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FluTracking: Weekly online community-based surveillance of respiratory illness in Australia, 2023 Report

Alexandra Kerr, Sandra Carlson, Stuart Adams, Tom McKenzie, David Boettiger, Craig Dalton

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GPO Box 9848, Canberra ACT 2601

Website: **cdc.gov.au/cdi**

Email: **cdi.editor@health.gov.au**

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Contents

We acknowledge the First Nations Peoples of Australia, who are the Custodians of the land and waters on which we live and work. We acknowledge the contributions, wisdoms, knowledges and experiences of the First Nations participants involved in FluTracking.

We respectfully refer to Aboriginal and Torres Strait Islander people as First Nations peoples, recognising Aboriginal and Torres Strait Islander people as the sovereign people of this land, and acknowledging the many cultures and nations across the country.

List of figures

List of tables

Abstract

FluTracking Australia, an online respiratory illness surveillance system, monitors self-reported symptoms, care-seeking, absence from normal duties, and testing and vaccination for influenza and coronavirus disease 2019 (COVID-19). From 2022 to 2023, the number of participants who completed at least one survey decreased by 16.8%, possibly due to participation fatigue and additional survey questions.

In 2023, FluTracking identified a 22% reduction in the peak weekly incidence of fever and cough (FC) compared to the 2022 season. The 2023 FC peak was similar in timing to the 2022 FC influenza peak but smaller in magnitude compared to most previous years documented by FluTracking.

From 2022 to 2023, FluTracking observed:

1. A 36% decrease in influenza polymerase chain reaction (PCR) testing among participants reporting incident FC symptoms, largely influenced by a 57% decrease in New South Wales.
2. A 25% decrease in SARS-CoV-2 testing, by PCR and/or rapid antigen test (RAT), among participants reporting incident runny nose and sore throat (RNST) symptoms.
3. An 11% decrease in SARS-CoV-2 testing (PCR and/or RAT) among participants reporting incident FC symptoms.

Reduced testing accessibility coupled with modified testing practices likely contributed to these decreases. By June 2023, SARS-CoV-2 PCR testing rates among participants with incident FC symptoms aligned with influenza PCR testing rates.

Period cumulative incidence of RNST symptoms showed minimal variation across age groups in 2023. In contrast, FC period cumulative incidence inversely correlated with age, suggesting young individuals experience a higher cumulative incidence of FC symptoms.

Keywords: FluTracking; influenza; COVID-19; surveillance; SARS-CoV-2; testing; vaccination; respiratory illness; epidemiology

Introduction

FluTracking provides weekly community-level COVID-19-like and influenza-like illness (defined as fever and cough, or FC) surveillance that is not biased by health seeking behaviour, clinician testing practices or differences in jurisdictional surveillance methods.[1–5] FluTracking provides an indication of the severity of respiratory disease at a community level and the FC incidence by age, geography and First Nations status.[6] Since 2009, FluTracking has been incorporated into Australia's National Influenza Surveillance Scheme and the Australian Influenza Surveillance Report, and since 2020, in the Australian COVID-19 Epidemiology Report.[7,8]

The main aims of FluTracking are:

1. to contribute to community level surveillance of COVID-19-like and influenza-like illness in Australia;
2. to provide consistent surveillance of respiratory illness incidence and testing across all jurisdictions and over time; and
3. to provide year-to-year comparisons of the timing and incidence of respiratory illness, health-seeking behaviour, laboratory testing, and severity of COVID-19-like and influenza-like illness in the community.

In this report, we:

- describe the performance characteristics of the FluTracking system, including participant recruitment and survey response timeliness;
- describe the epidemiology of COVID-19-like and influenza-like illness in the Australian community in 2023;
- describe self-reported influenza and COVID-19 vaccine coverage;
- describe self-reported influenza and SARS-CoV-2 testing;
- compare the percentage of FluTracking participants who reported FC with laboratory-confirmed influenza and COVID-19 notifications from the National Notifiable Diseases Surveillance System (NNDSS);[9,10] and
- compare the percentage of FluTracking participants who reported FC and testing for SARS-CoV-2, and who also reported a positive SARS-CoV-2 polymerase chain reaction (PCR) test, with COVID-19 notifications from the NNDSS.

Methods

Surveillance period

FluTracking previously operated between April and October each year. However, since the emergence of COVID-19 in 2020, FluTracking has operated year-round. Since October 2020, participants have been offered the option to suspend participation annually during October–April to reduce survey fatigue and maintain survey completion rates.

Participant recruitment

A participant was defined as any individual who had a survey submitted for themselves or on their behalf. A respondent was anyone who submitted a survey either for themselves or on behalf of a household member. FluTracking uses the term 'First Nations Peoples' to refer to participants who identify as Aboriginal and/or Torres Strait Islander. This term respectfully encompasses the diversity of Aboriginal and Torres Strait Islander cultures and identifies and acknowledges First Nations Peoples as sovereign.

Recruitment methods were consistent with those used from 2007–2022.[11,12] Recruitment initiatives took place before the influenza season to generate interest, and later in the year to capitalise on the momentum of recently joined participants. Participants could join FluTracking at any time during the year.

Survey revisions

The survey questions in 2023 were consistent with those used in 2022,[12] with several modifications of the survey occurring between 14 February 2023 and 27 September 2023 to reflect updates in COVID-19 vaccinations and survey format trials (Appendix A, Table A.1).

Case definitions

Weekly 'fever and cough' (FC) incidence

A participant with FC was defined as someone who self-reported both fever and cough in the same survey week.[13]

- **Denominator**: all participants who completed a survey for the current week.
- **Numerator**: all participants who reported FC symptoms in the current week, with the following exceptions:
  - if FC symptoms were reported in consecutive weeks, only the first week was used to determine the weekly FC incidence; and
  - if a participant reported FC symptoms, followed by at least one symptom-free week, and then reported symptoms again, the subsequent symptom report was included in the weekly FC incidence calculations.

Weekly 'runny nose and sore throat' (RNST) incidence

A participant with RNST was defined as someone who self-reported both runny nose and sore throat in the same survey week.

- **Denominator**: all participants who completed a survey for the current week.
- **Numerator**: all participants who reported RNST symptoms in the current week, with the following exceptions:
  - if RNST symptoms were reported in consecutive weeks, only the first week was used to determine the weekly RNST incidence; and

  - if a participant reported RNST symptoms, followed by at least one symptom-free week, and then reported symptoms again, the subsequent symptom report was included in the weekly RNST incidence calculations.
- If a participant reported 'yes' for 'fever' or 'shortness of breath', or time off work or normal duties in the current or prior week, they were excluded from the case definition but included in the denominator.

Additional notes on analyses

For the years 2020 to 2023, influenza vaccination data were excluded from 1 January each year until week ending 29 March 2020, week ending 25 April 2021, week ending 17 April 2022, and week ending 23 April 2023. The influenza vaccine question was hidden during these periods to reduce participant burden during periods of traditionally low influenza vaccine uptake. Vaccination data for the first four weeks after reintroducing the influenza vaccination question each year were also excluded, due to insufficient survey responses.

In prior annual reports,[11,12] 'don't know' responses for FC symptoms, time off work or normal duties, and influenza vaccination questions were excluded from incidence calculations. In this report, 'don't know' responses for these questions are included in the denominator for FC incidence calculations across all years.

The mean weekly percentage of respondents who responded within 24 hours of survey distribution was summarised by age group. Responses submitted within the first four hours after survey distribution were excluded to maintain comparability of daily routines between states and territories (a mean 5.5% of participants were excluded weekly in 2023). Response times were adjusted to align each state/territory with Australian Eastern Standard Time and Australian Daylight Savings Time for the relevant time period.

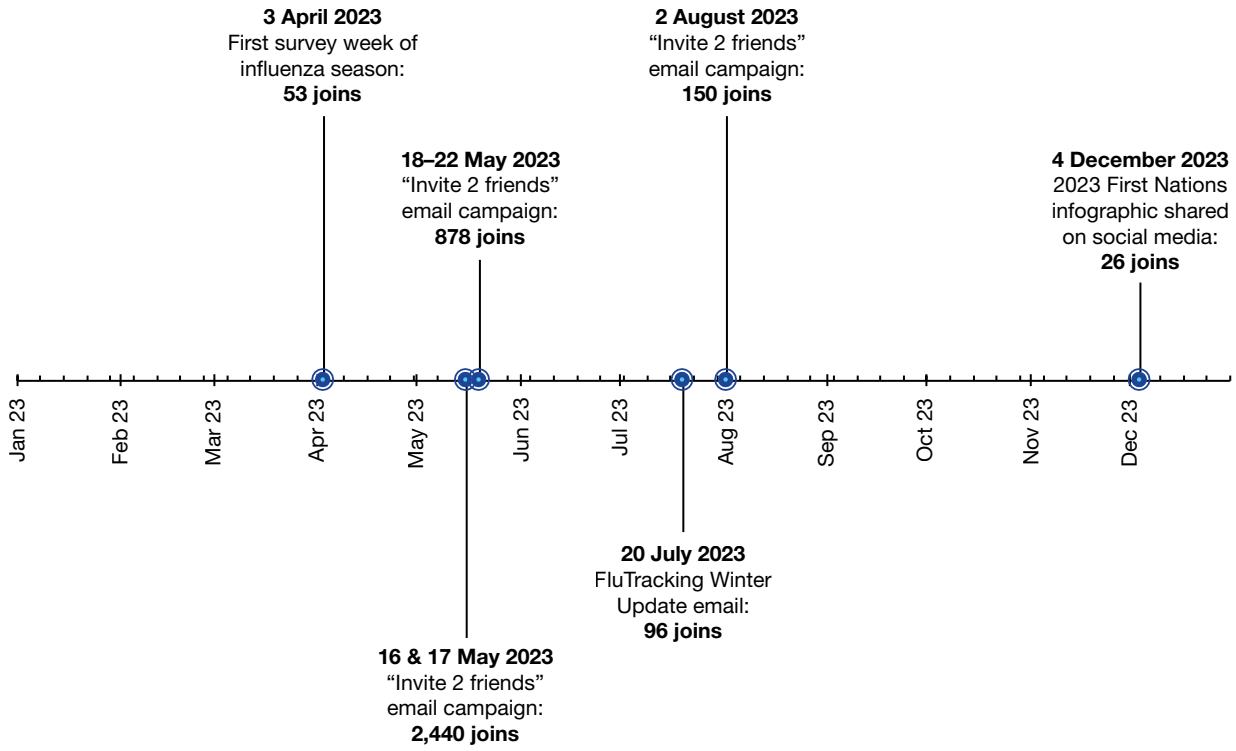
Exploratory analyses were conducted to examine variations in FC incidence by sex and education level. These analyses found no substantial differences (Appendix A, Figures A.2 and A.3).

