



**Evaluation of the ACT
influenza vaccination program for
children aged 6 months to <5 years**

Report

1 April 2019

Contents

Acknowledgements	13
Abbreviations	14
Executive Summary	15
Introduction	22
Chapter 1: Process evaluation.....	24
Module 1 – Online Survey of Immunisation Staff.....	25
Module 2 – Key Stakeholder Interviews.....	31
Chapter 2: Vaccination Coverage	49
Chapter 3: Vaccine Safety	61
Chapter 4: Disease Burden	64
Discussion	70
Conclusion	71
References	72

Acknowledgements

This evaluation was conducted under contract between ACT Health and the National Centre for Immunisation Research and Surveillance (NCIRS).

The evaluation was coordinated by Kelley Meder, NCIRS.

This report was prepared by NCIRS staff:

- Process evaluation:
 - Module 1: Harunor Rashid, Aditi Dey, Frank Beard
 - Module 2: Bianca Bullivant, Harunor Rashid, Aditi Dey, Frank Beard
- Vaccination coverage: Alexandra Hendry, Aditi Dey, Frank Beard
- Vaccine safety: Kelley Meder, Aditi Dey, Han Wang, Frank Beard
- Disease burden: Kelley Meder, Aditi Dey, Han Wang, Frank Beard

We thank Kristine Macartney, NCIRS, for comments on the draft report.

The authors acknowledge the following key stakeholder groups whose members participated in the interviews and online survey for the process evaluation:

- ACT Health, Health Protection Service
- Division of Women, Youth and Children
- Early Childhood Immunisation Clinic Staff
- Community Health Intake
- Capital Health Network
- Immunisation nurses
- General practitioners

Abbreviations

• ACT	Australian Capital Territory
• ACTPAS	ACT Patient Administration System
• AEFI	Adverse Events Following Immunisation
• AIR	Australian Immunisation Register
• ATAGI	Australian Technical Advisory Group on Immunisation
• CHI	Community Health Intake
• CHN	Capital Health Network
• DWYC	Division of Women, Youth, and Children
• ECI	Early Childhood Immunisation
• ERP	Estimated Resident Population
• FluCAN	The Influenza Complications Alert Network
• GPs	General Practitioners
• HPS	Health Protection Service
• NIP	National Immunisation Program
• NNDSS	National Notifiable Diseases Surveillance System
• PHN	Primary Health Network
• TGA	Therapeutic Goods Administration
• VIMS	Vaccine Inventory Management System

Executive Summary

Influenza contributes substantially to the global burden of severe acute paediatric respiratory illness.

Influenza vaccination has been recommended by the Australian Technical Advisory Group for Immunisation (ATAGI) for all children from 6 months to <5 years of age for a number of years. Under the National Immunisation Program (NIP) influenza vaccine is only funded in this age group for Aboriginal and Torres Strait Islander children and children with specified medical conditions. In April 2018, ACT Health introduced a program which provided funded vaccine for all children in this age group.

We evaluated the implementation (process evaluation) and early impact (coverage, vaccine safety and disease burden) of the influenza vaccination program for Australian Capital Territory (ACT) children aged 6 months to <5 years in 2018.

Key findings

Process evaluation

The process evaluation was conducted in two modules.

Module 1

In the first module, a link to an online survey was circulated by ACT Health to approximately 50 immunisation providers working for ACT Health. The survey was also promoted by the Capital Health Network to general practice staff via an electronic newsletter. Eleven providers (4 GP practice nurses, 4 Early Childhood Immunisation [ECI] staff, 2 immunisation nurses and 1 nurse manager) responded to the survey, which was conducted from 15 January – 12 February 2019.

Most respondents reported that parents of program eligible children were aware that free influenza vaccine was available for this age group (90.9%, 10/11, agreed or strongly agreed). All 11 respondents reported that the

program was well accepted by parents of eligible children and that the vaccination program was well accepted by providers.

The majority of respondents (64%, 7/11) reported that they did not actively contact parents to offer vaccination but provided opportunistic influenza vaccination to eligible children. One respondent reported contacting parents via emails, and 27% (3/11) reported other ways of promoting the influenza vaccination program to parents.

