (Figure 1). For example, COVID-19 case isolation rules reduced from 14 to 10 days, then to seven days, and from September 2022 quarantine of close contacts ceased. The international border slowly opened, and, by late July 2022, the border was fully re-opened to all visitors.

The management of respiratory patients by many GPs has changed substantially over the past three years, likely impacting sentinel GP virological surveillance and HealthStat sentinel GP surveillance of ILI consultations. Practices have reported seeing fewer patients with respiratory illness symptoms face-to-face, meaning the volume of patients with ILI in the community who attend GP consultations is likely lower than pre-pandemic years. In addition, patients may be required to test negative for COVID-19 via RAT before entering the practice. As such, the proportion of patients with ILI who test positive for COVID-19 as part of the sentinel virologic surveillance program may be lower than the true proportion among all consultation-seeking patients with ILI. Additionally, due to increased demand on primary care during the pandemic, the number of GPs participating in sentinel surveillance and the number of swabs submitted was lower in 2022 than in pre-pandemic years.

Use of HealthLine, the free, national, 24-hour telephone health service, has increased substantially during the pandemic, in part due to increased emphasis on and awareness of telehealth services. In addition, public awareness of circulating respiratory illness and public health measures may have impacted call volumes across pandemic years.

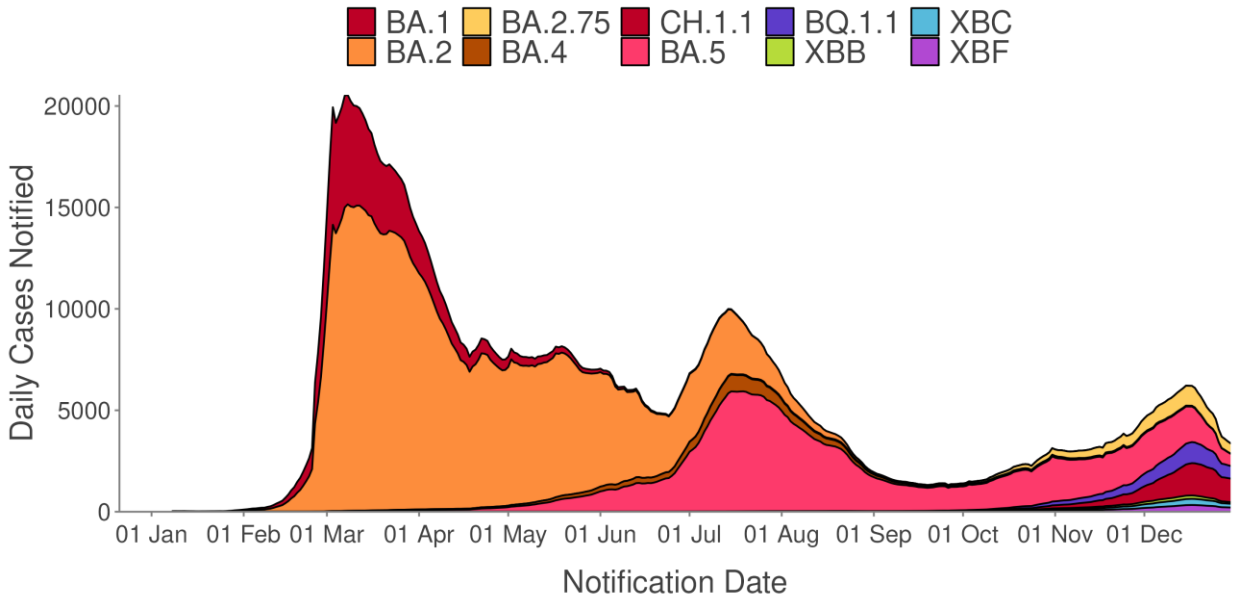
In addition, 2022 was the first year since the COVID-19 pandemic began in which SARS-CoV-2 was circulating in the community alongside influenza and other seasonal respiratory viruses. The incidence of COVID-19 peaked in early 2022, with a second significant wave observed in July/August, (Figure 2) likely further affecting respiratory virus surveillance systems that would normally be primarily identifying seasonal winter virus activity at that time.

Figure 1: Smoothed daily number of COVID-19 cases with key pandemic public health measures



Source: EpiSurv as at 13 February 2023. Detail on the COVID Protection Framework levels can be found on the Unite Against COVID-19 website. Smoothing by local polynomial regression fitting (+ 95% confidence interval in grey).

Figure 2: Daily rolling average number of COVID-19 cases by Omicron variant



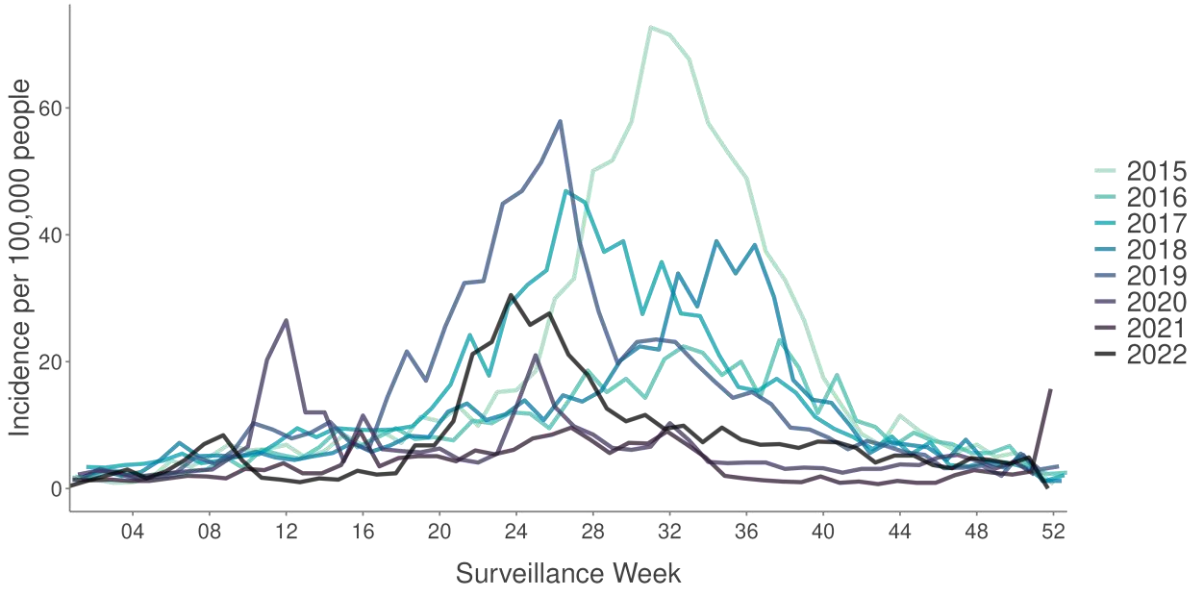
Source: EpiSurv, ESR Sequencing Laboratory as at 01 January 2023. 7 day rolling average.

COMMUNITY-BASED SURVEILLANCE

HealthStat GP ILI-related consultations

A small peak in HealthStat ILI-related GP consultation rates was observed in early March 2022, corresponding to the first wave of COVID-19 Omicron infections (Figure 3). From the beginning of May, consultation rates rapidly increased and peaked at a moderate level in mid-June corresponding with the peak in community influenza activity (A(H3N2) virus predominant). The 2022 peak rate was below the average peak rates observed in pre-pandemic years.

Figure 3: Weekly HealthStat GP ILI consultation rates

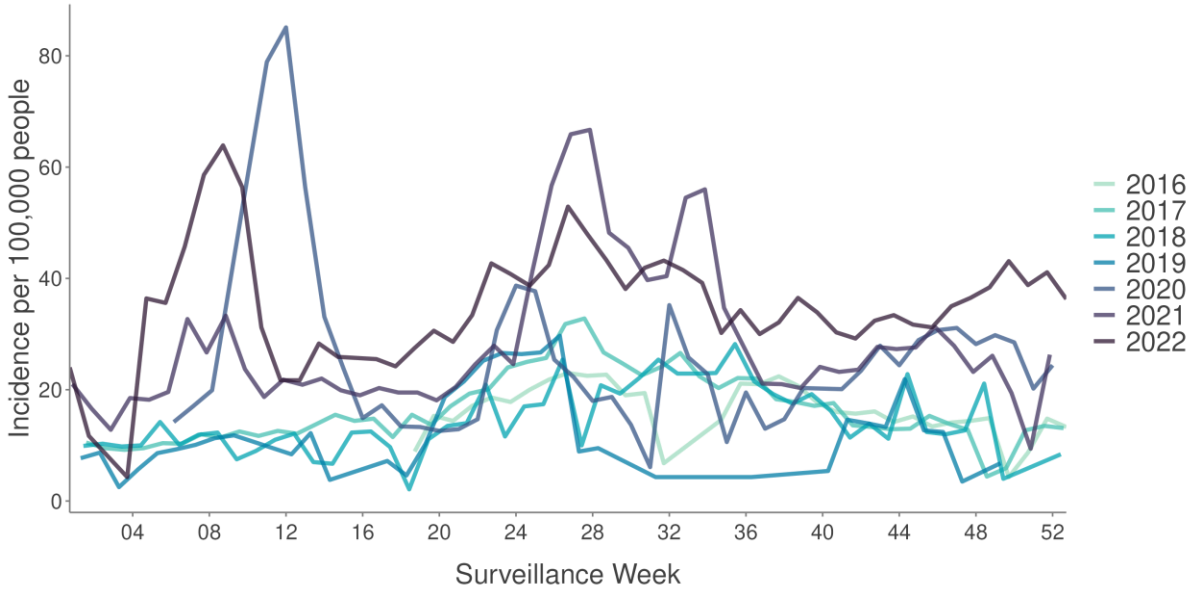


Source: HealthStat as at 12 May 2023.