Results

Recruitment and participation

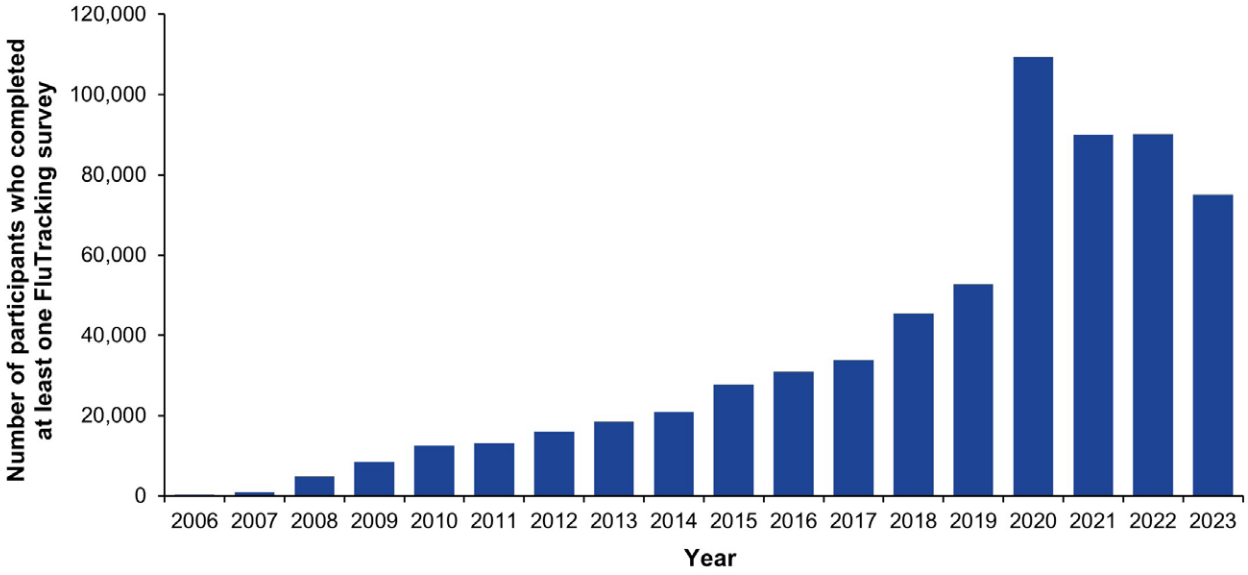
The most effective recruitment method in 2023 was an 'Invite 2 friends' email campaign. On 16 May 2023, emails sent to 50,215 existing participants resulted in 3,318 new participants (Figure 1).

Figure 1: Significant FluTracking recruitment events and impact, Australia, 2023



Surveys were completed for 75,078 participants in 2023, a 16.8% decrease from 90,257 participants in 2022 (Figure 2). This includes surveys completed by participants or on their behalf.

Figure 2: Number of participants who completed at least one survey, Australia, 2006–2023, by year



A lower retention rate was observed in 2023, with 77.2% of participants who completed at least one survey in 2022 having completed at least one survey in 2023, compared to 84.4% in 2022 and 70.8% in 2021 (Table 1).

Peak week participation decreased in all states and territories from 2022 to 2023, with the largest declines in the Northern Territory (18.5%), Western Australia (17.6%) and South Australia (15.0%). In 2023, participation rates per 100,000 population ranged from 142.2 in Queensland to 790.9 in the Australian Capital Territory (Appendix A, Table A.2).

Table 1: Summary of participation, Australia, 2021–2023

	2021 N = 90,089		2022 N = 90,257		2023 N = 75,078	
Type of participant	**n**	**%**	**n**	**%**	**n**	**%**
Primary respondents	53,360	59.2	54,662	60.6	47,476	63.2
Household members	36,729	40.8	35,595	39.4	27,602	36.8
Completed survey during first four weeks of traditional season[a]	74,269	82.4	73,332	81.2	65,614	87.4
Completed at least one survey during first four weeks of traditional season[a] and completed > 90% of all available surveys until beginning of opt-out period[b]	58,833	79.2	52,282	71.3	46,108	70.3
Completed at least one survey during first four weeks of traditional season[a] and completed all surveys until beginning of opt-out period[a]	46,420	62.5	37,263	50.8	33,620	51.2
Number of participants retained who completed at least one survey in prior year[c]	77,405	70.8	76,022	84.4	69,716	77.2
Number of new participants recruited[d]	12,920	14.3	13,736	15.2	6,001	8.0

a Refer to Appendix A, Table A.4 for survey weeks used.

b Denominator is the count of participants who completed a survey during the first four weeks of the traditional season.

c Denominator is the count of participants who completed a survey in the prior year.

d Refers to participants who may have joined FluTracking and not completed a survey in the respective survey year.

Socio-demographic characteristics of 2023 participants

Of the participants who completed at least one survey in 2023, complete demographic details were available for 72,307 participants. The largest percentage of participants were aged 40 to 64 years (41.1%); females comprised the majority of participants (59.9%); and the most common education level was a bachelor's degree (25.9% completed or enrolled; Appendix A, Table A.4). Since 2020, the percentage of participants aged 65 years and over has increased. The percentage of participants who identified as First Nations decreased from 1.3% in 2022 to 1.1% in 2023 (compared to 3.8% of the Australian population).[14]

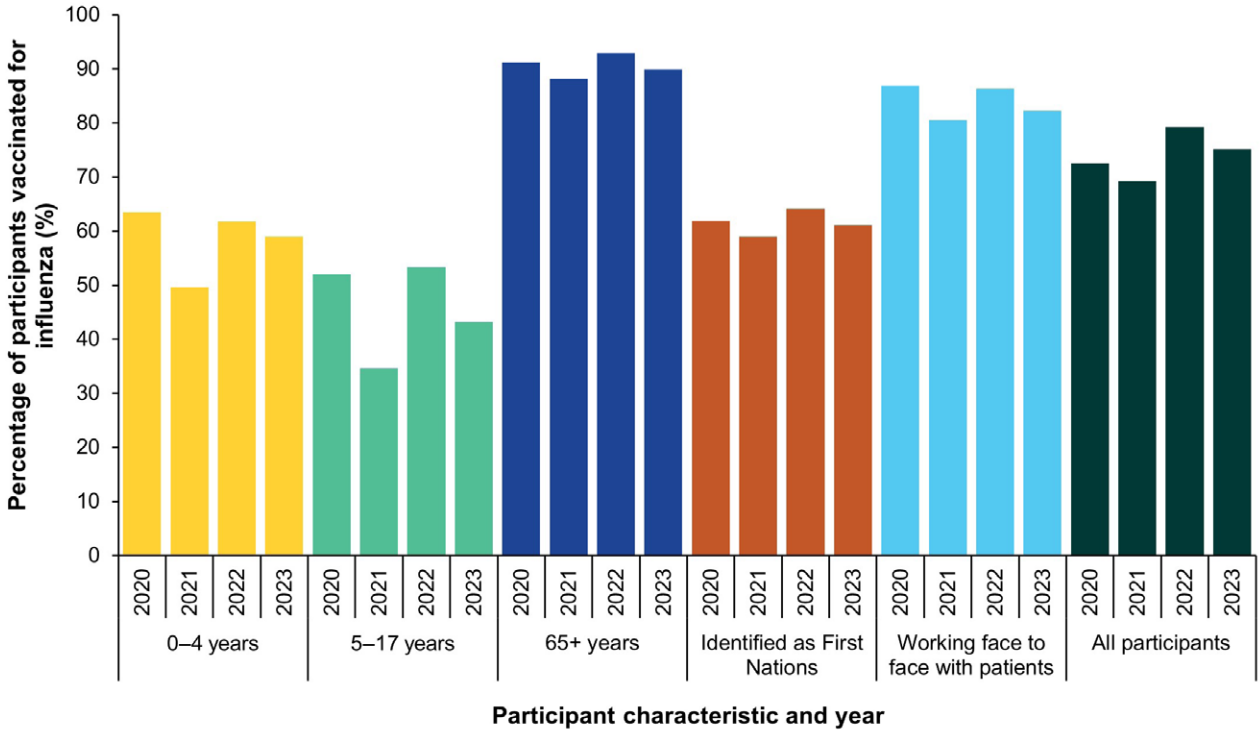
Time to respond to survey each week

In 2023, of responding participants, 80.0% responded within 24 hours on average. Those aged 65 years and over had the highest 24-hour response rate at 85.0%.

Influenza vaccination

By the final 2023 survey, 75.1% of participants reported receiving the annual influenza vaccine, decreasing from 79.2% in 2022 (Figure 3). The steepest decline in influenza vaccination coverage occurred in children aged 5–17. Influenza vaccination coverage was largely unaffected from 2020 to 2023 for participants aged over 65 years and over and those who identified as First Nations.

Figure 3: Percentage of participants who reported receiving the seasonal influenza vaccine at the final survey of each participant, by participant characteristics, Australia, 2020–2023, by year



COVID-19 vaccination

Participants aged 18 years and older, as well as those who worked face-to-face with patients, reported higher vaccination coverage than other demographic groups across all doses (Table 2). As dose count increased, COVID-19 vaccine coverage decreased across all demographic groups.

Table 2: COVID-19 vaccination uptake by number of doses at the final survey of each participant, Australia, 2023, by participant characteristics[a]

Participant group	Received at least					
	One dose (%)	Two doses (%)	Three doses (%)	Four doses (%)	Five doses (%)	Six doses (%)
All participants (n = 75,078)	97.5%	96.9%	88.1%	70.2%	50.7%	13.9%
Participants who worked face to face with patients (n = 10,178)	99.5%	99.3%	97.3%	72.8%	44.9%	8.9%
Participants aged 0–4 years[b] (n = 967)	3.5%	2.0%	NA	NA	NA	NA
Participants aged 5–11 years[b] (n = 2,831)	84.8%	78.6%	2.4%	NA	NA	NA
Participants aged 12–17 years (n = 2,982)	97.2%	95.3%	23.0%	2.8%	0.5%	0.1%
Participants aged 18–64 years (n = 40,405)	99.3%	99.0%	94.1%	65.4%	38.5%	6.0%
Participants aged 65+ years and over (n = 27,893)	99.4%	99.3%	98.2%	93.9%	80.7%	28.6%
Participants who identified as First Nations (n = 847)	92.8%	90.7%	71.8%	47.1%	26.8%	6.1%

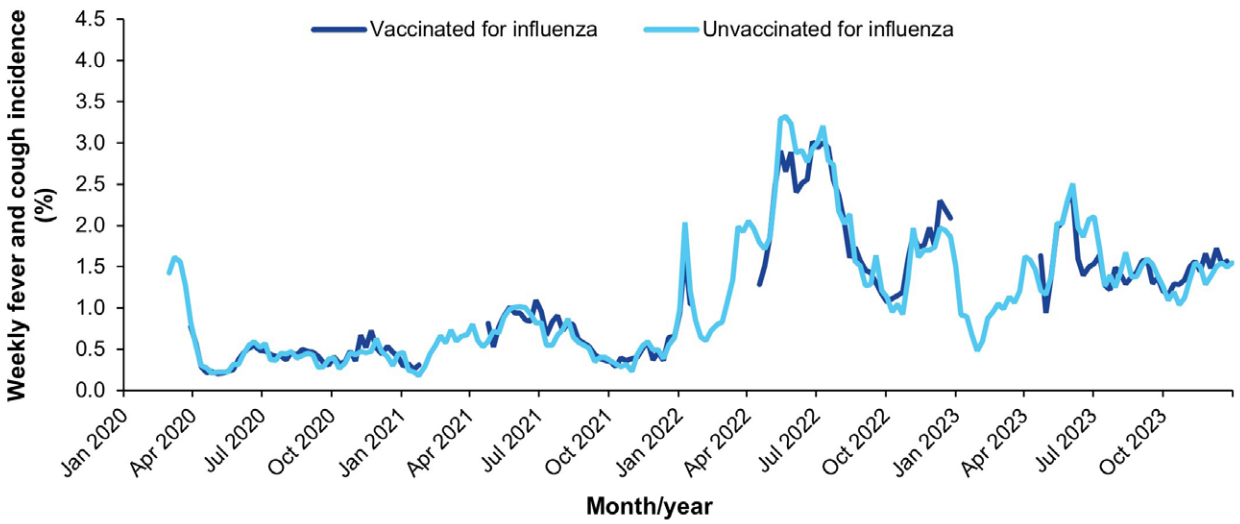
a Self-reported COVID-19 vaccination status was defined at or before the participant's last submitted survey of the year.

b NA: not applicable.

