

FLUTRACKING WEEKLY ONLINE COMMUNITY SURVEY OF INFLUENZA-LIKE ILLNESS ANNUAL REPORT, 2015

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Abstract

Flutracking is a national online community influenza-like illness (ILI) surveillance system that monitors weekly ILI activity and impact in the Australian community. This article reports on the 2015 findings from Flutracking. From 2014 to 2015 there was a 38.5% increase in participants to 27,824 completing at least 1 survey with a peak weekly response of 25,071 participants. The 2015 Flutracking national ILI weekly fever and cough percentages peaked in late August at 5.0% in the unvaccinated group, in the same week as the national counts of laboratory confirmed influenza peaked. A similar percentage of Flutracking participants took two or more days off from work or normal duties in 2015 (peak level 2.3%) compared with 2014 (peak level 2.5%) and the peak weekly percentage of participants seeking health advice was 1.6% in both 2014 and 2015. Flutracking fever and cough peaked in the same week as Influenza Complications Alert Network surveillance system influenza hospital admissions. The percentage of Flutracking participants aged 5 to 19 years with cough and fever in 2015 was the highest since 2011. The 2015 season was marked by a transition to predominantly influenza B strain circulation, which particularly affected younger age groups. However, for those aged 20 years and over, the 2015 national Flutracking influenza season was similar to 2014 in community ILI levels and impact. *Commun Dis Intell* 2016;40(4):E512–E520.

Keywords: influenza, surveillance, syndromic surveillance, influenza-like illness, survey, Flutracking.

Introduction

Flutracking provides weekly community level influenza-like illness (ILI) surveillance that is not biased by health seeking behaviour, clinician testing practices or differences in jurisdictional surveillance methods.^{1–4} Flutracking provides an indication of differential ILI rates in influenza-vaccinated and unvaccinated participants and impact of illness at a community level.⁵ The Flutracking surveillance system has been incorporated into the weekly Australian Influenza Surveillance Report since 2009.⁶

The main aims of Flutracking are to:

1. compare ILI syndrome proportions between vaccinated and unvaccinated participants to detect inter-pandemic and pandemic influenza;
2. provide consistent surveillance of influenza activity across all jurisdictions and over time; and
3. provide year-to-year comparison of the timing, incidence, and impact of influenza on the community.

In this report, we aim to describe

- the epidemiology of ILI and influenza vaccination in the community;
- the performance characteristics of the Flutracking system; and
- the comparison between these estimates with other sources of surveillance data in the 2015 season.

Methods

The Flutracking surveillance system was in operation for 26 weeks in 2015, from the week ending Sunday 26 April to the week ending Sunday 18 October 2015. The cohort of participants is maintained year to year and is boosted by an annual recruitment drive, which usually runs from March to May. In 2015, the recruitment drive was from 1 April to 6 May. Participants may opt out of participating at any time. The recruitment methods in 2015 were similar to those used in 2007–2014.¹

The weekly survey questions evolved from 2007–2012.^{1,7} but no changes have been made to the questions from 2013 onwards.

Descriptive statistics

Descriptive statistics were tabulated and summarised for each state and territory, by age group, gender, education level, Aboriginal and Torres Strait Islander status, and vaccination status.

A participant is defined as anyone who has a survey submitted by them self or on their behalf. A respondent is anyone who submits a survey either for them self or on behalf of a household member.

The participation rate was calculated using the Australian Bureau of Statistics June 2015 Estimated Resident Population⁸ for state and territory, age group, gender, education level, and Aboriginal and Torres Strait Islander status.

We analysed the proportion of vaccinated participants aged less than 10 years of age by whether there was at least 1 participant in their household who was a healthcare worker with patient contact.

The mean proportion of participants who responded by 24 hours after the survey was distributed was calculated across all 26 weeks of surveillance. This calculation was also stratified by age groups. Time taken to respond to the survey was calculated for primary participants only (that is, those responding for themselves and possibly other household members). For participants in Western Australia, 2 hours were subtracted from their time to respond, to account for differences in time zones. No adjustment was made for the 30 minute time zone difference in South Australia and the Northern Territory.