The majority (73%, 8/11) of respondents reported not experiencing any issues with the supply of influenza vaccine for children aged 6 months to <5 years. However, 27% (3/11) of respondents reported experiencing some transient delays in the supply of influenza vaccine.

The key barriers identified by respondents were lack of awareness among some parents (4/11), restricted age eligibility for free influenza vaccine (3/11), concerns about vaccine effectiveness or safety (3/11), adding an annual vaccination to an already crowded schedule (3/11), busy clinic load (3/11) and the vaccination being seasonal (3/11).

Module 2

In the second module, 14 key stakeholders (individuals involved in the program, including but not limited to immunisation providers) from across the ACT were interviewed via telephone between 10 January and 6 February 2019.

Stakeholders generally considered the information resources provided by ACT Health to be of good quality, however, their use of, and familiarity with, the resources varied.

Several key barriers were highlighted including: a short lead time from program announcement to implementation; reluctance to give four injections (NIP scheduled and influenza vaccines) at once to a child; transient delays in

vaccine supply, and parents with anti-vaccination views refusing to let their children be vaccinated.

Six stakeholders reported that the very short lead time made it difficult for them to recruit additional staff prior to the implementation of the program. Two stakeholders reported additional workload and stress due to the lack of additional staff allocated for the program. Lack of clinic space limited bookings and capacity to vaccinate children especially in the early weeks of peak vaccine demand, resulting in staff recalling patients or vaccinating at later visits.

Seven stakeholders reported that the program was not tailored specifically for people from culturally and linguistically diverse backgrounds, whilst two mentioned the limited availability of translated resources and interpreter services.

Seven stakeholders acknowledged issues with transient delays in vaccine supply in the ACT (in context of a more generalised nationwide shortage). Stakeholders reported no major issues with cold chain breaches or vaccine leakage. However several instances of improper vaccine administration were reported.

Issues with recording data were also reported by some (n=2) but not all stakeholders. Two stakeholders from Health Protection Service (HPS) mentioned that lack of labelling of FluQuadri assigned to the ACT-funded childhood program resulted in issues with recording data in the Vaccine Inventory Management System (VIMS) system but no major issues with recording information on medical software or on the Australian Immunisation Register (AIR) were reported.

Coverage

Early impact of the vaccination program was evaluated by estimating coverage of influenza vaccines for ACT children aged between 6 months and <5 years. Using AIR data as at 30 September 2018, influenza vaccination

coverage was calculated by calendar year (2014-2018), age group and Indigenous status.

Overall 43.4% of ACT children aged between 6 months to <5 years were recorded on the AIR to have received at least one dose of influenza vaccine between 1 April and 30 September 2018. Overall coverage was 43.7% for non-Aboriginal children and 33.8% for Aboriginal children. This represented a substantial increase in coverage from 2017 (5.7% and 10.3%, respectively). The proportion of children recorded on the AIR with at least one dose of influenza vaccine in 2018 decreased with increasing age from 70.6% in children aged 6 months to <1 year to 35.4% in 3 years to <5 year olds. Coverage was higher in non-Aboriginal compared to Aboriginal children across each age group. Of the children recorded on the AIR as receiving their first dose of an influenza vaccine in 2018, 74.2% received a second dose, as recommended; this was lower in Aboriginal (67.0%) compared to non-Aboriginal (74.3%) children.

Vaccine Safety

Passive Adverse Events Following Immunisation (AEFI) surveillance was used to monitor the safety of the ACT influenza vaccination program for children aged 6 months to <5 years.

In 2018, there were 5 reported AEFI in ACT resident children aged 6 months to <5 years for 19,874 total influenza doses administered from 1 January to 31 December 2018, an AEFI rate of 0.03 (95% CI 0.01-0.06) per 100 vaccine doses administered. One adverse event was reported following FluQuadri, and four AEFI following doses of FluQuadri Junior. No AEFI were reported in the previous year (2017).

Of the five 2018 AEFI reports, signs/symptoms included rash (4), fever (1), injection site reaction (1), paleness (1), nausea (1), and abdominal cramps (1); all children recovered fully and no reports were categorised as serious.

Disease Burden

There were 62 notifications of influenza in children aged 6 months to <5 years in 2018 in the ACT, equating to a notification rate of 24.1 per 10,000

population. This was a dramatic drop compared to 2017, when 295 notifications were recorded (115.2 per 10,000 population), and 56% lower than the average annual notification rate over the previous 5 years (2013 to 2017, 55.2 notifications per 10,000 population).