Percentage of participants reporting incident FC symptoms by influenza vaccination status

In 2023, there were several observed divergences in weekly FC incidence by influenza vaccination status. The greatest divergence occurred in the week ending 25 June 2023 (2.1% unvaccinated to 1.5% vaccinated, Figure 4).

Figure 4: Age-standardised percentage of participants reporting incident fever and cough (FC) symptoms by influenza vaccination status, Australia, 2020–2023, by week[a]

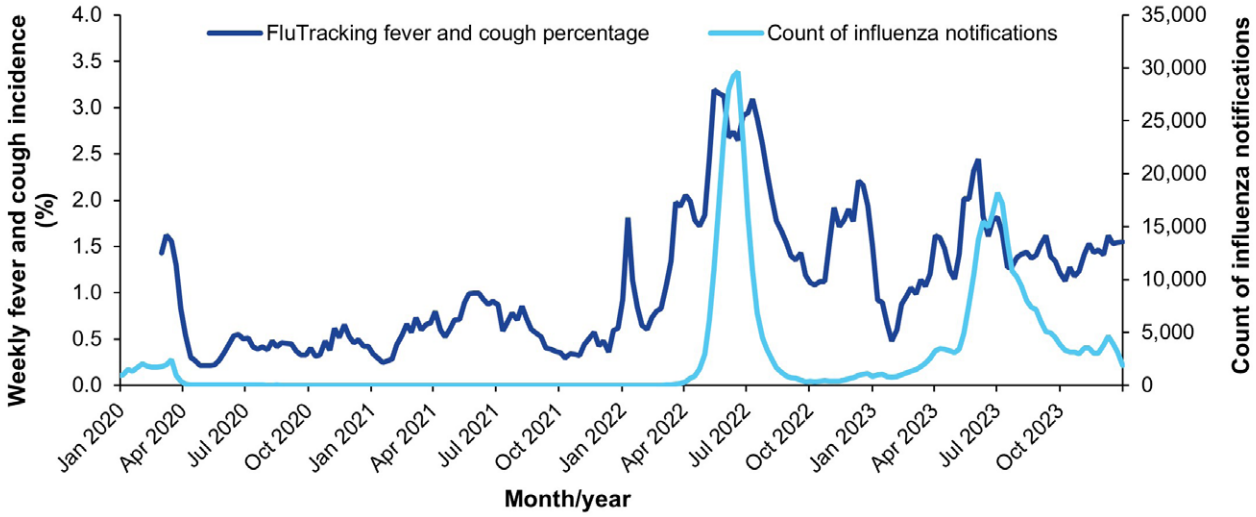


a Participants were defined as vaccinated for influenza two weeks after they reported being vaccinated. This was to allow time for immunity to develop following vaccination.[15] This delay was not applied to participants who were already vaccinated at the time of their first FluTracking survey for the year.

Comparison with national laboratory-confirmed influenza notifications

NNDSS laboratory-confirmed influenza notifications peaked during the week ending 2 July 2023, four weeks after the peak in FluTracking FC activity (Figure 5). Four out of eight states and territories experienced peak weekly FC incidence in May 2023 (Appendix A, Figure A.1).

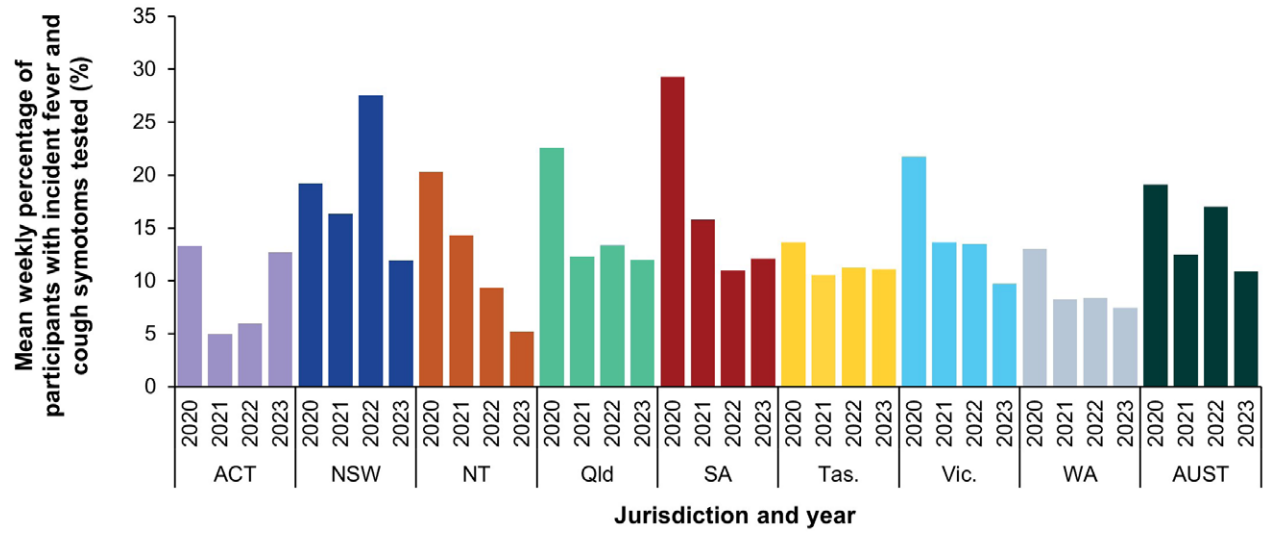
Figure 5: Age-standardised percentage of participants reporting incident fever and cough (FC) symptoms versus national influenza laboratory-confirmed notifications, Australia, 2020–2023, by week



Percentage of self-reported laboratory influenza tests

The mean percentage of participants who reported incident FC symptoms and influenza testing decreased from 17.0% in 2022 to 10.9% in 2023. Declines were observed in all states/territories except for South Australia and the Australian Capital Territory (Figure 6).

Figure 6: Mean weekly percentage of FluTracking participants who reported incident fever and cough (FC) symptoms and being tested for influenza, Australia, 2020–2023, by jurisdiction, epidemiological weeks 23–41[a,b]



a Analyses including influenza testing data commence from epidemiological week 23 for each respective year due to survey modifications applied in 2020.[12]

b ACT: Australian Capital Territory; NSW: New South Wales; NT: Northern Territory; Qld: Queensland; SA: South Australia; Tas.: Tasmania; Vic.: Victoria; WA: Western Australia; AUST: Australia.

Burden of illness activity

In 2023, the proportion of participants who sought medical attention for incident FC symptoms was 40.6%, a decrease from 49.9% in 2022 (Table 3). Among those reporting FC symptoms, 14.2% underwent SARS-CoV-2 PCR testing (vs. 39.1% in 2022), and 83.4% were tested for SARS-CoV-2 via a RAT (vs. 88.6% in 2022).

Table 3: FluTracking burden of illness activity of participants with incident fever and cough symptoms, Australia, 2021–2023 (epidemiological weeks 1–52 of each survey year)

Health seeking behaviour and testing[a]	2021 N = 10,730 (n; %)	2022 N = 32,173 (n; %)	2023 N = 20,211 (n; %)
Tested positive for SARS-CoV-2 (RAT)[b]	165 (1.5%)	16,800 (52.2%)	7,264 (35.9%)
Tested positive for SARS-CoV-2 (PCR)	318 (3.0%)	7,042 (21.9%)	655 (3.2%)
Tested positive for influenza (PCR)	90 (0.8%)	792 (2.5%)	725 (3.6%)
Tested for SARS-CoV-2 (RAT)[b]	451 (4.2%)	28,505 (88.6%)	16,862 (83.4%)
Tested for SARS-CoV-2 (PCR)	6,428 (59.9%)	12,580 (39.1%)	2,871 (14.2%)
Tested for influenza (PCR)	1,513 (14.1%)	4,446 (13.8%)	2,333 (11.5%)
Sought medical attention	6,913 (64.4%)	16,040 (49.9%)	8,201 (40.6%)

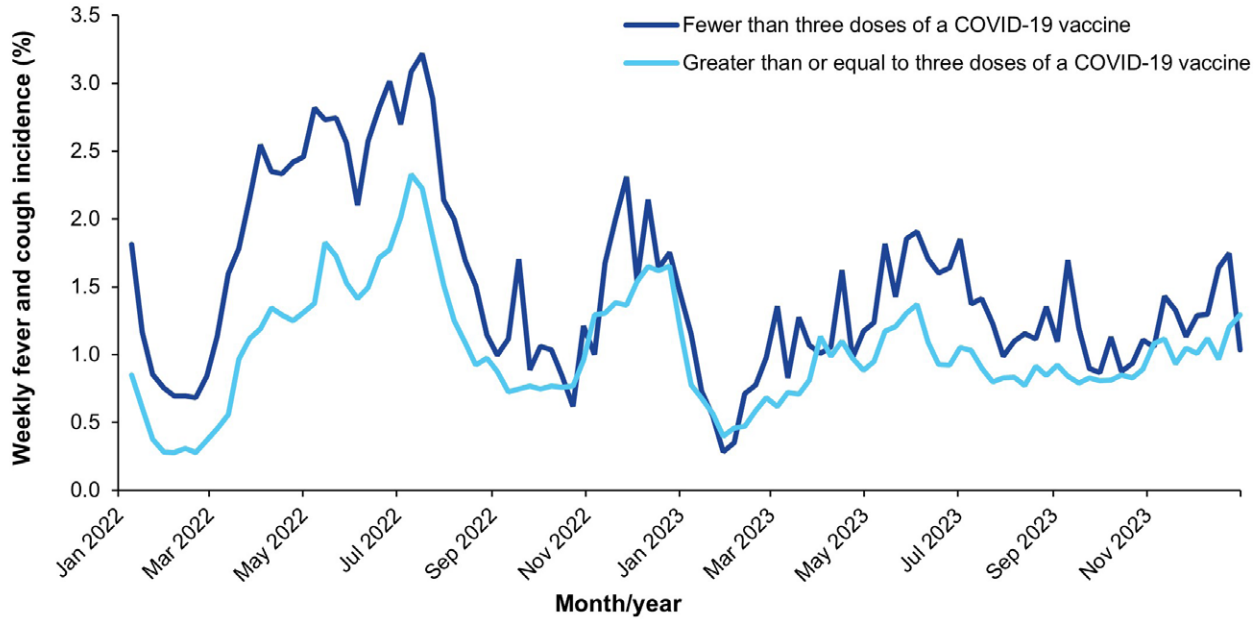
a RAT: rapid antigen test; PCR: polymerase chain reaction.

b SARS-CoV-2 RATs were made available in Australia in November 2021.