Unless otherwise stated, a participant with ILI was defined as having both self-reported fever and cough. For ILI percentage calculations, the numerator was all persons who completed a survey for the current week and reported ILI symptoms, and the denominator was all persons who completed a survey for the current week. Weekly ILI percentages were compared by self-reported vaccination status for participants. The unstratified (by vaccination status) ILI percentages were also compared with national laboratory confirmed influenza notifications for 2009 to 2015.

Weekly percentages of community ILI were calculated. ILI percentages, not stratified by vaccination status, were compared with FluCAN admissions to hospital for influenza from 2012 to 2015.

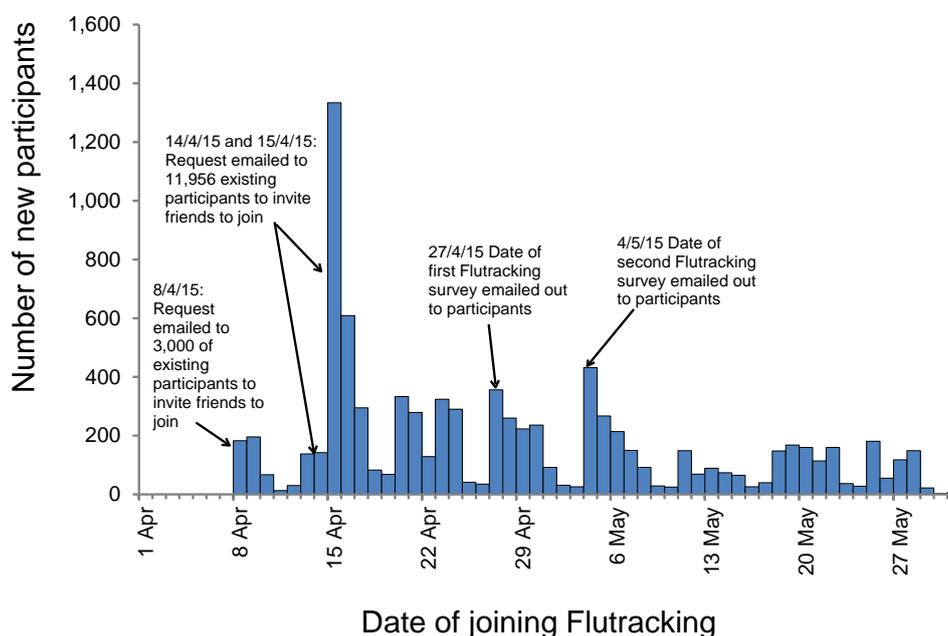
The weekly percentage of participants from 2011 to 2015 who had 1) fever and cough and 2 or more days off work or normal duties; and 2) who visited a general practitioner, emergency department or were admitted to hospital due to fever and cough was compared.

Results

Recruitment in 2015

Participants were encouraged to join at any time during the year. Similar to previous years, the most successful recruitment strategy in 2015 was recruitment through previous participants. There were 17,687 participants who previously participated in 2014 and also completed at least 1 survey in 2015. On 8, 14, and 15 April 2015, a *Welcome Back to Flutracking* email was sent to all active participants (15,082 participants who respond for themselves and other household members) with a suggestion that participants invite friends to join the survey. From 1 January to 7 April 2015, 50 people had enrolled. On 8 and 9 April, respectively 183 and 196 participants enrolled. On 14, 15 and 16 April, respectively 142, 1,334 and 609 participants enrolled. There were an additional 356 participants recruited on 27 April and an additional 432 participants recruited on 4 May: these spikes correspond to the dates the first and second Flutracking survey emails were sent to participants (Figure 1).

Figure 1: Significant Flutracking recruitment events and impact, 2015



The Western Australia Department of Health recruited an additional 1,873 participants into Flutracking to support a research project in 2015.