HealthLine ILI-related calls

ILI-related call rates to HealthLine spiked in early March 2022, corresponding with the first wave of COVID-19 Omicron infections (Figure 4). Following a decline, rates increased slowly to a peak in early July and remained relatively elevated for the rest of 2022. ILI-related call rates were markedly higher throughout 2022 than in pre-pandemic years, likely reflecting both prolonged elevated ILI activity in the community and an increased awareness and use of telehealth services during the pandemic (see Impact of COVID-19 pandemic on surveillance systems). Moreover, in contrast to the standard WHO definition of ILI used in most national surveillance systems, the presence of fever is not required for categorisation as an ILI-related call in HealthLine. HealthLine may therefore be more likely to capture broader and less severe presentations of ARI, particularly when COVID-19 became most widespread in the community for the first time during the pandemic and people sought advice. The impact of reporting bias through this system is also illustrated by the occurrence of the highest level of call volumes in March 2020 in the lead up to the first lockdown, despite the true COVID-19 disease incidence markedly surpassing this in March 2022.

Figure 4: Weekly HealthLine ILI call rates

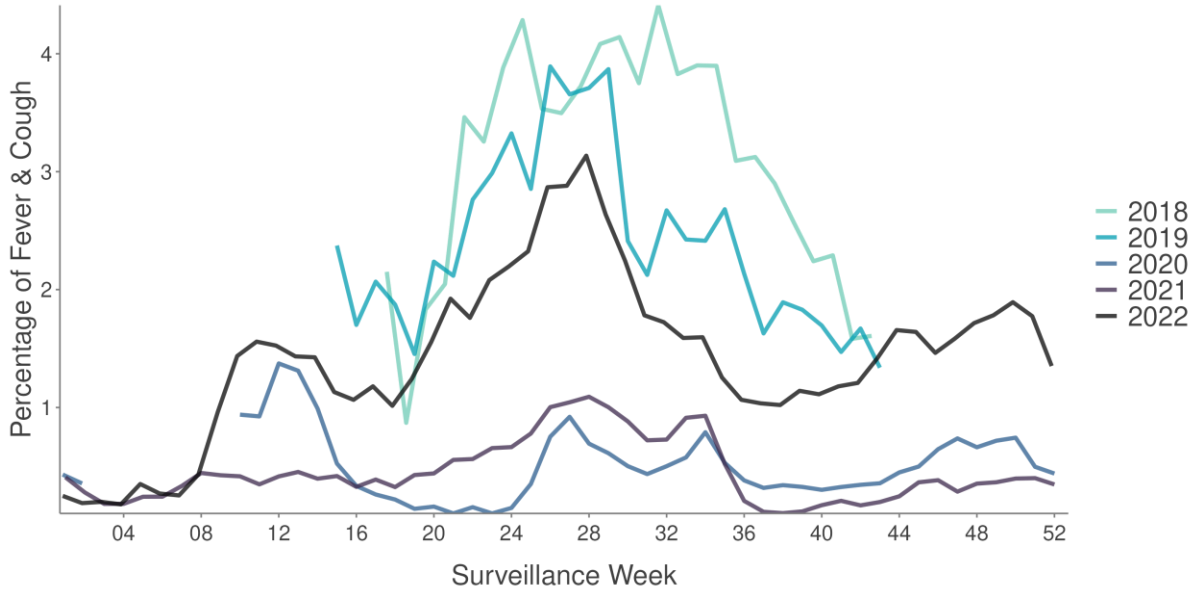


Source: HealthLine as at 12 May 2023.

FluTracking

Rates of fever and cough reported by FluTracking participants increased in March 2022, corresponding to the first wave of COVID-19 Omicron infections (Figure 5). Rates then increased throughout the winter months, peaking in mid-July, but remaining lower than rates in pre-panedmic years. The rates decreased from July but remained moderately elevated for the remainder of 2022.

Figure 5: Weekly FluTracking ILI



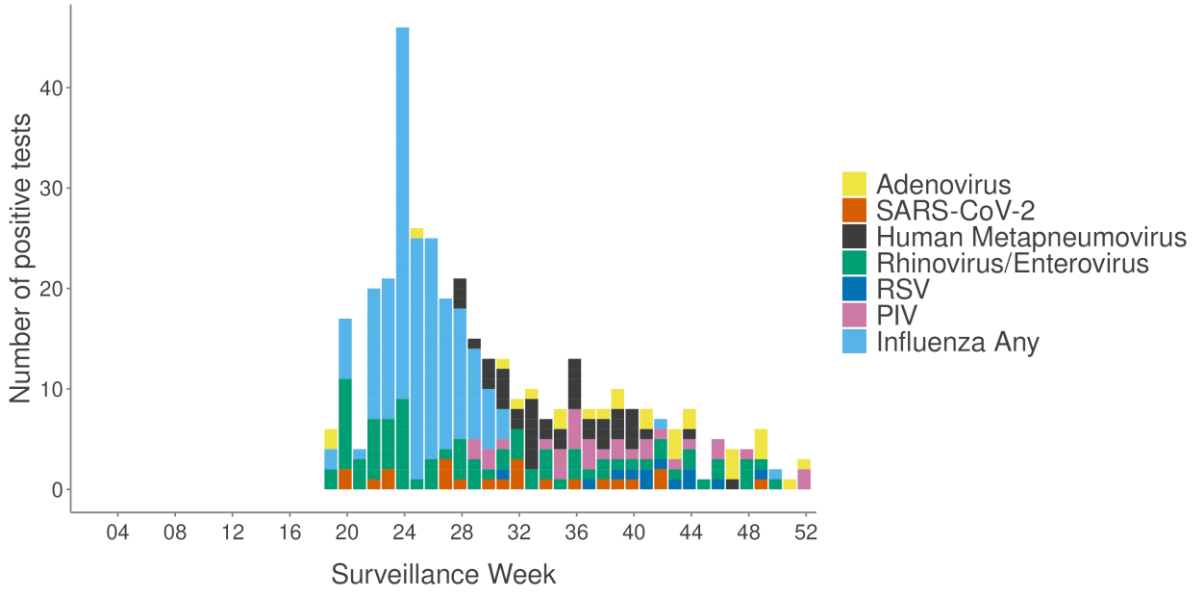
Source: FluTracking as at 09 February 2023.

Community-based virologic surveillance

Virological surveillance at sentinel GPs commenced at the beginning of May 2022 and was extended through the summer 2022/23*. Influenza detections (Figure 6) and influenza test positivity (Figure 7) in patients with ILI increased rapidly from mid-May, peaking at the beginning of June, with only sporadic influenza cases detected from the end of July. Influenza A(H3N2) was the predominant subtype throughout the season. Very few Influenza B detections occurred in 2022. Rhinovirus/enterovirus was detected throughout the season, with the greatest volume of detections in May. RSV, adenovirus and parainfluenza viruses (PIV) were sporadically detected in ILI patients throughout the season. Human metapneumovirus was the most common virus detected throughout August and September. SARS-CoV-2 was detected in small numbers throughout the season; these detections did not correspond to the peaks in COVID-19 case notifications (Figure 6).