COVID-19 vaccination and FC percentages

Participants who reported receiving fewer than three doses of a COVID-19 vaccine reported higher weekly FC incidence compared to those who reported receiving three or more doses in both 2022 and 2023 (Figure 7).

Figure 7: Percentage of participants reporting incident fever and cough (FC) symptoms by COVID-19 vaccination status, Australia, 2022–2023, by week[a,b]



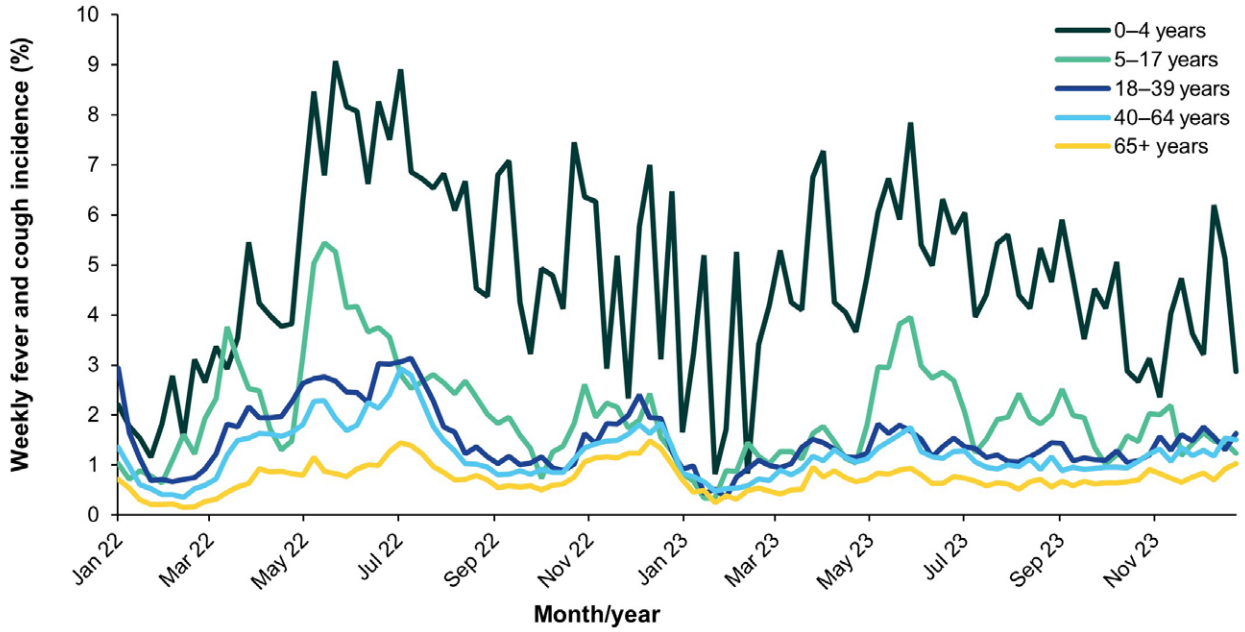
a Data are for participants aged 16 years and older, given children aged under 16 years were not recommended to receive a third COVID-19 vaccine unless immunocompromised or at risk of severe COVID-19 infection.[16]

b Participants were defined as vaccinated for COVID-19 two weeks after they reported being vaccinated.[15]

Weekly FC incidence by age group

Weekly FC incidence trends in 2023 were similar to those seen in 2022, with higher incidence observed in younger age groups (Figure 8).

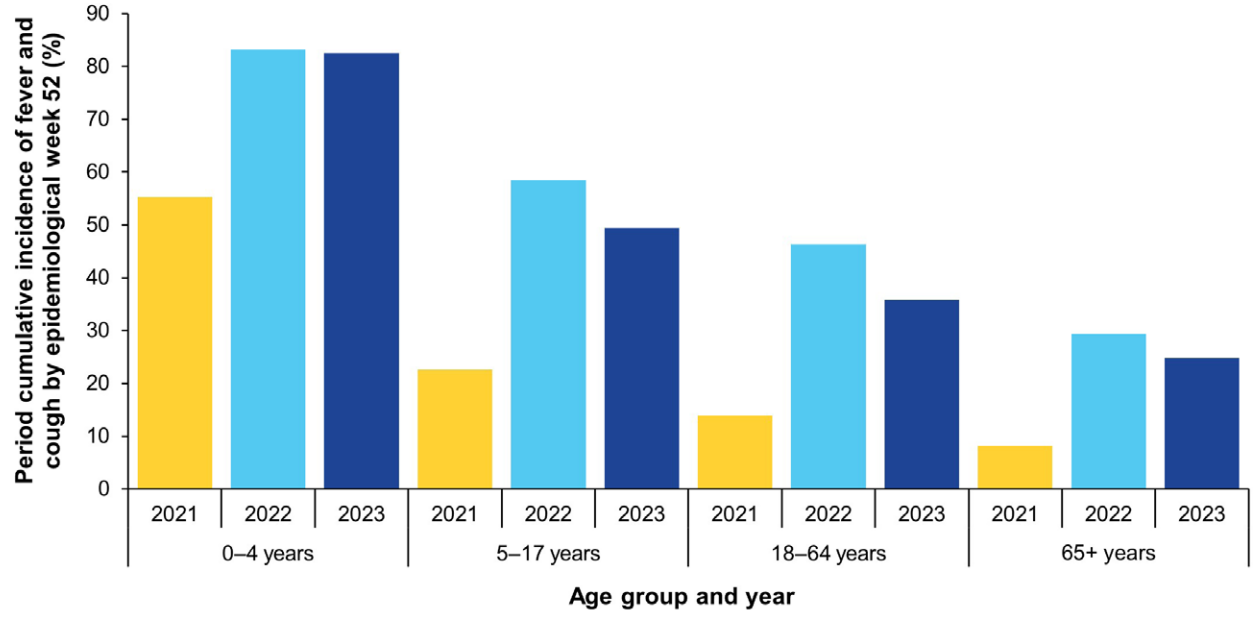
Figure 8: Weekly fever and cough (FC) incidence by age group, Australia, 2022–2023, by week



Period cumulative incidence of FC by age group

All age groups showed decreased cumulative incidence of FC by epidemiological week 52 from 2022 to 2023. Adults aged 18–64 years experienced the largest decrease, with a 22.7% decline (Figure 9).

Figure 9: Period cumulative incidence of fever and cough (FC) symptoms by age group, Australia, 2021–2023, epidemiological weeks 1–52[a,b]



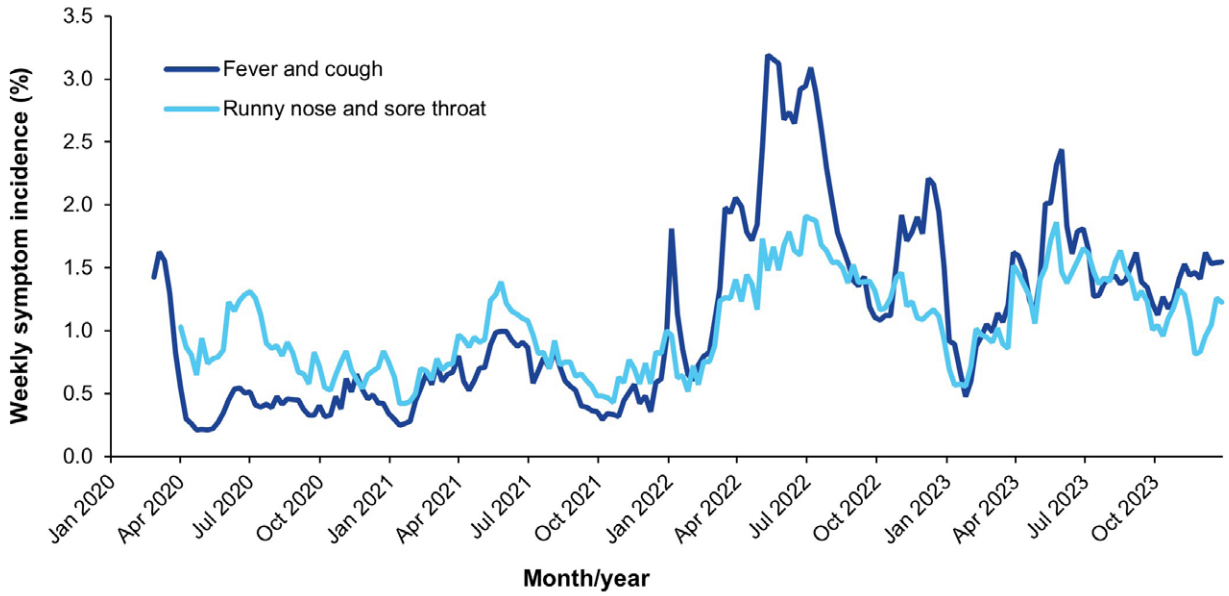
a Only the first incident of fever and cough symptoms for each participant per year was included.

b Excludes participants who did not complete all surveys during epidemiological weeks 1 to 52 in 2021–2023.

Mild illness: runny nose and sore throat

In 2023, weekly RNST incidence remained below 2.0% (Figure 10). The percentage of participants reporting incident RNST symptoms was consistently lower than the percentage of participants reporting incident FC symptoms.