The 30 organisations with the highest number of participants in Flutracking for 2014 were emailed a 'Congratulations' certificate and asked to invite any new employees to participate in Flutracking in 2015.

Facebook requests to participants to 'like' the Flutracking page resulted in an increase in page likes from 2,497 'likes' (6 April 2015) to 3,138 'likes' (20 April 2015).

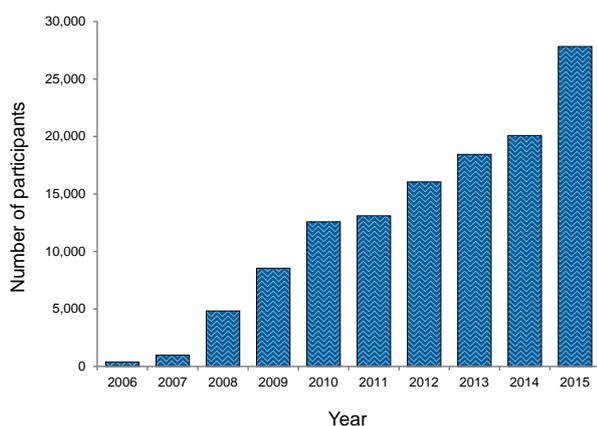
As a result of the above recruitment strategies and media coverage a total of 9,987 participants joined the survey in 2015, compared with the 5,099 that joined in 2014.

Participation in 2015

There were 16,707 respondents for 27,828 participants who completed at least 1 survey in 2015. Of the 26,224 participants who completed a survey during the first 4 survey weeks of 2015, 59.1% completed all available surveys, and 78.0% completed more than 90% of available surveys. From 2014 onwards, once they have finished their current survey, participants have been able to click on any prior surveys from the past 5 weeks to complete. This has increased the percentage of surveys completed for both 2014 and 2015.

There were 27,824 participants who completed at least 1 survey in 2015, compared with 20,087 in 2014 (a 38.5% increase) (Figure 2). At a state and territory level, increases in peak weekly participation were most marked in Western Australia, the Australian Capital Territory, Queensland, and Victoria. In 2015, Tasmania had the highest rate

Figure 2: Number of participants who completed at least one survey, Australia, 2006 to 2015, by year



of Flutracking participation per 100,000 persons, followed by the Northern Territory and the Australian Capital Territory (Table 1). New South Wales, Victoria, and Queensland all had lower rates of participation than the general Australian population (Table 1).

Socio-demographic characteristics

Of the participants who completed at least 1 survey and responded to each of the demographic questions in 2015, 59.0% were aged 35–64 years, 61.6% were female, 61.7% had completed a bachelor degree, graduate diploma or certificate or post-graduate degree, and 1.3% identified as Aboriginal and/or Torres Strait Islander (Table 2). Compared with the national profile, the following demographic groups were underrepresented among Flutracking participants: 0–34 years and 65 years or over age groups; males; Aboriginal and Torres Strait Islander participants; and participants with lower levels of educational attainment.

Time to respond to survey each week

Most participants responded within 24 hours of the survey being sent, with a mean 24 hour response of 72.9% over the 26 weeks. The 65 years or over age group had the highest percentage of all age groups responding within 24 hours, with a mean 24 hour response of 81.4% over the 26 weeks.