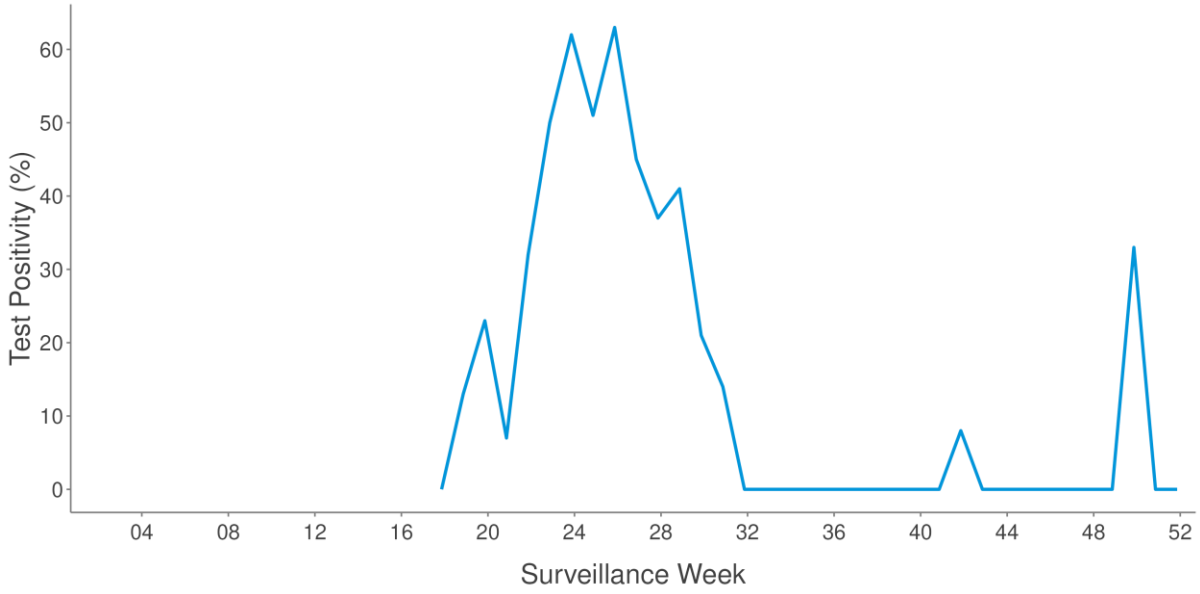
* This was due to the uncertain seasonality of COVID-19 variants circulating in New Zealand and potential risk of resurgence of other viruses as a result of there being open borders in New Zealand during a Northern Hemisphere winter season for the first time in two years.

Figure 6: Weekly viruses detected through sentinel GP sampling



Source: STARLIMS as at 07 February 2023, HealthLink as at 16 February 2023.

Figure 7: Weekly influenza test positivity at sentinel GP sites

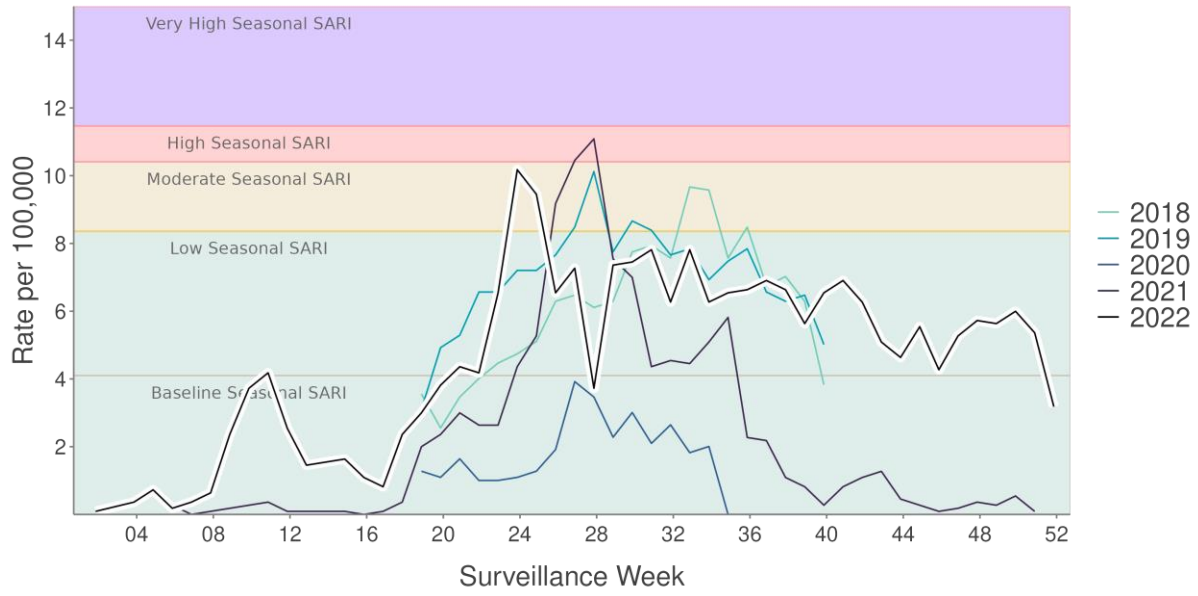


Source: STARLIMS as at 07 February 2023, HealthLink as at 16 February 2023. Note, unexpected spike in December was due to a low total number of swabs.

HOSPITAL-BASED SARI SURVEILLANCE

Auckland regional hospital SARI rates in 2022 increased in late February to just below the seasonal threshold, primarily due to COVID-19 cases (Figure 8). SARI rates then decreased before increasing rapidly in mid-May and peaking in late May, earlier than in any of the previous 5 years. The 2022 SARI season reached a peak of moderate activity at the end of May, driven mostly by the first influenza season in New Zealand since 2019. SARI activity remained elevated for the remainder of the year, although the degree to which SARI activity was elevated relative to pre-pandemic years is unknown, as SARI surveillance on Auckland hospital respiratory wards typically ended by October in pre-pandemic years.

Figure 8: Weekly hospitalisation rate with SARI (any cause)

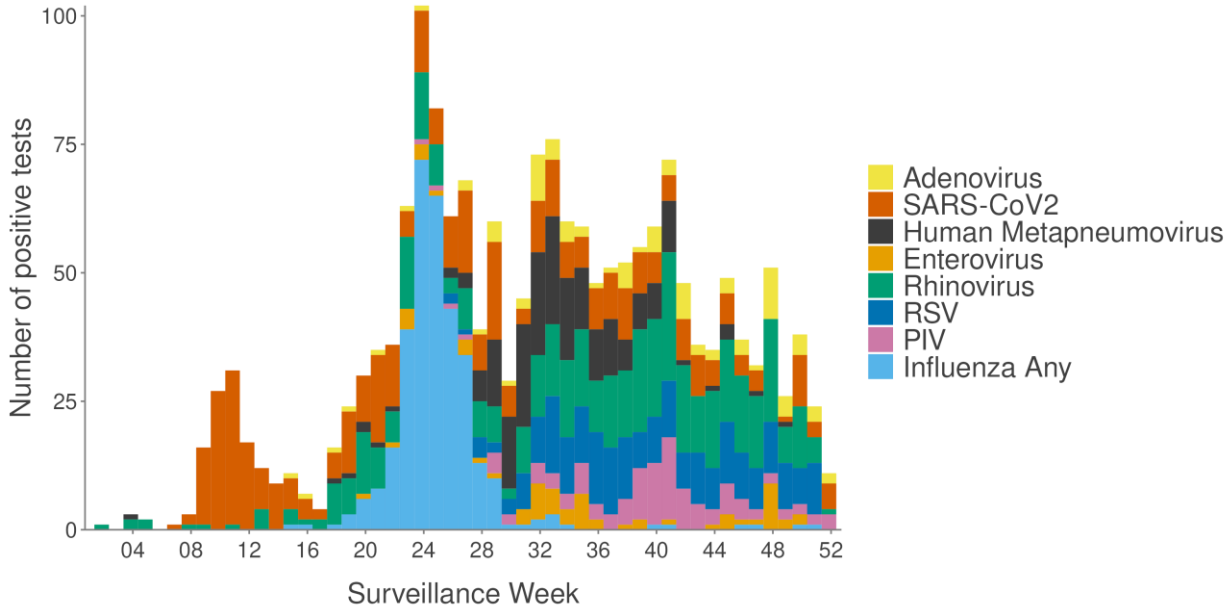


Source: Redcap SARI Surveillance Lite Project as at 16 February 2023.

SARI virology

SARI rates in 2022 followed a tri-modal distribution (Figure 9). With the arrival of the Omicron variant in New Zealand, SARS-CoV-2 was almost exclusively responsible for the first peak in SARI cases in February and March 2022. The second wave peaking in June was driven primarily by influenza. The third wave was prolonged and driven by multiple viruses including human metapneumovirus, RSV, PIV and rhinovirus.