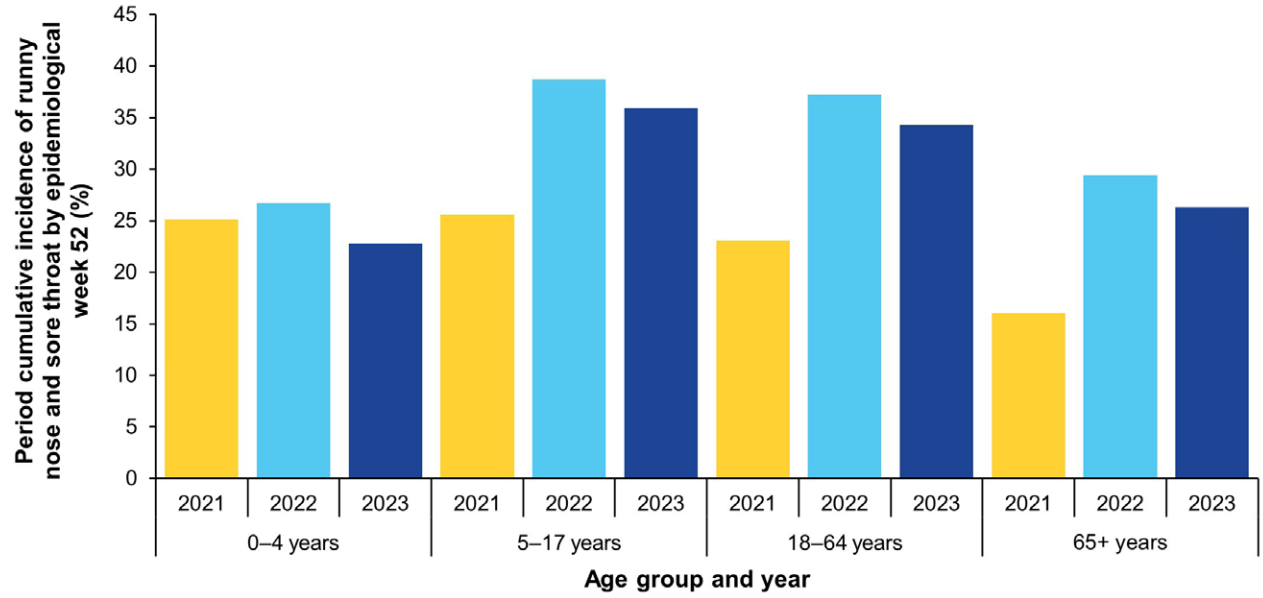
Figure 10: Age-standardised incident fever and cough (FC) versus incident runny nose and sore throat (RNST) symptoms, Australia, 2020–2023, by week



Period cumulative incidence of RNST by age group

The period cumulative incidence of RNST by epidemiological week 52 decreased across all demographic groups from 2022 to 2023 (Figure 11). Children aged 0-4 years had the largest decrease (16.7%).

Figure 11: Period cumulative incidence of runny nose and sore throat (RNST) symptoms by age group, Australia, 2021–2023, epidemiological weeks 1–52[a,b]



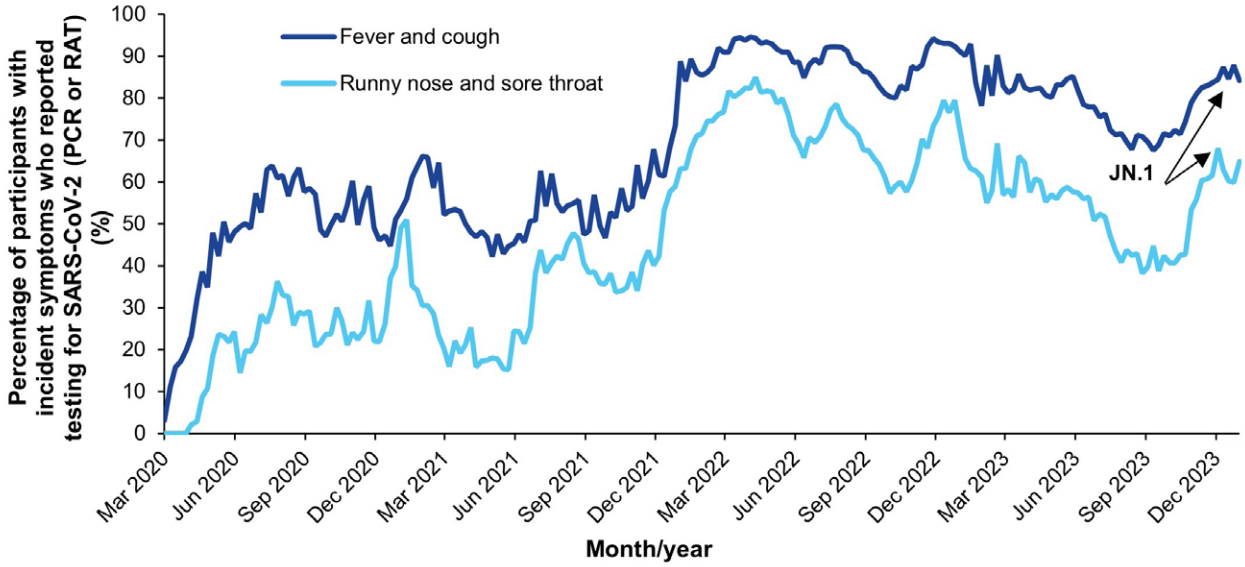
a Only the first incident of runny nose and sore throat symptoms for each participant per year was included.

b Excludes participants who did not complete all surveys during epidemiological weeks 1 to 52 in 2021–2023.

SARS-CoV-2 testing in participants with respiratory illness

Throughout 2023, SARS-CoV-2 testing percentages were consistently lower among participants reporting incident RNST symptoms compared to those reporting FC symptoms. Weekly SARS-CoV-2 testing percentages for both symptom groups increased in late 2023 during the JN.1 wave (Figure 12).

Figure 12: SARS-CoV-2 testing via polymerase chain reaction (PCR) and/or rapid antigen test (RAT) among participants with incident fever and cough (FC) versus incident runny nose and sore throat (RNST) symptoms, Australia, 2020–2023, by week

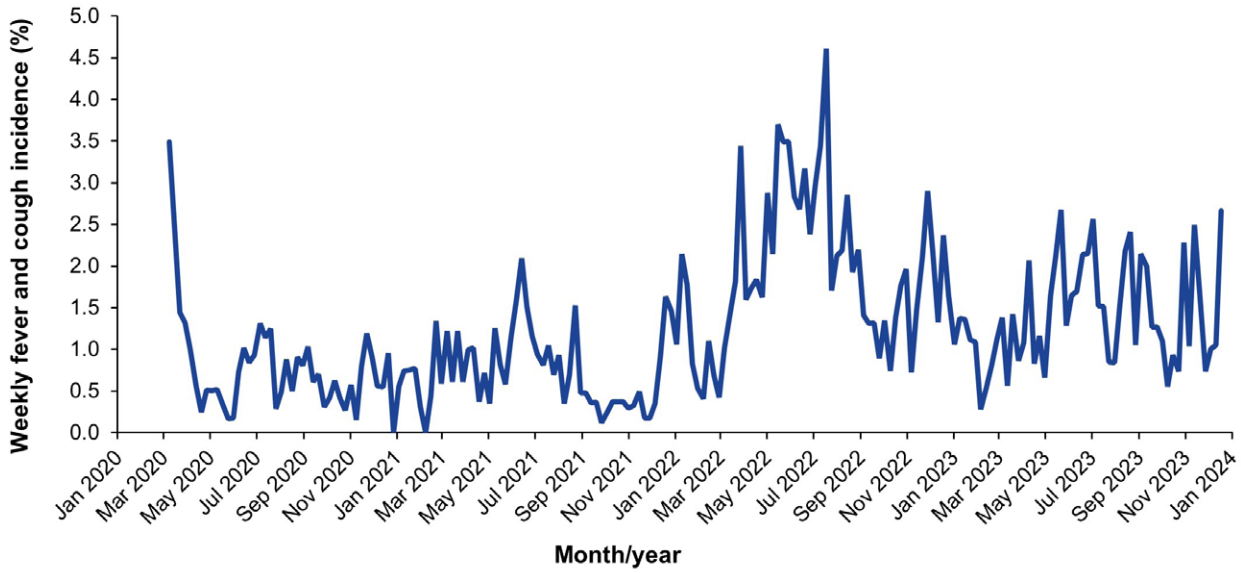


First Nations analyses

First Nations participants incident FC symptoms

Incident FC symptoms among First Nations participants fluctuated throughout 2023 with no clear trend, limited by a reduced sample size. Incidence of FC symptoms peaked at 2.7% during the week ending 21 May 2023 (Figure 13).

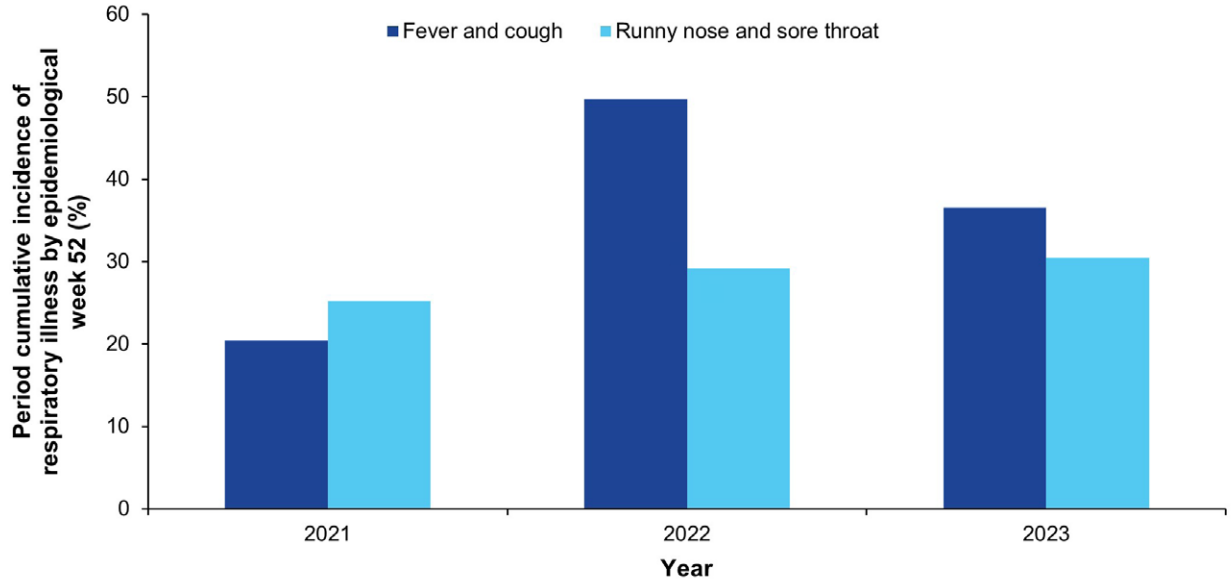
Figure 13: First Nations participants incident fever and cough (FC) symptoms, Australia, 2020–2023, by week



Period cumulative incidence of FC and RNST, First Nations participants

Among First Nations participants, the period cumulative incidence of FC at epidemiological week 52 decreased from 49.7% in 2022 to 36.5% in 2023 (Figure 14). The period cumulative incidence of RNST at epidemiological week 52 increased slightly from 29.2% in 2022 to 30.4% in 2023.