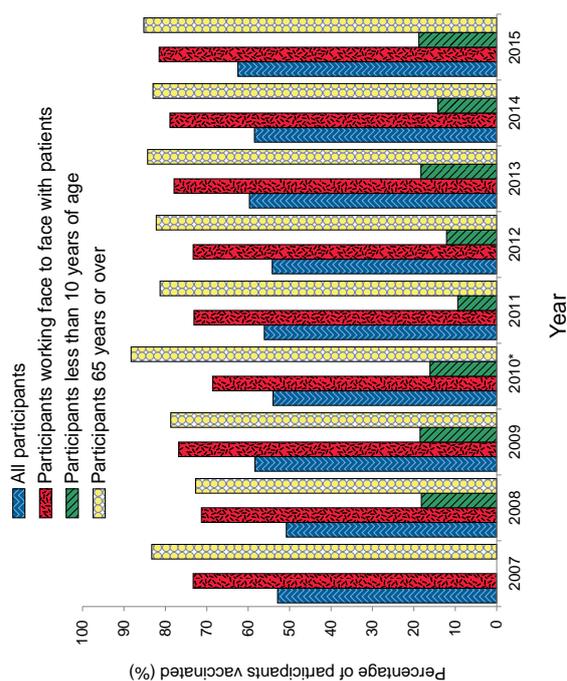
Percentage of participants vaccinated

Seasonal vaccination levels among participants were higher in 2015 than prior years. By the end of the 2015 season (week ending 18 October 2015), 62.5% (13,313/21,293) of participants had received the 2015 seasonal vaccine, compared with 58.5% (9,742/16,642) of participants by the end of 2014. Of the 4,447 participants who identified as working face-to-face with patients in 2015, 3,622 (81.4%) received the vaccine compared with 78.9% by the end of 2014. In 2015, 18.8% (269/1,429) of participants less than 10 years of age were vaccinated with the seasonal influenza vaccine by the end of the season, compared with 14.0% in 2014. In 2015, among households with at least 1 member working face-to-face with patients, 17.5% of participants aged less than 10 years were vaccinated, compared with 16.9% of participants aged less than 10 years in households without a member working face-to-face with patients. In 2015, 85.2% (2,411/2,054) participants aged 65 years or over were vaccinated with the seasonal influenza vaccine by the end of the season, compared with 83.0% in 2014 (Figure 3).

Table 1: Recruitment to Flutracking, 2014 and 2015, by state or territory

State or territory	2014			2015			% Distribution of the underlying Aust. population	Percentage positive change
	Number of participants (peak week)	Flutracking participation per 100,000 population	Per cent of participants (peak week)	Number of participants (peak week)	Flutracking participation per 100,000 population	Per cent of participants (peak week)		
ACT	662	169.4	3.6	1,062	271.8	4.2	1.6	60.4
NSW	6,357	83.4	34.8	7,525	98.8	30.0	32.0	18.4
NT	801	327.5	4.4	954	390.0	3.8	1.0	19.1
Qld	1,726	36.1	9.4	2,283	47.8	9.1	20.1	32.3
SA	2,840	167.2	15.5	3,355	197.5	13.4	7.1	18.1
Tas.	2,012	389.5	11.0	2,368	458.4	9.4	2.2	17.7
Vic.	2,844	47.9	15.6	3,482	58.6	13.9	25.0	22.4
WA	1,045	40.3	5.7	4,041	155.9	16.1	10.9	286.7
Total	18,287	76.9	100.0	25,070	105.4	100.0	100.0	37.1

Figure 3: Percentage of participants vaccinated with the seasonal influenza vaccine at the final survey of each year, by participant characteristics, Australia, 2007 to 2015, by year



* This percentage calculation is for those participants who received either the monovalent H1N109 influenza vaccine in 2009 or 2010, or received the 2010 seasonal influenza vaccine.

Table 2: Socio-demographic characteristics of Flutracking participants who completed at least one survey during 2014 and 2015