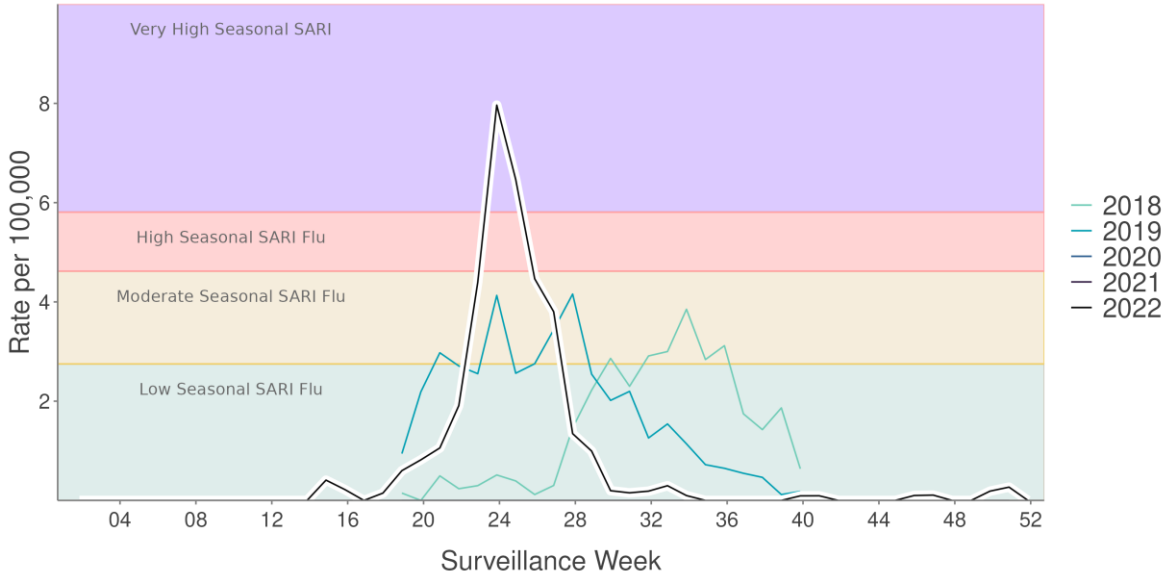
Figure 9: Weekly viruses detected through sentinel hospital SARI sampling



Source: Auckland and Middlemore Hospital virology as at 14 February 2023.

Rates of influenza-positive SARI reached the highest levels observed since SARI surveillance commenced in 2012, peaking in June at approximately 8 cases per 100,000 and reaching the very high seasonal influenza-positive SARI threshold. This rate was nearly two times higher than that seen in 2018 and 2019 (Figure 10). This indicates influenza spread rapidly with a high acute impact, perhaps due to reduced baseline immunity following the absence of circulation of these viruses in previous years. Influenza-positive SARI rates then rapidly decreased and by mid-July the rate had fallen below one case per 100,000.

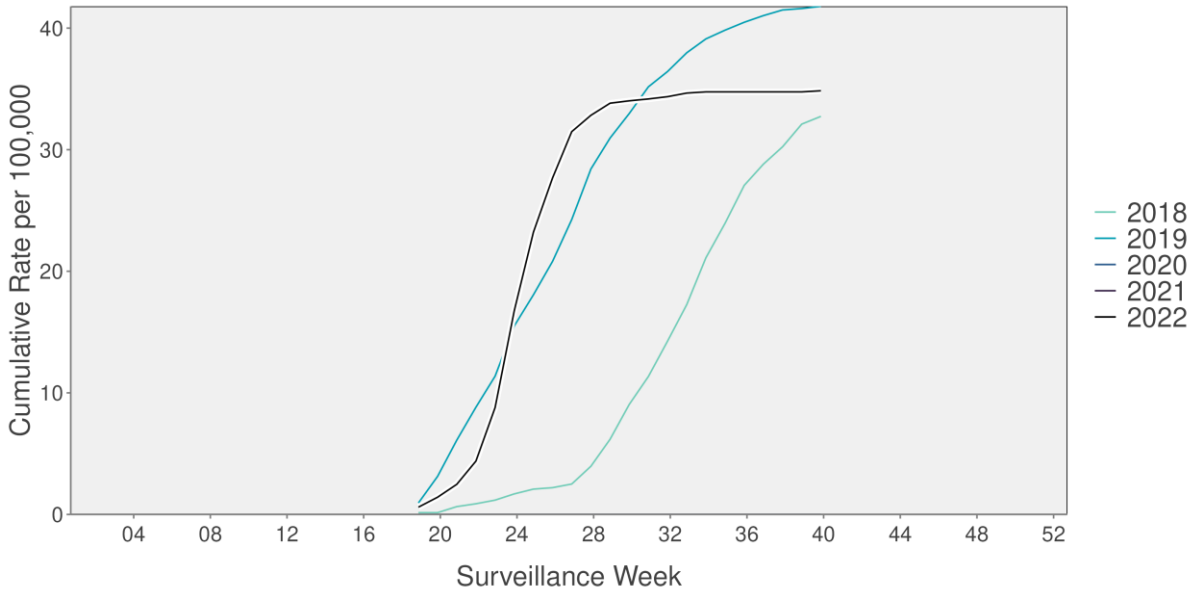
Figure 10: Weekly influenza-positive SARI hospitalisation rates



Sources: Auckland and Middlemore Hospital virology as at 14 February 2023. *Note: There were no influenza-positive SARI hospitalisations in 2020 and 2021.*

Despite the very high peak in influenza-positive SARI hospitalisations in 2022, cumulative incidence of influenza-positive SARI across the influenza season (May to October) was between 2018 and 2019 levels (Figure 11), which were considered moderately severe seasons.

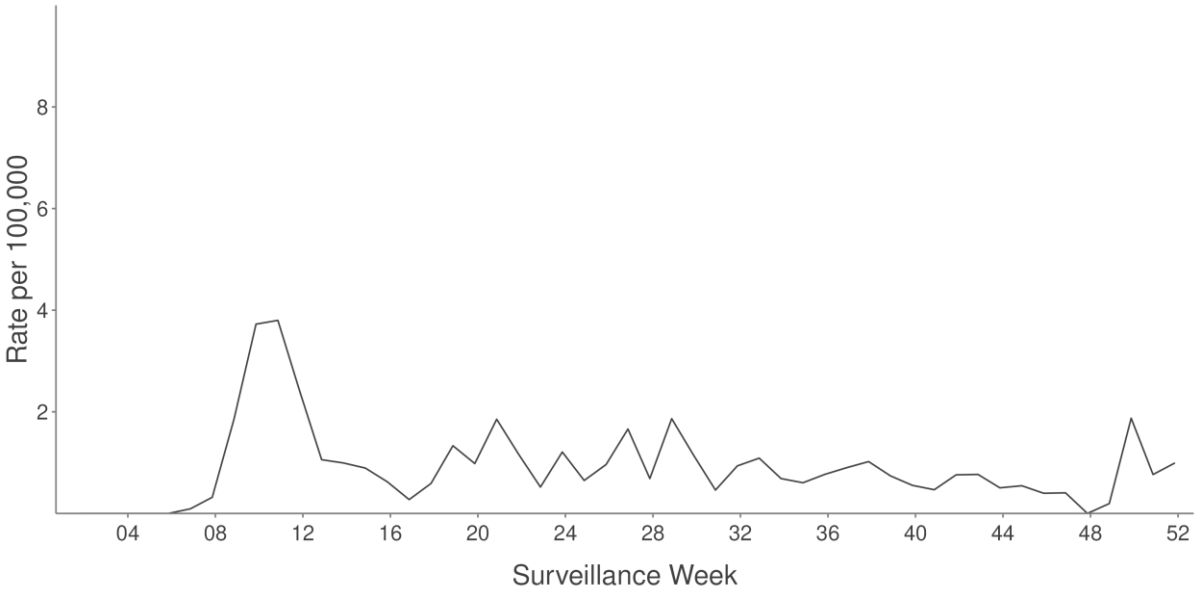
Figure 11: Cumulative rate of influenza-positive SARI hospitalisations



Sources: Auckland and Middlemore Hospital virology as at 14 February 2023. Redcap SARI Surveillance Lite Project as at 16 February 2023. *Note: There were no influenza-positive SARI hospitalisations in 2020 and 2021.*