Figure 14: Period cumulative incidence of fever and cough (FC) versus runny nose and sore throat (RNST) symptoms for First Nations participants, Australia, 2021–2023, epidemiological weeks 1–52[a,b]



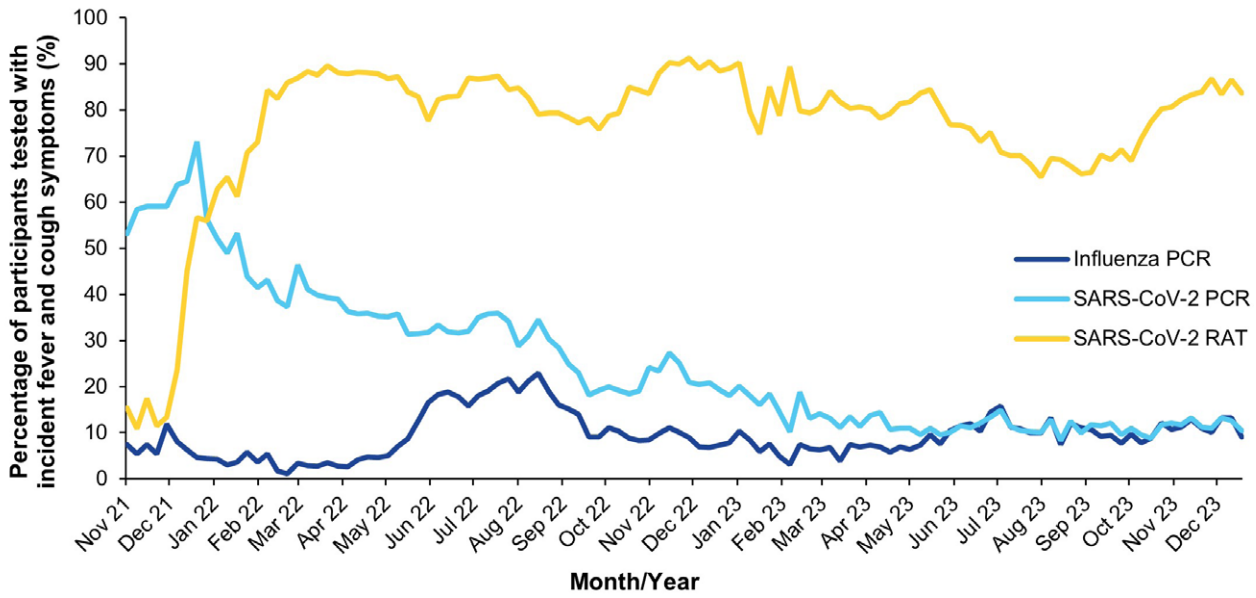
a Only the first incident of fever and cough, and of runny nose and sore throat, for each participant per year was included.

b Excludes participants who did not complete all surveys during epidemiological weeks 1 to 52 in 2021–2023.

Testing for influenza and SARS-CoV-2 in participants reporting incident FC symptoms

Influenza and SARS-CoV-2 PCR testing percentages among participants who reported incident FC symptoms converged in June and remained aligned thereafter (Figure 15).

Figure 15: Influenza and SARS-CoV-2 testing among participants reporting incident fever and cough (FC) symptoms, Australia, November 2021 – December 2023, by week

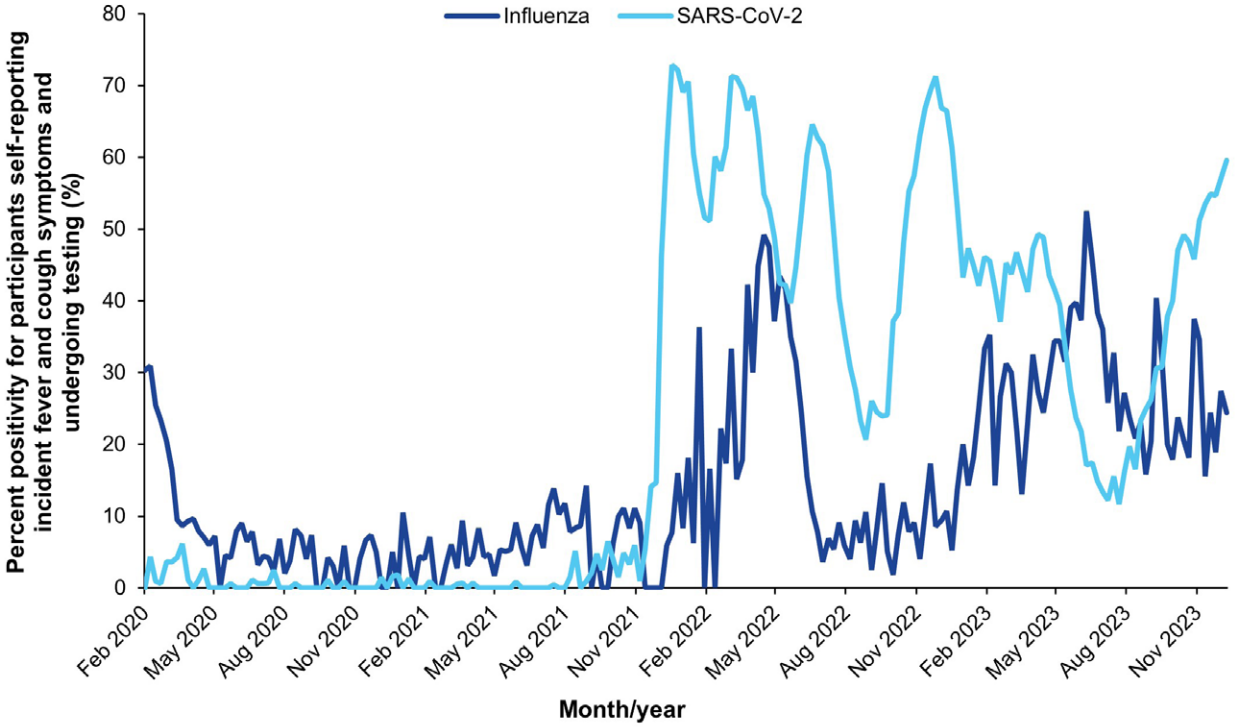


Percent positivity for influenza and SARS-CoV-2 in participants reporting incident FC symptoms

SARS-CoV-2 test percent positivity (PCR and/or RAT) decreased to 37.1% in the week ending 12 March 2023, before peaking at 49.2% in May 2023, lower than in previous Omicron waves. It increased again from 11.7% in the week ending 13 August 2023 to 59.6% in December 2023, marking the highest test percent positivity for 2023.

Influenza test percent positivity (PCR) peaked at 52.6% during the week ending 2 July 2023 (Figure 16).

Figure 16: Influenza and SARS-CoV-2 test (polymerase chain reaction [PCR] and/or rapid antigen test [RAT]) percent positivity among participants reporting incident fever and cough (FC) symptoms, Australia, 2020–2023, by week

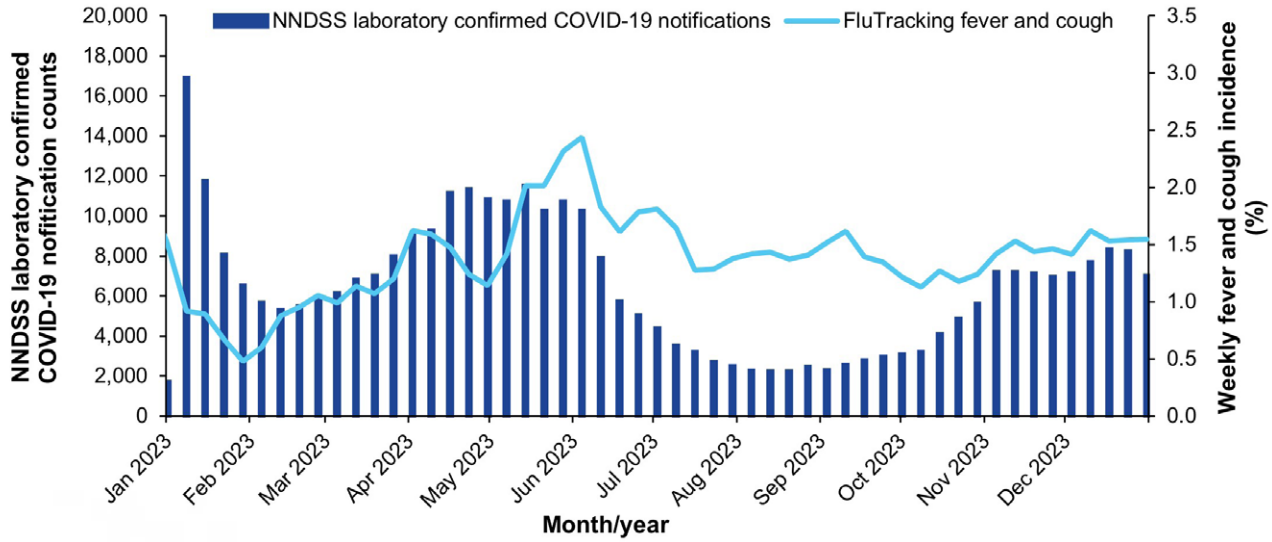


Comparisons with other surveillance systems

Comparison of FluTracking weekly FC incidence and weekly NNDSS COVID-19 laboratory-confirmed notifications

Peaks in the percentage of participants reporting incident FC symptoms closely aligned with the timing of peaks in NNDSS notifications during the Omicron waves in May–June 2023 (Figure 17).

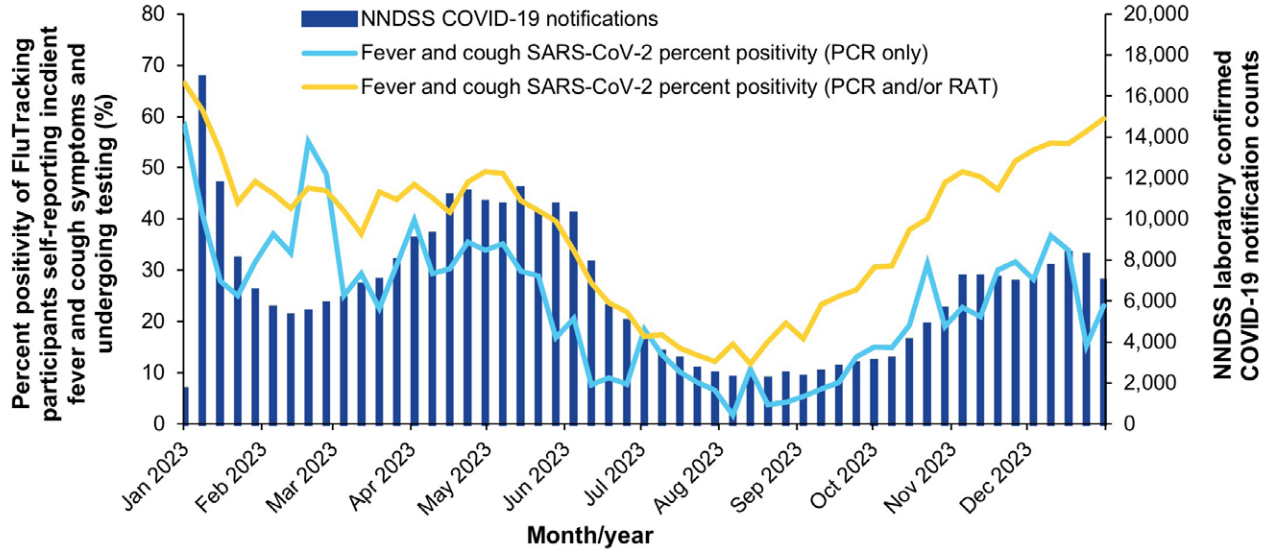
Figure 17: FluTracking weekly incident fever and cough (FC) symptoms versus National Notifiable Diseases Surveillance System (NNDSS) confirmed COVID-19 polymerase chain reaction (PCR) notifications, Australia, 2023, by week



Comparison of FluTracking SARS-CoV-2 percent positivity with NNDSS COVID-19 laboratory-confirmed notifications

SARS-CoV-2 test percent positivity peaks among participants with incident FC symptoms closely aligned with the timing of peaks in NNDSS COVID-19 notifications (Figure 18). One exception was a peak in PCR-only test percent positivity during the week ending 19 February 2023.