	2014		2015		% Distribution of the Australian population	
	Frequency	Per cent	Rate per 100,000*	Per cent		Rate per 100,000*
Age (years)						
0–15	2,638	12.6	55.4	12.4	72.4	20.0
16–34	3,754	17.9	59.0	18.5	81.1	26.7
35–49	5,405	25.7	112.7	25.3	146.8	20.2
50–64	7,311	34.8	170.2	33.7	218.5	18.1
65 and over	1,909	9.1	53.5	10.0	78.2	15.0
Total participants	21,017	100.0	88.4	100.0	117.0	100.0
Gender						
Male	7,461	38.6	63.1	38.4	85.6	49.7
Female	11,867	61.4	99.3	61.6	135.8	50.3
Total reported	19,328	100.0	81.3	100.0	110.8	100.0
Education†						
Year 11 or below (or equiv) or Certificate I/II/III/IV	3,417	21.0	44.7	20.9	60.3	44.1
Year 12 (or equivalent)	1,299	8.0	45.0	8.4	64.1	16.6
Advanced Diploma/ Diploma	1,538	9.5	110.4	9.2	145.6	8.0
Completed Bachelor Degree	3,801	23.4	162.4	24.0	226.6	13.5
Grad Diploma/ Grad Certificate	2,265	13.9	761.9	13.6	1009.8	1.7
Postgraduate Degree	3,921	24.1	621.3	24.1	844.7	3.6
Total who nominated an ABS equivalent education level (15 years and over only)	16,241	100.0		100.0		
Aboriginal and/or Torres Strait Islander						
Yes	235	1.4	35.1	1.3	45.4	3.0
No	16,309	98.6	75.3	98.7	108.6	97.0
Total reported	16,544	100.0	74.1	100.0	106.7	100.0

* Calculated using Australian Bureau of Statistics (ABS) June 2015 quarter Estimated Resident Population.

† Note that the rate per 100,000 was calculated using participants aged 15–74 years for all categories except Enrolled Bachelor Degree. The rate per 100,000 for Enrolled Bachelor Degree was calculated using participants aged 15–64 years of age. These age adjustments were necessary to match the age groups in the ABS data.

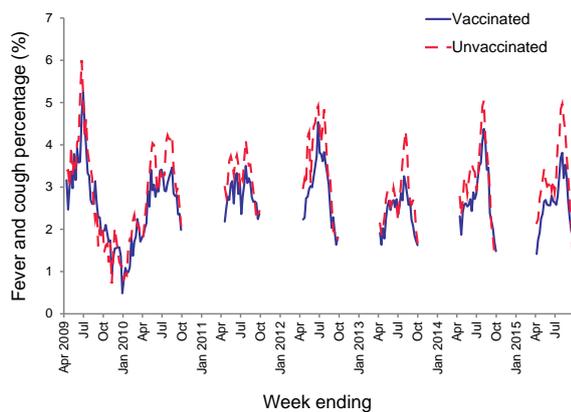
Percentage of participants with influenza-like illness symptoms

Of participants who completed a survey in the national peak week of ILI for 2015, 4.3% reported fever and cough compared with 4.7% in 2014 and 3.6% in 2013. Of participants who completed at least 1 survey in the national peak 4 weeks of ILI for 2015, 11.7% reported fever and cough, compared with 12.4% in 2014 and 9.6% in 2013 (Table 3).

Detection of influenza-like illness

Figure 4 shows the 2009 to 2015 weekly ILI percentages by vaccination status. Peak ILI activity for 2015 was during the week ending 23 August (5.0% in the unvaccinated group and 3.8% in the vaccinated group). Divergence between the vaccinated and unvaccinated participants' ILI percentages was highest during the following week of week

Figure 4: Fever and cough percentage stratified by vaccination status, Australia, 2009 to 2015, by week

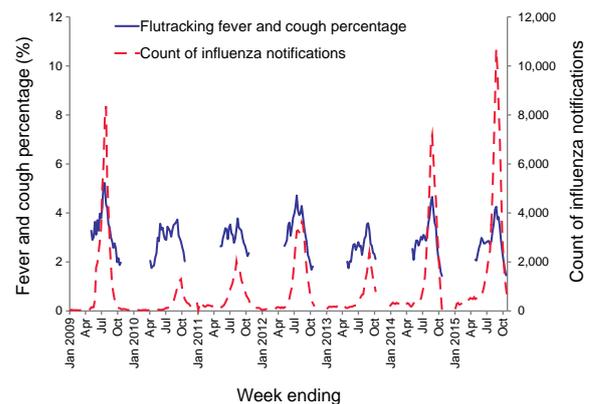


ending 30 August (4.6% in the unvaccinated group and 3.2% in the vaccinated group). The levels of ILI seen in 2015 were similar to the 2014 and 2012 seasons.