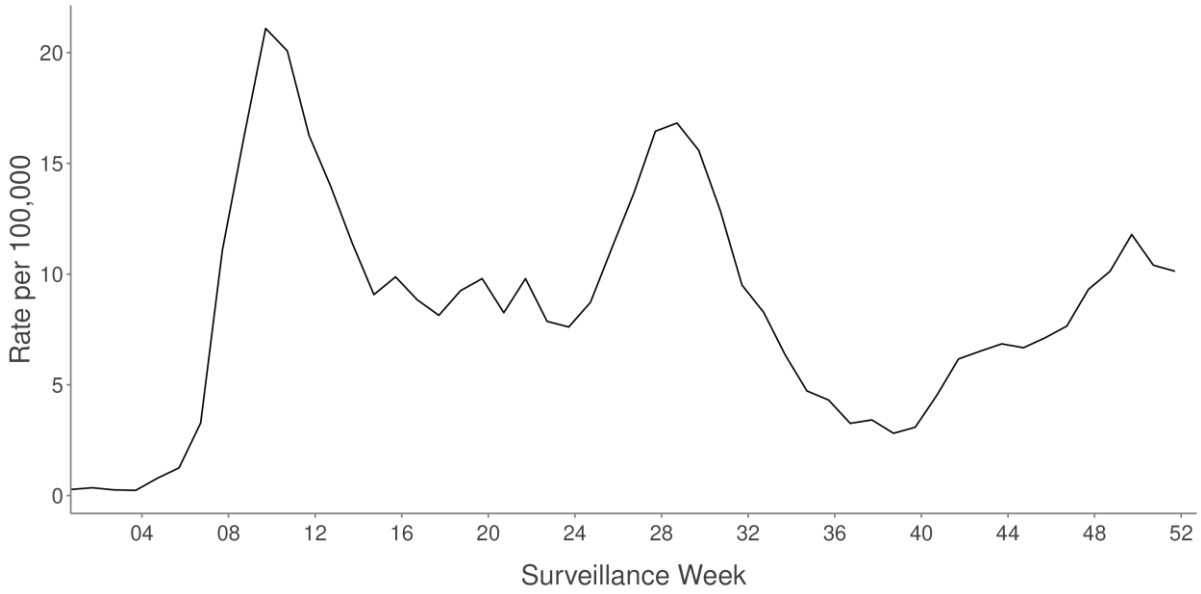
Around surveillance week 9 (late February), the rate of SARS-CoV-2-positive SARI hospitalisations increased to the highest level observed since COVID-19 became widespread in the community (Figure 12). After surveillance week 12 (late March), the rate decreased and remained below two cases per 100,000 for the rest of the year. For comparison, the national weekly COVID-19 hospitalisation rate is shown in Figure 14. This includes all hospitalisations due to COVID-19, including both those meeting the SARI case definition and those not meeting the SARI case definition. National COVID-19 hospitalisations also peaked in March (surveillance weeks 8-12), then remained at moderate levels from April to June before a second peak in July-August (weeks 26–32) (Figure 13). Rates then remained low until a final lower peak in December. There was no corresponding mid-winter peak in the SARS-CoV-2-positive SARI hospitalisation rate which may reflect differences in COVID-19 hospitalisation rates for the Auckland region compared with national rates as well as differences in disease presentation (less febrile illness) for the COVID-19 variant circulating at that time.

Figure 12: Weekly SARS-CoV-2-positive SARI hospitalisation rates in 2022



Sources: Auckland and Middlemore Hospital virology as at 14 February 2023. Redcap SARI Surveillance Lite Project as at 16 February 2023.

Figure 13: Weekly hospital admissions for COVID-19-related illness in 2022

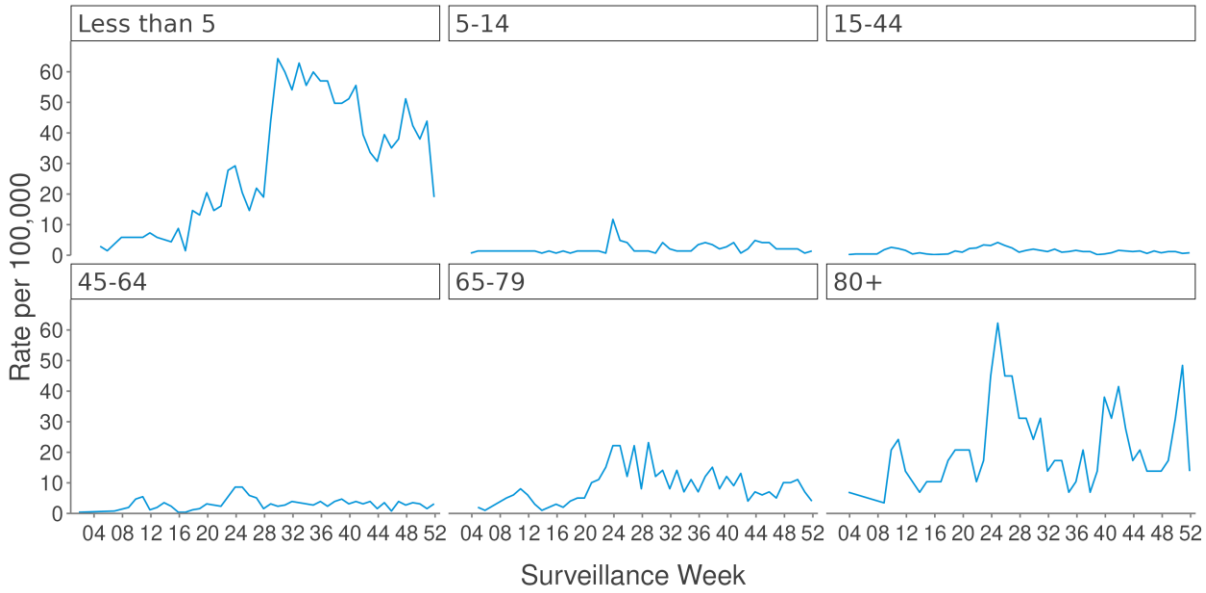


Source: Ministry of Health as at 18 April 2023

SARI cases by age

The highest rates of SARI in the first half of the year were observed in adults aged 80+, with a wave in early March primarily due to COVID-19 and the annual peak (approximately 60 per 100,000) occurring in June due to influenza and remaining elevated for the remainder of the year (Figure 14). Children under 5 years of age experienced high SARI rates beginning in July and remained elevated through the end of the year, driven mostly by non-influenza non-SARS-CoV-2 viruses.

Figure 14: Weekly hospitalisation rate with SARI (any cause) by age

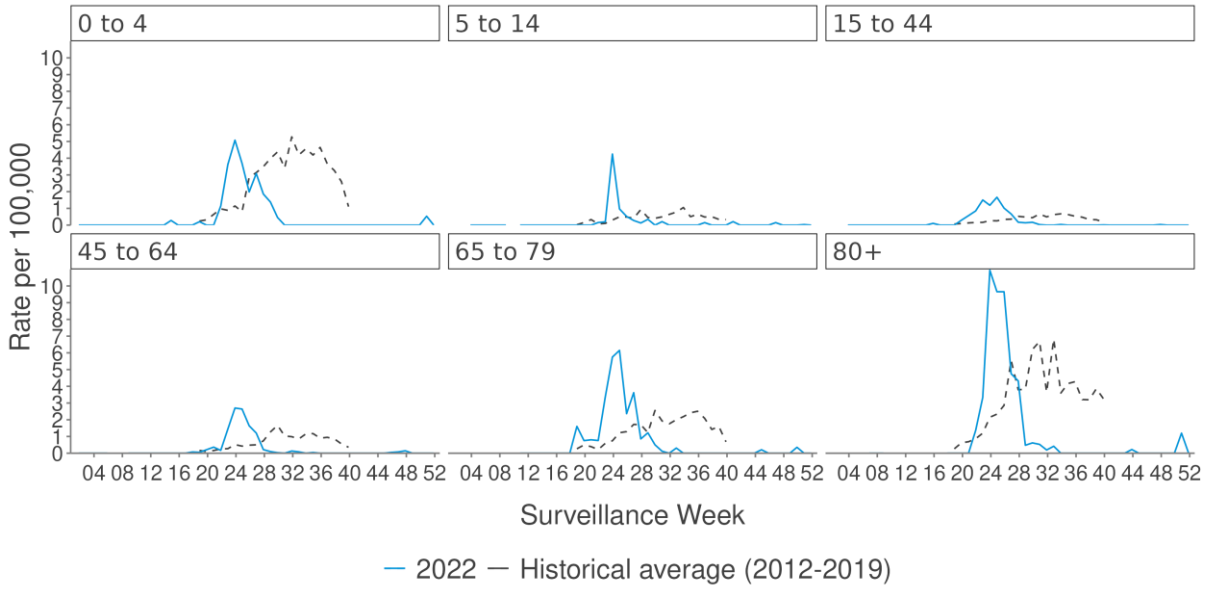


Source: Redcap SARI Surveillance Lite Project as at 16 February 2023.