Figure 18: FluTracking SARS-CoV-2 test percent positivity by test type in participants reporting incident fever and cough (FC) symptoms versus National Notifiable Diseases Surveillance System (NNDSS) COVID-19 laboratory-confirmed notifications, Australia, 2023, by week



Discussion

FluTracking participation declined by 16.8% from 2022 to 2023. Despite this decline, participants maintained prompt survey responses in 2023, with a mean of 80% of participants completing surveys within 24 hours of distribution. The cohort retained from 2022 into 2023 exhibited lower retention rates compared to previous years.

In 2023, FluTracking detected an early, brief peak in weekly FC incidence, followed by consistently lower FC activity for the remainder of the year. This contrasted with increased activity and multiple Omicron-associated FC peaks observed in 2022. The 2023 FC incidence peak was lower than all preceding years documented by FluTracking since 2006, except for 2018, 2020 and 2021. It is important to note that influenza reached historically low levels in 2020 and 2021 due to the implementation of COVID-19 public health restrictions, and the 2018 influenza season was widely considered as mild.[17,18] The highest weekly FC incidence in 2023 (2.4%) occurred during the week ending 4 June 2023. This occurred between peaks in NNDSS-confirmed COVID-19 and influenza notifications, suggesting concurrent circulation of both viruses. While marginally higher than the FC peaks corresponding to the BA.2 and mixed Omicron waves in 2022, this peak was smaller than the 2022 FC peak attributed to influenza and the 2022 BA.4/BA.5 FC wave.

From 2022 to 2023, SARS-CoV-2 testing (PCR and/or RAT) decreased by 25% among participants reporting incident RNST symptoms, and by 11% among those reporting incident FC symptoms. This decline coincided with evolving COVID-19 management approaches and a diminishing emphasis on PCR testing as the management of COVID-19 aligned with approaches for other respiratory illness. Contributing factors included the closure of drive-through testing clinics nationwide, new general practitioner (GP) referral requirements for PCR testing among low-risk individuals, and broader shifts in public health strategies.[19–21] The impact was particularly pronounced for influenza testing, with mean weekly PCR testing percentages among those reporting FC symptoms decreasing by 35.9% from 2022 to 2023. This reduction was largely driven by New South Wales (56.7% decline) where, unlike other states that required GP referrals, influenza PCR testing had been freely available at COVID-19 drive-through clinics in 2022 before their closure in 2023.[22]

FluTracking test percent positivity data suggests that influenza activity was similar in 2022 and 2023, with higher laboratory notifications in 2022 likely driven by increased testing accessibility. Despite decreases in reported FC incidence and SARS-CoV-2 PCR testing in 2023, SARS-CoV-2 PCR test percent positivity consistently aligned with NNDSS-confirmed COVID-19 case trends.

The disparity in period cumulative incidence for RNST and FC symptoms highlights distinct age-related differences. While RNST period cumulative incidence shows minimal variation across age groups, FC period cumulative incidence inversely correlates with age, indicating that younger participants experience a higher cumulative incidence of severe illness.

While FluTracking participants consistently demonstrate higher vaccination rates compared to the general Australian population, self-reported influenza vaccination coverage decreased from 2022 to 2023, particularly in children aged 5 to 17 years (19% decrease). This decrease aligns with findings from other sources.[23] Plausible explanations include disruptions to routine vaccination services due to COVID-19 and general vaccine hesitancy. Additionally, the absence of a no-cost influenza vaccine incentive, which was available in many states and territories during 2022 but not extended in 2023 (excluding Queensland and Western Australia), may have contributed to the reduced vaccine uptake.[24,25]

In 2024, the COVID-19 vaccination survey question will be modified to align with COVID-19 vaccination guidelines focusing on recency of vaccination rather than cumulative dose count. FluTracking will also continue engaging in PREVENT (Pandemic Respiratory Virus Surveillance Trial), a community based self-swabbing pilot study, conducted in collaboration with Hunter Medical Research Institute (HMRI). This study enrolled 51 FluTracking participants residing in the Newcastle area to perform a weekly nasal self-swab for 12 months, with the swabs screened for respiratory pathogens on a 16-plex PCR panel. Results from this pilot study are currently under analysis.

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Author details

Ms Alexandra G Kerr,[1] Analyst

Ms Sandra J Carlson,[1] Manager – FluTracking

Dr Stuart R Adams,[1] Analyst

Mr Tom C McKenzie,[1] Project Officer

Dr David C Boettiger,[1,2,3] Epidemiologist

Dr Craig B Dalton,[1,2,3] Public Health Physician

1. Hunter New England Local Health District, NSW, Australia
2. University of Newcastle, Callaghan, NSW, Australia
3. Hunter Medical Research Institute, Lambton Heights, NSW, Australia

Corresponding author

Dr Craig B Dalton

Booth Building, Longworth Ave, Wallsend, NSW, Australia 2287

Phone: +61 2 4924 6499

Email: craig.dalton@health.nsw.gov.au

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Appendix A

Table A.1: Survey questionnaire changes, 2023[a]

Date	Change to monitoring	Testing/COVID-19 vaccination questions asked in surveys
14 February 2023	Participants were asked whether they have received a fifth dose of a COVID-19 vaccine for participants aged 16 years and over (including the nested question for vaccine brand).	**COVID-19 vaccine dose 5** 'Have you received the 5th dose of a COVID-19 vaccine? (This is a booster dose for the immunocompromised)' *(yes/no/don't know)* • If yes, 'What was the vaccine brand?' *(Pfizer/AstraZeneca/Moderna/Novavax/ other/don't know)*
23 May 2023	An express survey was developed that asked a single screening question about the presence of any symptoms, tests or vaccinations. It was made available for respondents who had completed at least 26 surveys in the last 12 months, and with at least one additional active household member at the time of survey.	**Express survey** 'For the week of *<insert survey start period>* to *<insert survey end period>* did you, *<insert household member 1>* or *<insert household member 2>* have any symptoms, tests or vaccinations? • If 'yes' or 'don't know', then survey questionnaire to be completed as normal • If 'no', then survey questionnaire completed
27 September 2023	Participants were asked whether they have received a sixth dose of a COVID-19 vaccine for participants aged 18 years and over (including the nested question for vaccine brand).	**COVID-19 vaccine dose 6** 'Have you received the 6th dose of a COVID-19 vaccine? (This is a booster dose for the immunocompromised)' *(yes/no/don't know)* • If yes, 'What was the vaccine brand?' *(Pfizer/AstraZeneca/Moderna/Novavax/ other/don't know)*
18 October 2023	For all COVID-19 vaccine questions, the vaccine brand was hidden.	—

a Changes to the way FluTracking Australia asks participants about COVID-19 vaccination were made and an express survey was implemented.

Table A.2: Recruitment and participation in FluTracking by jurisdiction, Australia, 2020–2023[a]

Jurisdiction[b]	2020			2021			2022			2023			Percent distribution of Australian population	Percent change 2022 to 2023
	Number of participants (peak week)	FluTracking participation per 100,000 population	Percent of participants (peak week)	Number of participants (peak week)	FluTracking participation per 100,000 population	Percent of participants (peak week)	Number of participants (peak week	FluTracking participation per 100,000 population	Percent of participants (peak week)	Number of participants (peak week)	FluTracking participation per 100,000 population	Percent of participants (peak week)		
ACT	4,377	958.4	5.0%	4,168	912.6	5.6%	4,260	932.8	5.8%	3,692	790.9	5.8%	1.8%	-13.3%
NSW	29,796	365.4	34.0%	26,080	319.9	34.7%	25,946	318.2	35.2%	22,655	271.7	35.8%	31.3%	-12.7%
NT	1,361	543.1	1.6%	1,298	518.0	1.7%	1,214	484.4	1.6%	989	391.7	1.6%	0.9%	-18.5%
Qld.	11,835	222.4	13.5%	9,255	173.9	12.3%	9,043	169.9	12.3%	7,765	142.2	12.3%	20.5%	-14.1%
SA	7,484	411.1	8.5%	6,507	357.4	8.7%	6,397	351.4	8.7%	5,437	293.6	8.6%	7.0%	-15.0%
Tas.	5,293	926.2	6.0%	4,846	847.9	6.5%	4,681	819.1	6.4%	4,001	698.5	6.3%	2.2%	-14.5%
Vic.	18,068	273.2	20.6%	15,111	228.5	20.1%	14,527	219.7	19.7%	12,500	183.5	19.8%	25.6%	-14.0%
WA	9,471	340.0	10.8%	7,802	280.1	10.4%	7,580	272.1	10.3%	6,245	216.9	9.9%	10.8%	-17.6%
Total	**87,685 (+20 missing)**	**329.2**	**100.0%**	**75,067 (+19 missing)**	**281.9**	**100.0%**	**73,648 (+19 missing)**	**276.5**	**100.0%**	**63,284 (+2 missing)**	**237.6**	**100.0%**	**100.0%**	**-14.1%**

a The peak week of participation refers to the week with the highest national survey submissions for the respective year.

b ACT: Australian Capital Territory; NSW: New South Wales; NT: Northern Territory; Qld: Queensland; SA: South Australia; Tas.: Tasmania; Vic.: Victoria; WA: Western Australia.