Comparison with national laboratory influenza notifications

There was an increase in the number of laboratory confirmed cases of influenza from 7,170 notifications in the peak week of laboratory notifications for 2014 to 10,678 notifications in the peak week of laboratory notifications for 2015. However, the peak weekly 2015 Flutracking ILI percentage unstratified by vaccination status was lower (4.3%) than the peak weekly 2014 percentage (4.7%) (Figure 5). In 2015, the timing of the peak week

Figure 5: Fever and cough percentage, 1 April to 31 October* compared with national influenza laboratory notifications, Australia, 2009 to 2015, by week



* Not stratified by vaccination status

Table 3: Percentage of participants with influenza-like illness symptoms who completed a survey either in the national peak influenza-like illness week, or completed at least one survey in the national peak 4 weeks of influenza-like illness, Australia, 2013 to 2015

Symptoms	Participants who completed a survey in the national peak ILI week						Participants who completed at least one survey during the national peak 4 weeks ILI					
	2013*		2014†		2015‡		2013§		2014¶		2015**	
	n	%	n	%	n	%	n	%	n	%	n	%
Fever	742	4.8	1,067	5.8	1,289	5.4	2,130	12.5	2,920	15.2	3,568	14.2
Cough	2,208	14.2	2,957	16.2	3,751	15.6	4,816	28.3	6,212	32.4	7,727	30.7
Fever and cough	558	3.6	852	4.7	1,021	4.3	1,634	9.6	2,385	12.4	2,942	11.7
Fever, cough and sore throat	430	2.8	618	3.4	745	3.1	1,263	7.4	1,775	9.3	2,288	9.1

* ending 25 August 2013, N=1 Week 5579.
 † Week ending 24 August 2014, N=18,287.
 ‡ Week ending 23 August 2015, N=23,985.

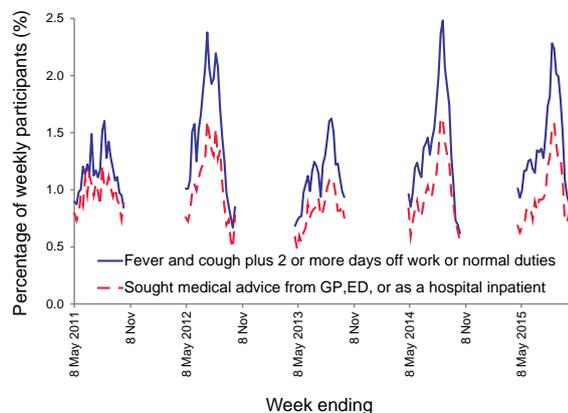
§ Weeks ending 11 August to 1 September 2013, N=16,988.
 ¶ Weeks ending 10 August to 31 August 2014, N=19,188.
 ** Weeks ending 16 August to 6 September 2015, N= 25,196.

of Flutracking ILI levels was the same as the timing of the peak week of laboratory notifications of influenza (week ending 23 August 2015).

Time off work or normal duties and health seeking behaviour

The peak weekly percentage of participants taking time off work or normal duties in 2015 was 2.3% in 2015 and 2.5% in 2014, while the peak weekly percentage of participants seeking health advice was 1.6% in both 2014 and 2015 (Figure 6).