In 2022, the most commonly detected viruses in SARI patients under 5 years old were rhinovirus, RSV, and human metapneumovirus. In SARI patients aged 5–14 years old, roughly half tested positive for influenza, followed by a large proportion with rhinovirus. Among SARI patients aged 15–49 and 50–64 years old, roughly 60% of cases tested positive for influenza, while about 30% of cases tested positive for SARS-CoV-2. As the age increased among SARI patients, the proportion of patients testing positive for SARS-CoV-2 also increased, with roughly 60% of SARI patients 80 years or older testing positive for SARS-CoV-2, while the majority of other positive tests in these patients were for influenza. This is expected as both SARS-CoV-2 and influenza A(H3N2) viruses tend to more severely affect older age groups.

The peak rate of influenza-positive SARI patients was greatest in those aged over 65 years, followed by children aged under 14 years (Figure 15).

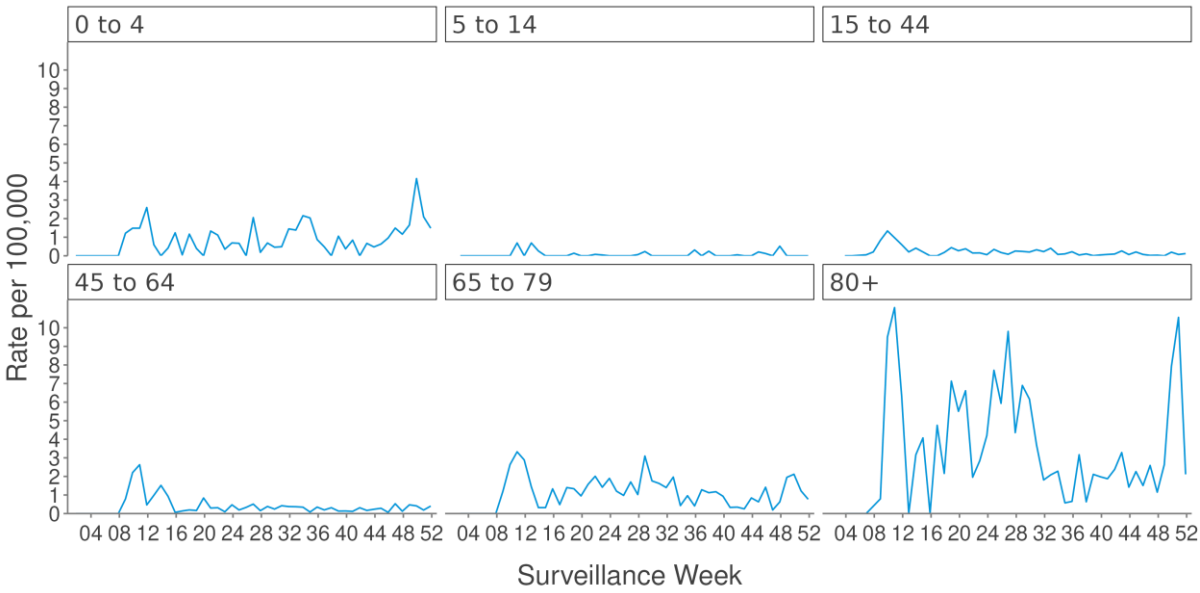
Figure 15: Weekly influenza-positive SARI hospitalisation rates by age



Sources: Auckland and Middlemore Hospital virology as at 14 February 2023, Redcap SARI Surveillance Lite Project as at 16 February 2023.

The highest rates of SARS-CoV-2-positive SARI throughout the year were observed among those aged over 65 years, followed by those aged under 4 years (Figure 16). SARS-CoV-2-positive SARI rates among children aged 5 to 14 years and those aged between 15 and 44 years were the lowest throughout the year.

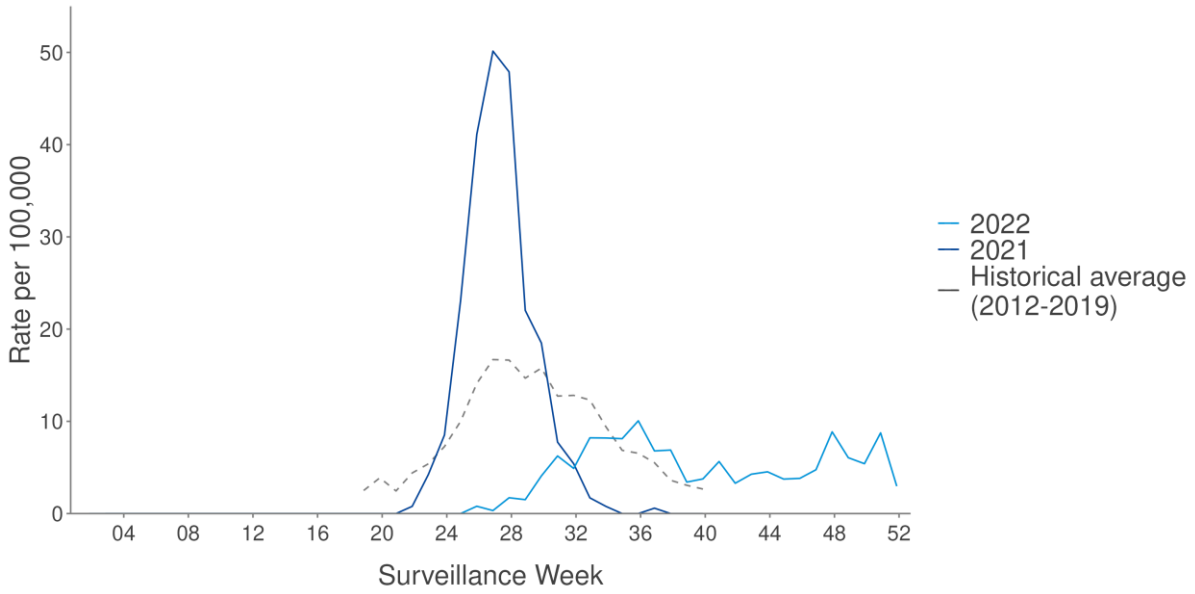
Figure 16: Weekly SARS-CoV-2-positive SARI hospitalisation rates by age



Source: Auckland and Middlemore Hospital virology as at 14 February 2023. Redcap SARI Surveillance Lite Project as at 16 February 2023.

The distribution of SARI patients aged 0–4 years presenting with RSV was unusual in 2022 compared to prior years (Figure 17). In 2021, a particularly severe RSV season saw a very high peak of young children presenting with RSV between June and August, after which very little RSV was detected in this age group. The historical average shows a more moderate peak of RSV during the winter months, largely ending by October. In 2022, RSV began being detected in SARI patients aged 0–4 years in July, later than in prior years, and continued at a sustained moderate level for the remainder of 2022. This may reflect a reduced pool of susceptible individuals following last year's large outbreak delaying the start of the season, or viral interference from SARS-CoV-2 and influenza which were widely circulating during June-August when RSV typically peaks. Other countries have also noted a disruption of typical seasonal patterns in RSV caused by the COVID-19 pandemic.[2, 3]

Figure 17: Weekly RSV-positive SARI hospitalisation rates for those aged 0–4

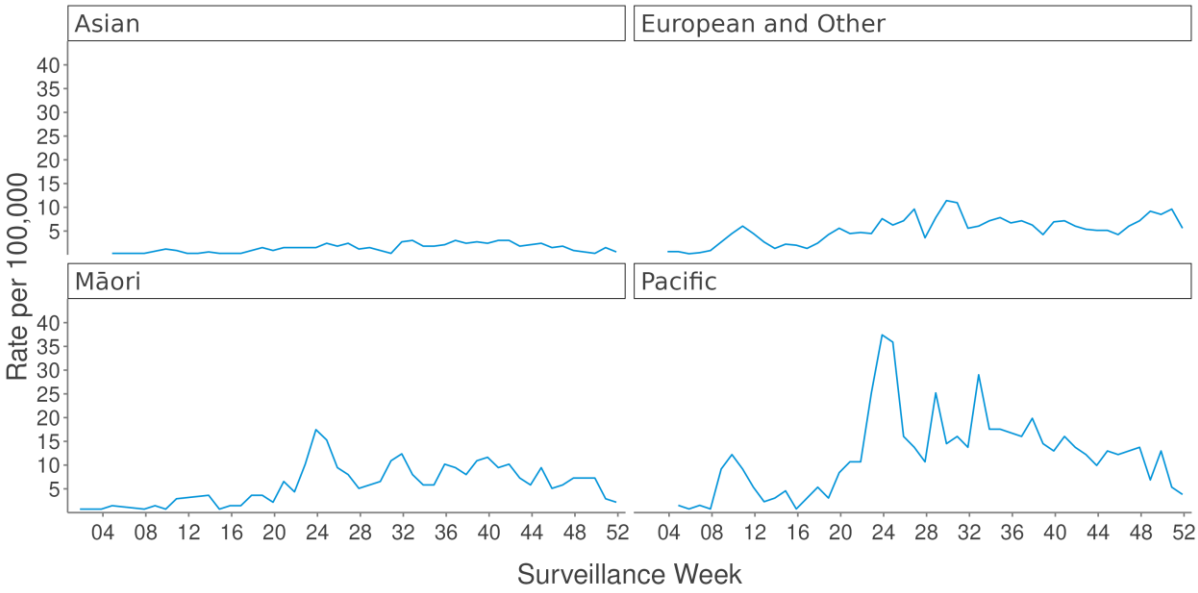


Source: Auckland and Middlemore Hospital virology as at 14 February 2023. Redcap SARI Surveillance Lite Project as at 16 February 2023

SARI cases by ethnicity

The highest rates of SARI throughout the year were observed among Pacific Peoples, followed by Māori (Figure 18). SARI rates among those of Asian ethnicity were the lowest throughout the year.