Table A.3: Survey weeks within traditional survey season and opt-out periods, Australia, 2020–2023

Year	Survey weeks within traditional FluTracking season	Survey weeks within opt-out period
2020	23 March 2020 – 18 October 2020	25 October 2020 – 3 January 2021
2021	4 April 2021 – 24 October 2021	31 October 2021 – 2 January 2022
2022	3 April 2022 – 23 October 2022	30 October 2022 – 1 January 2023
2023	2 April 2023 – 22 October 2023	29 October 2023 – 31 December 2023

Table A.4: Socio-demographic characteristics of FluTracking participants who completed at least one survey, Australia, 2020–2023

Characteristic	Value or range	2020			2021			2022			2023			Percentage of Australian population
		Frequency	Percentage	Rate[a]	Frequency	Percentage	Rate[a]	Frequency	Percentage	Rate[a]	Frequency	Percentage	Rate[a]	
Age in years	0–4	4,187	3.8	277.3	2,110	2.3	139.7	1,732	1.9	114.7	967	1.3	63.8	5.7
	5-17	13,055	11.9	315.5	8,875	9.9	214.5	8,442	9.4	204.0	5,813	7.7	137.1	15.9
	18-39	23,203	21.2	297.7	15,216	16.9	195.2	13,690	15.2	175.6	9,552	12.7	116.3	30.8
	40-64	47,538	43.5	599.3	39,871	44.3	502.7	38,658	42.8	487.4	30,853	41.1	380.2	30.5
	65 and over	21,417	19.6	496.5	24,017	26.7	556.8	27,735	30.7	642.9	27,893	37.2	612.1	17.1
	Total participants	109,400	100	425.9	90,089	100	350.7	90,257	100	351.4	75,078	100	281.8	100
Sex	Male	45,603	41.9	357.7	36,688	41.0	287.8	36,348	40.3	280.9	29,913	40.0	226.2	49.6
	Female	63,070	58	487.5	52,776	58.9	407.9	53,328	59.1	412.2	44,708	59.9	333.3	50.4
	Other	118	0.1	—	92	0.1	—	90	0.1	—	72	0.1	—	—
	Missing data on sex	641	—	—	533	—	—	491	—	—	385	—	—	—
	Total reported[b]	108,761	100	423.4	89,556	100	348.6	89,766	100	351.0	74,693	100	280.4	100
Highest level of education completed by participant (15 years and over only)	Year 11 or below (or equivalent) or Certificate I/II/III/IV	21,016	22.5	266.6	16,721	20.6	212.0	16,252	20.4	206.0	13,425	19.8	170.1	38.0%
	Year 12 (or equivalent)	8,214	8.8	264.6	6,493	8.0	209.2	6,335	7.9	204.1	5,145	7.6	165.7	14.9%
	Diploma or Advanced Diploma	9,069	9.7	465.9	7,885	9.7	405.0	8,029	10.1	412.4	6,955	10.3	357.3	9.4%
	Enrolled in, or completed, Bachelor Degree	25,162	27.0	697.2	20,951	25.8	580.5	21,053	26.4	583.3	17,527	25.9	485.6	17.4%
	Graduate Diploma or Graduate Certificate	9,695	10.4	1954.9	8,929	11.0	1800.4	9,178	11.5	1850.6	8,192	12.1	1651.8	2.4%
	Postgraduate Degree	20,134	21.6	1481.1	18,231	22.5	1341.1	18,963	23.8	1394.9	16,405	24.3	1206.8	6.5%
	Did not nominate an ABS equivalent education level	1,660	—	—	1,989	—	—	2,282	—	—	2,122	—	—	—
	Total reported[b]	90,839	100	437.0	79,210	100	381.1	79,810	100	384.0	67,649	100	335.7	100

Characteristic	Value or range	2020			2021			2022			2023			Percentage of Australian population
		Frequency	Percentage	Rate[a]	Frequency	Percentage	Rate[a]	Frequency	Percentage	Rate[a]	Frequency	Percentage	Rate[a]	
Aboriginal and/or Torres Strait Islander status	Yes	1,779	1.7	180.8	1,212	1.4	123.2	1,147	1.3	116.6	847	1.1	86.1	3.8
	No	105,233	97.7	426.0	86,985	98.2	352.1	87417	98.4	353.9	72,908	98.5	295.2	96.2
	Prefer not to say	664	0.6	—	362	0.4	—	305	0.3	—	231	0.3	—	—
	Missing data on Aboriginal and/or Torres Strait Islander status	1,724	—	—	1,530	—	—	1,388	—	—	1,092	—	—	—
	Total reported[b]	107,676	100	419.2	88,559	100	344.7	88,869	100	346.0	73,986	100	288.0	100

a Rate per 100,000 population within the indicated category. Participant rates for age group and sex were calculated using the ABS June 2023 Estimated Resident Population.[26] The participation rate for education level and First Nations status was calculated using the 2021 Australian Census data.[14,27]

b Totals for these characteristics exclude those with missing data, or who did not nominate an educational level.

Figure A.1: Age-standardised FC incidence by jurisdiction, Australia, 2020–2023, by week

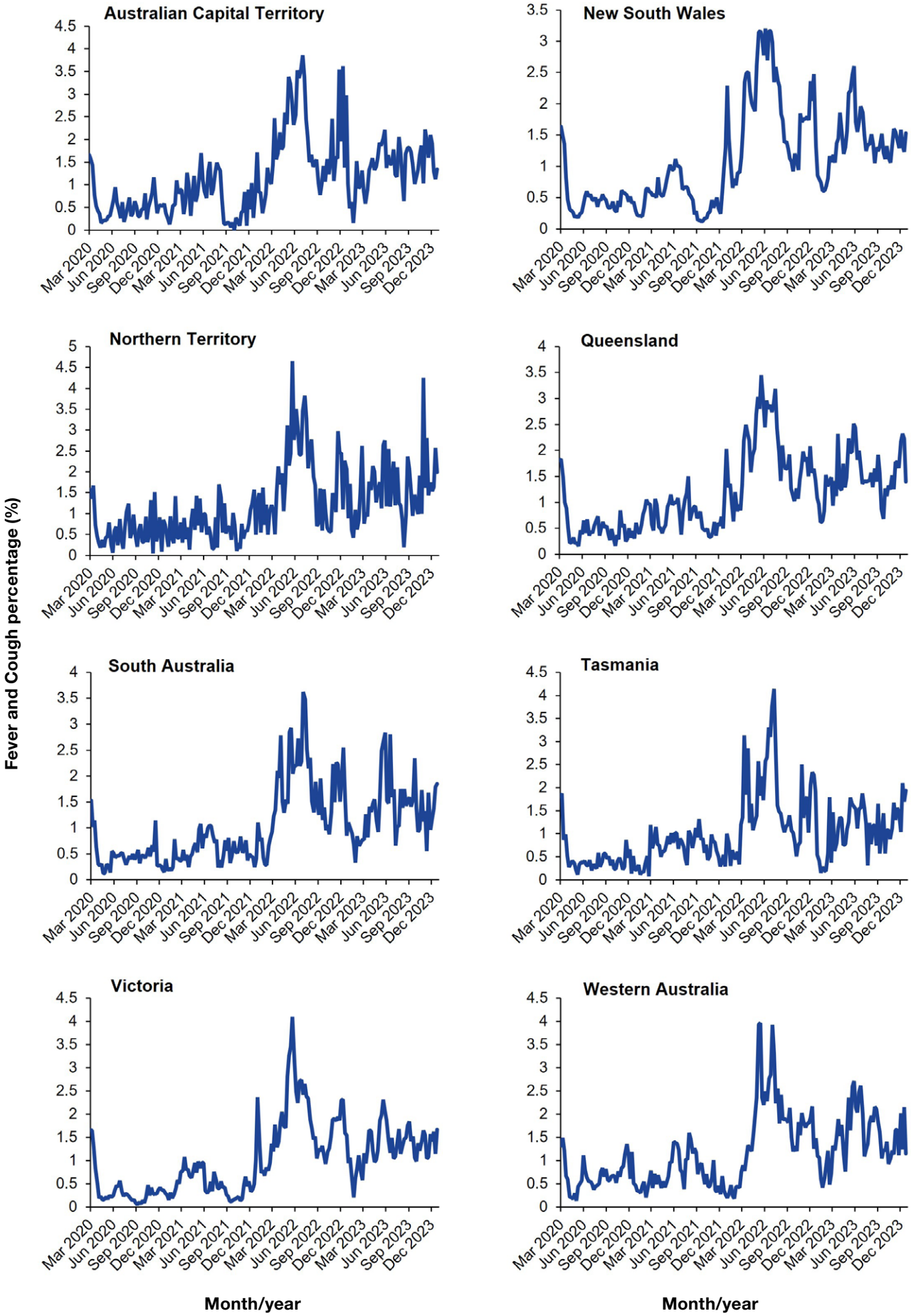

Figure A.2: FC incidence by sex, Australia, 2020–2023, by week

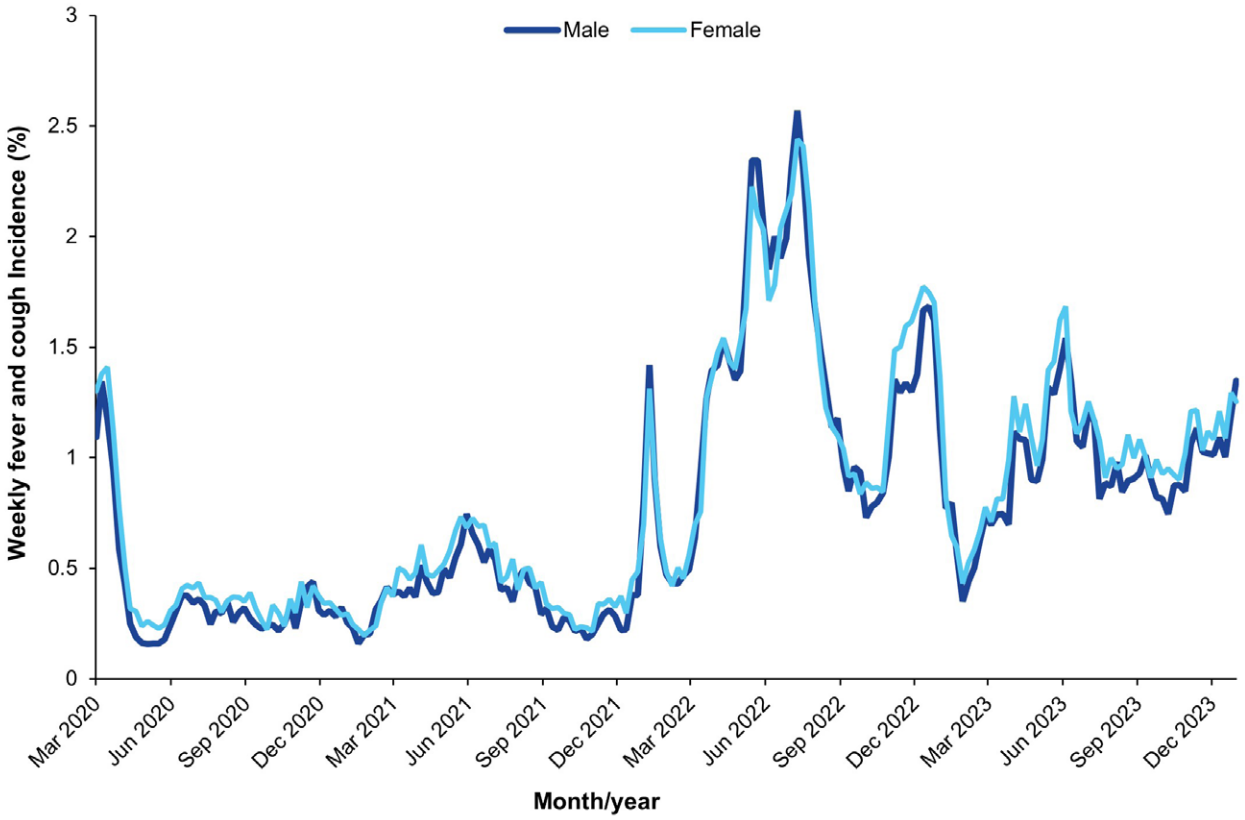

Figure A.3: FC incidence by highest education level, Australia, 2020-2023, by week