Figure 6: Figure 6: Weekly influenza-like illness severity,*Australia, 2011 to 2015, by week



* The denominator is the number of weekly participants.
GP General practitioner
ED Emergency department

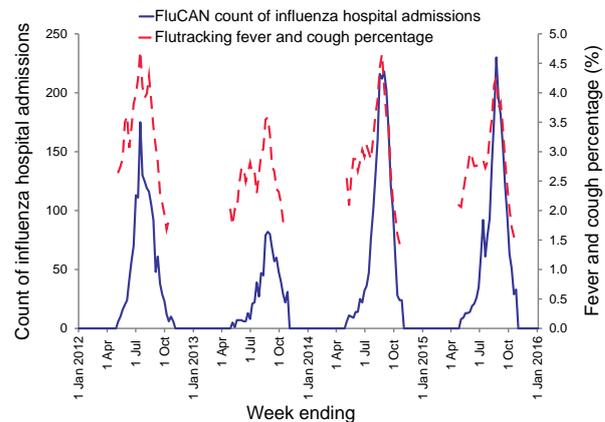
Comparison of Flutracking influenza-like illness with the hospital-based FluCAN surveillance system

There was an increase in the number of influenza admissions with confirmed influenza recorded in the peak week of FluCAN surveillance data (218 in the peak week of 2014 compared with 230 in the peak week of 2015). In 2015 the timing of the peak week of Flutracking ILI levels (fever and cough) was the same as the timing of the peak week of FluCAN hospital admissions for influenza (week ending 23 August 2015) (Figure 7).

Percentage of participants with influenza-like illness by age group

The percentage of Flutracking participants aged 5–19 years with cough and fever in 2015 was the highest since 2011 (Figure 8).

Figure 7: Percentage of Flutracking participants with fever and cough compared with FluCAN influenza hospital admissions, Australia, 2012 to 2015, by week



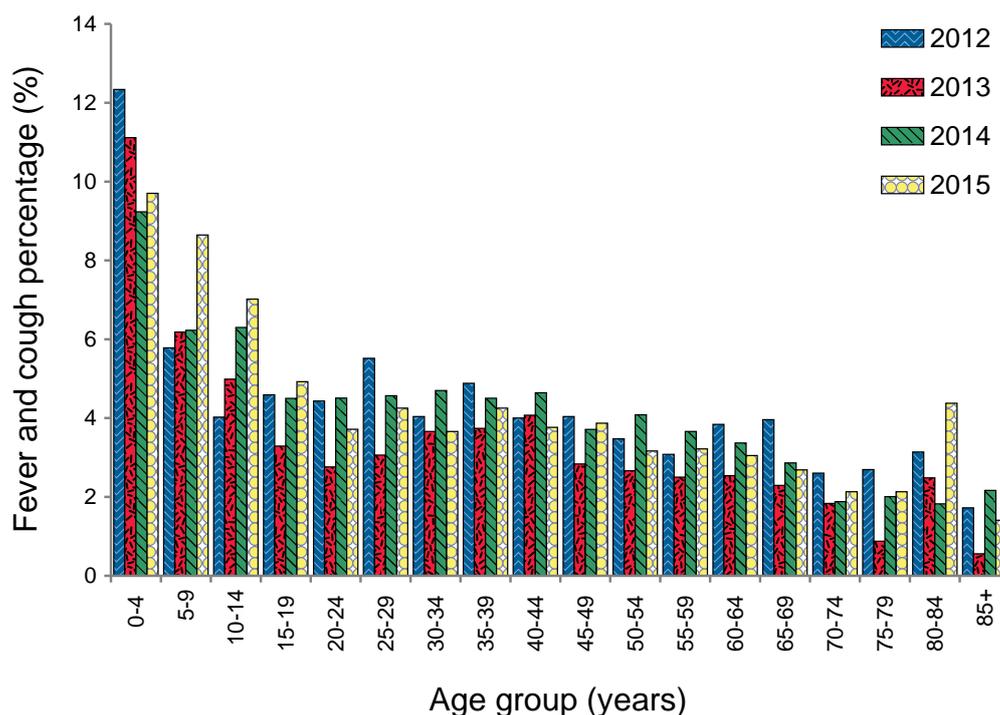
Discussion

The number of participants enrolled to participate in Flutracking increased markedly from 2014 to 2015. Although there were increases in participation in every state and territory in 2015, almost a quarter (24%) of this national increase in participation could be attributed to Western Australia Department of Health encouraging employees to sign up to Flutracking to participate in a vaccine effectiveness study. Dissemination of invitations to potential participants by existing Flutracking participants also continued to be an effective method of recruitment.