Figure 18: Weekly hospitalisation rate with SARI (any cause) by ethnicity

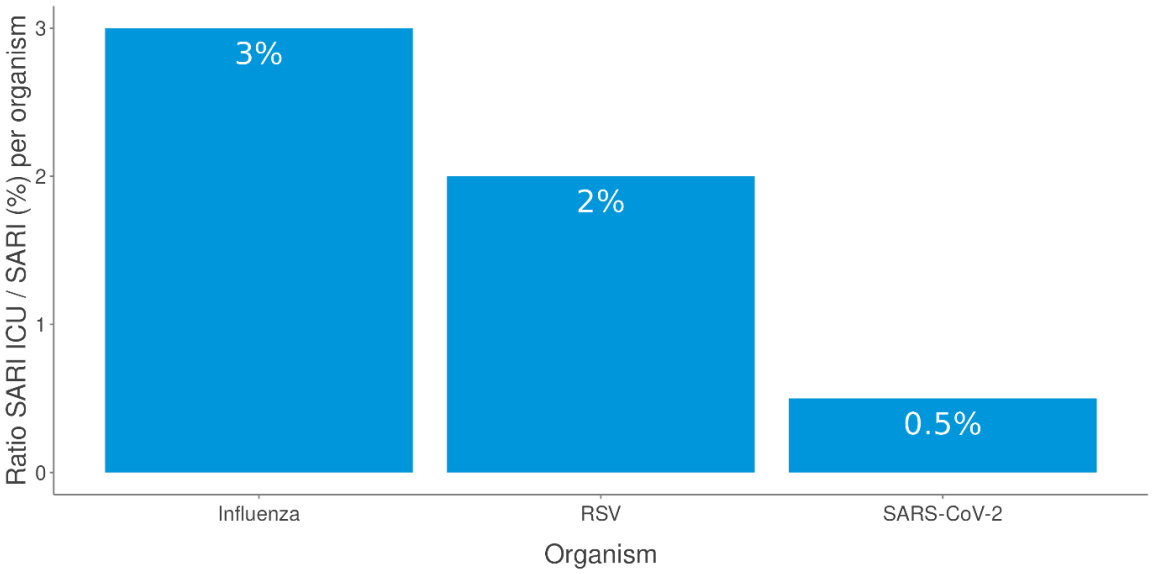


Source: Redcap SARI Surveillance Lite Project as at 16 February 2023.

Severity of illness among SARI patients

The severity of influenza illness (measured by the ratio of influenza-associated ICU SARI admissions to influenza-associated SARI hospitalisations) was greater than that for RSV and SARS-CoV-2 (Figure 19). The severity of SARS-CoV-2 illness was even lower than either influenza and RSV.

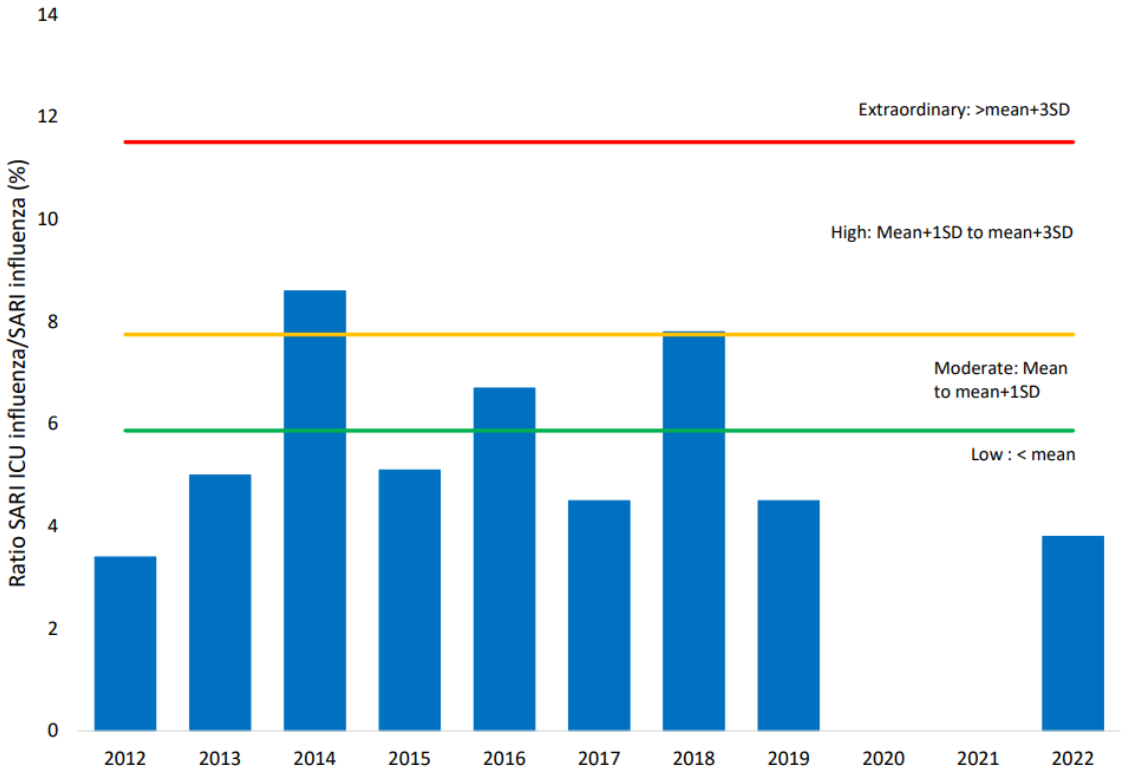
Figure 19: Severity of disease indicator among SARI patients by virus



Sources:
Auckland and Middlemore Hospital virology as at 14 February 2023, Redcap SARI Surveillance Lite Project as at 16 February 2023.

Relative to pre-pandemic years, the seriousness of influenza illness (measured by the ratio of influenza-associated ICU SARI admissions to influenza-associated SARI hospitalisations) was low in 2022 (Figure 20).

Figure 20: Severity of disease indicator among influenza-positive SARI patients, 2012-2022



Sources:
The New Zealand Influenza Data in 2022 Report for the WHO Consultation on the Composition of Seasonal Influenza Vaccines for the Southern Hemisphere 2023

INFLUENZA VACCINE COVERAGE AND VACCINE EFFECTIVENESS

Influenza vaccine coverage

Below is the summary of vaccine uptake by funded groups (Table 1). The 2022 eligibility criteria for free vaccines were:

- Those aged over 65 years of all ethnicities.
- Those aged 54 to 65 years of Māori & Pacific ethnicity.
- Those aged 3 to 12 years of all ethnicities (only became a funded group on 28 June 2022).
- Those with specific medical conditions (including pregnancy). Note, vaccine coverage for this group is not presented in this report as medical condition data are not available in reporting.systems.

Of note, privately funded influenza vaccinations are not necessarily recorded in centralised national databases, therefore numbers vaccinated and uptake percentages will be under-reported. Additionally, coverage statistics were based on 2021/22 financial year Ministry of Health's Health Service User (HSU) data, as this was determined to be a better reflection of the population at the time but are likely to undercount Māori and capture non-residents.[4] People who died before the end of the 2022 influenza season have not been included in this data.