As the recruitment strategies were similar in 2015 to 2014, the distribution of participants among each age group, gender, education level, and Aboriginal and Torres Strait Islander status group has remained similar to 2014. There is still underrepresentation of participants in the 0–34 years and 65 years or over age groups, males, participants with non-tertiary education and Aboriginal and Torres Strait Islander participants. This highlights the need for more targeted recruitment strategies reaching out to under-represented groups through consultation and targeted recruitment campaigns.

Influenza vaccine coverage of Flutracking participants increased in 2015 to its highest recorded level since 2007 for all participants, and more specifically, for participants working face-to-face with patients and participants aged less than 10 years of age. Among children less than 10 years of age, the percentage who received influenza vaccination has gradually increased since 2011. These results do not appear to be biased by children with healthcare

Figure 8: Percentage of participants with fever and cough episodes, by year and age group, Australia, 2012 to 2015*



* Only the 4 peak weeks of fever and cough in Australia for each year were included.

workers in the family. The lower levels of vaccination in this age group in 2011 may be attributed to the increased reports of fever and febrile convulsions in children less than 10 years of age after vaccination with Fluvax and Fluvax Junior in 2010.⁹ We acknowledge that Flutracking participants may be more likely to be vaccinated than the general population based on motives to participate in the survey, and because unvaccinated participants are asked about their vaccination status each week.

Based on Flutracking fever and cough weekly percentages, the peak community ILI levels in the 2015 season were slightly lower than the peak community ILI levels in the 2012 and 2014 seasons. However, national influenza laboratory notifications showed an increase in influenza cases from 2014 to 2015. This discrepancy between the relative magnitude of the influenza season as described by laboratory notifications and Flutracking most likely reflected an increase in laboratory testing. Fielding et al noted that public funding for the purchase of new polymerase chain reaction (PCR) testing equipment following the 2009 H1N1 influenza pandemic and Medicare reimbursement for PCR testing, may have influenced provider practice and driven increases in influenza testing.¹⁰

Flutracking analyses suggest similar levels of ILI in the community in 2015 and 2014, with slightly lower time off normal duties in 2015 and similar

health care seeking behaviour. FluCAN's influenza peak number of weekly hospital admissions also suggested that the 2014 and 2015 seasons were not meaningfully different. The total number of FluCAN influenza hospital admissions for 2015 were similar to 2014 (2,060 in 2015 as compared with 2,092 in 2014). Compared with 2014, when there was a mix of influenza A H1N1 and H3N2 with lower levels of influenza B, 2015 was marked by a transition to predominantly influenza B strain circulation with the B/Victoria lineage dominating the B/Yamagata lineage by the end of the influenza season.⁶ Influenza B has been regarded as less severe than influenza A infection but no difference was identified in a recent comparison of severity of influenza A and B infection based on outcomes among hospitalised patients.¹¹ The similar levels of severity overall in 2014 and 2015 seen in Flutracking and FluCAN supports this.

The predominance of influenza B activity in 2015 particularly affected younger age groups. Flutracking ILI percentages were at their highest since 2011 in the 5–19 years age groups and this was reflected in laboratory surveillance.⁶ In summary, in 2015 Flutracking demonstrated that the severity of the 2015 season at the community level was similar to 2014, except in participants under 20 years of age who were likely impacted by circulating influenza B strains.

Competing interests

All authors declare that they have no competing interests.

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Author contributions

Craig Dalton conceived and designed the project, oversaw the statistical analysis, and contributed to writing of the manuscript. Sandra Carlson contributed to the writing of the manuscript and the statistical analysis. David Durrheim contributed to the design of the project and writing of the manuscript. Michelle Butler also contributed to the statistical analysis. Allen Cheng provided FluCAN data for comparison and contributed to the interpretation of data and writing of the manuscript. Heath Kelly contributed to data interpretation and writing of the manuscript.

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