Table 1: Influenza vaccination coverage data for eligible groups

Measure	Aged 3–12 Years	Aged 54–65 Māori & Pacific	65+ all ethnicities
People who received (at least) 1 dose	54,321	38,327	559,929
Number of eligible people	667,302	105,748	843,432
HSU coverage rate	8.1%	36.2%	66.4%

Sources: The New Zealand Influenza Data in 2022 Report for the WHO Consultation on the Composition of Seasonal Influenza Vaccines for the Southern Hemisphere 2023

Vaccine effectiveness estimates

With few observations in some strata, crude vaccine effectiveness (VE) will provide unreliable and non-significant estimates.

From the GP ILI data, using a test-negative design, VE was 58.7% (95% CI 26.9-77.6%) across all ages and 68.4% (95% CI 30.9-86.9%) for 19-64 years olds (Table 2). This represents good VE for a seasonal vaccine, although statistical precision is low due to small numbers. Patients were determined to be vaccinated if they had received the seasonal influenza vaccine at least two weeks before consultation date.

Table 2: GP ILI-based seasonal influenza vaccine effectiveness estimates

	Influenza positive		Influenza negative		Crude VE (%)
	Vaccinated -Yes	Vaccinated -No	Vaccinated -Yes	Vaccinated -No	VE % (95% CI)
All ages	18	144	78	258	58.7 (26.9–77.6)
0–18 years	1	50	1	86	N/A
19–64 years	9	91	50	160	68.4 (30.9–86.9)
65+ years	8	3	27	12	N/A

Sources: The New Zealand Influenza Data in 2022 Report for the WHO Consultation on the Composition of Seasonal Influenza Vaccines for the Southern Hemisphere 2023 N/A: not applicable as numbers too low to reach statistical significance.
CI: confidence intervals

From the SARI surveillance data, using a test-negative design, VE for 19–64 years olds was 61.7% (95% 36.8–77.5%) (Table 3). This represents good VE against severe diseases for a seasonal vaccine, although statistical precision is low due to small numbers. Patients were determined to be vaccinated if they had received the seasonal influenza vaccine at least two weeks before admission date.

Table 3: Hospital SARI-related seasonal influenza vaccine effectiveness estimates

	Influenza positive		Influenza negative		Crude VE (%)
	Vaccinated-Yes	Vaccinated-No	Vaccinated-Yes	Vaccinated-No	VE % (95% CI)
All ages	9	104	64	8222	N/A
0–18 years	24	129	124	255	61.7 (36.8–77.5)
19–64 years	44	244	37	163	N/A

Sources: The New Zealand Influenza Data in 2022 Report for the WHO Consultation on the Composition of Seasonal Influenza Vaccines for the Southern Hemisphere 2023.
N/A: not applicable as numbers too low to reach statistical significance. CI: confidence intervals

INFLUENZA VIRUS CHARACTERISATION

Influenza virus identifications by sub-type and lineage

Among SARI patients, of 319 influenza-positive specimens, 318 were influenza A (99.7%). Of the influenza A-positive specimens, 139 were subtyped further (43.7%), of which 137 were A(H3N2) (98.6%) and two were A(H1N1)pdm09 (1.4%).

From sentinel GP sites, of 161 influenza-positive specimens, 161 were influenza A (100%). Of the influenza A-positive specimens, 160 were A(H3N2) (99.4%) and one was A(H1N1)pdm09 (<1.0%).

Virus-vaccine matches in the National Influenza Laboratory

Influenza A(H1N1)pdm09 viruses detected in 2022 belonged to two subclades 6B.1A.5a.1 (5a.1) and 6B.1A.5a.2 (5a.2) and circulated in different geographic locations. Some antigenic changes in the A(H1N1)pdm09 viruses detected later in the 2022 season were found to be less well matched with the 2022 southern hemisphere seasonal influenza vaccine A(H1N1) component. This contributed to the decision to change this component in the 2023 southern hemisphere seasonal influenza vaccine to one which is expected to provide greater protection against this influenza A seasonal virus.

The vast majority of A(H3N2) viruses detected in 2022 had HA genes that belonged to genetic group 3C.2a1b.2a.2 (2a.2). Upon assessment in October 2022, the majority of these circulating viruses were found to remain a good match with the A(H3N2) virus component of the 2022 southern hemisphere seasonal influenza vaccine.

Antiviral resistance data

In 2022, fluorometric neuraminidase inhibition assay was used to test 72 influenza viruses for antiviral resistance. The results showed that all were sensitive to both oseltamivir and zanamivir antiviral medications.

For more information, please refer to the 2022 AIVC vaccine strain selection report.

INFLUENZA VACCINE COMPOSITION FOR 2023 SEASON

The Australian Influenza Vaccine Committee and New Zealand, in collaboration with the World Health Organization, have recommended the following composition for influenza virus vaccines for the 2023 Southern Hemisphere influenza season:

Egg-based quadrivalent influenza vaccines:

- an A/Sydney/5/2021 (H1N1)pdm09-like virus (replacing A/Victoria/2570/2019 (H1N1)pdm09-like virus used in the 2022 southern hemisphere seasonal vaccine);
- an A/Darwin/9/2021 (H3N2)-like virus;
- a B/Austria/1359417/2021 (B/Victoria lineage) - like virus; and
- a B/Phuket/3073/2013 (B/Yamagata lineage) - like virus.
- Cell-based or recombinant-based quadrivalent influenza vaccines:
- an A/Sydney/5/2021 (H1N1)pdm09-like virus (replacing A/Wisconsin/588/2019 (H1N1)pdm09-like virus used in the 2022 southern hemisphere seasonal vaccine);
- an A/Darwin/6/2021 (H3N2)-like virus;
- a B/Austria/1359417/2021 (B/Victoria lineage)-like virus; and
- a B/Phuket/3073/2013 (B/Yamagata lineage)-like virus.

The composition of trivalent influenza vaccines is recommended to include the A(H1N1), A(H3N2) and the B/Victoria lineage virus. For more information, please refer to the 2022 AIVC vaccine strain selection report.

FUTURE DIRECTIONS

Ongoing integration of COVID-19 into respiratory surveillance

In 2022, both SARS-CoV-2 and influenza were widely co-circulating in the community for the first time, allowing for a unique opportunity to assess how well the systems detected COVID-19 activity relative to influenza activity.

A review is underway of the performance of surveillance systems with respect to monitoring COVID-19 activity during the 2022 season. The review findings will inform ongoing ARI surveillance development work.

In addition, respiratory panel testing for sentinel general practice virologic surveillance is performed by the Virology 'Reference Laboratory at ESR. Any time SARS-CoV-2 is detected, the sample is now sent on for whole genome sequencing. This is providing information on the specific SARS-CoV-2 strains circulating in New Zealand. Extending this capability to influenza is underway.

Improving GP virologic surveillance

The COVID-19 pandemic response has impacted heavily on existing GP sentinel respiratory virus surveillance systems. Due to changes in patient flow, the burden of work on frontline health workers, and the prioritising of testing resources to detect COVID-19 over other pathogens, we have experienced lower levels of GP participation to the voluntary sentinel surveillance system and have seen a sharp decline in virologic samples from ILI patients, even after the border reopened and respiratory viruses were known to be circulating again.

Work is ongoing to increase GP recruitment and boost participation of existing general practices. Through interviewing participating GPs on their experiences, protocols for surveillance have been adapted, making them simpler and more flexible. Additional materials have also been developed for GP, including instructional posters, educational videos and monthly reports on viruses detected in individual practices. In addition, more resource has been dedicated to advertising to and recruitment of GPs.

Enhancing GP syndromic surveillance systems

During the COVID-19 pandemic, the syndromic monitoring component of the ESR sentinel ILI GP surveillance programme was paused due to major changes in patient management in primary care. This system relied on manual data entry of every ILI patient presenting to a participating GP. Currently, only the virological sampling component of this system is operating. GP syndromic surveillance continues to be obtained from HealthStat with an expanded network of 300 practices (compared to 90 pre-pandemic). This is currently under review and novel systems for collecting syndromic ILI surveillance data are being explored.

Further development of SARI surveillance

Currently, SARI surveillance is undertaken only at Auckland and Middlemore hospitals. The current system, which requires research nurses to collect data on SARI patients, is resource intensive and costly, and therefore is not scalable across New Zealand. ESR is currently evaluating alternatives, among these using chief complaint coding and text mining across health records of hospitalised patients.

Eclair repository

Work is ongoing to allow the provision of all positive and negative respiratory panel test results performed in community diagnostic laboratories to be shared with ESR through the Eclair clinical result repository. This will allow monitoring of test positivity rates as an indicator of the prevalence of different respiratory viruses.

Mortality

Deaths from ARI are an important surveillance indicator, however cause-specific mortality data are usually only available with a one-to-two-year delay. All-cause mortality usually increases during the winter season and may be a useful crude indicator of respiratory viral season severity. ESR is exploring this to support acute respiratory surveillance.

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