There were six hospitalisations coded as due to influenza in the target age group in 2018 (2.3 hospitalisations per 10,000 population), representing an 86% decline compared to 2017 (16.8 hospitalisations per 10,000 population) and a 76% decline compared with the previous 5 years (2013 to 2017, 9.8 hospitalisations per 10,000 population). Of the six children hospitalised in 2018, only one (aged 6 months to <1 year) was vaccinated. None of the cases had identified medical risk factors.

Conclusions

This evaluation report shows that the ACT influenza vaccination program for children aged 6 months to <5 years resulted in substantially higher influenza vaccination coverage in both non-Aboriginal and Aboriginal (NIP funded) children compared with 2017, although the increase in coverage was more marked in non-Aboriginal children. Overall, 2018 coverage of 43.4% for at least one vaccine dose was slightly below the program target of 50%, although coverage recorded on the AIR likely underestimates true coverage due to underreporting. Coverage in the ACT was substantially higher than the comparable national figure (25.6%). Of the 11,569 children recorded on the AIR as receiving at least one dose of influenza vaccine in 2018, 7,440 (64.3%) received a second dose; which exceeded the program target of 50%.

No safety issues were identified during the program and much lower influenza notification and hospitalisation rates were observed, although how much of this was related to natural annual fluctuations in influenza disease activity associated with strain variation, natural immunity and the higher vaccine effectiveness observed in 2018 as compared with 2017 nationally, is unclear.

Limitations of this evaluation include the relatively small number of people who participated in the surveys (with no GPs participating) and the single season observation period, which makes it difficult to definitively assess the impact of the program on disease burden.

In summary, the ACT influenza vaccination program for children aged 6 months to <5 years was rolled out largely successfully, despite a relatively short lead time for implementation. A number of recommendations are provided below to optimise implementation and coverage in future years' programs.

Recommendations

Planning and engagement

- Provide greater lead time to allow optimal engagement between key stakeholders (including HPS, DWYC, Community Health Intake [CHI], and Capital Health Network [CHN]) in planning for future years' programs.
- Consult with relevant Aboriginal stakeholders e.g. Aboriginal Medical Service, regarding potential strategies to improve uptake in Aboriginal children.

Communication

- Enhance the communications strategy for future years' programs, including by allowing enough lead time for pilot testing of information resources for acceptability, readability and content.
- Expand program-specific materials for culturally and linguistically diverse populations, and distribute prior to start date of program.

Coverage

- Amend coverage target for receipt of two doses of influenza vaccine to proportion of those recorded as receiving the vaccine for the first time ever in the relevant year

Human resources and clinic space

- Allow sufficient lead time to enable recruitment of necessary prior to rollout of the program..

- Provide appropriate training to additional casual staff with sufficient lead time prior to program start.
- Direct some program resources to Community Health Intake to increase their staff resourcing to meet call demand at the start of the vaccination campaign.
- Identify and secure additional clinic space for influenza vaccination visits, if needed, with sufficient lead time prior to program start.

Introduction

Influenza is a highly contagious respiratory condition caused by the influenza virus.[1] It is spread from person-to-person by virus-containing respiratory droplets. Infants and children under five years of age are at increased risk of potentially serious influenza-related complications such as croup, otitis media, pneumonia, and heart and other organ damage.[1] Influenza can be fatal, even in otherwise healthy children.

Influenza vaccination rates in this age group in Australia have been historically very low. Modelling data from the United Kingdom indicates that vaccinating young children protects them and others around them by reducing transmission rates.[2] The Australian Technical Advisory Group on Immunisation (ATAGI) recommends all children from 6 months to <5 years be vaccinated for influenza,[3] however vaccination in this age group is only funded under the National Immunisation Program for Aboriginal and Torres Strait Islander children and children with certain medical conditions.[4] In 2018 all jurisdictions, except for the Northern Territory, funded jurisdiction-based influenza immunisation programs for this age group.[5]

In the Australian Capital Territory (ACT), General Practitioners (GPs) and Early Childhood Immunisation (ECI) services are the usual providers (60% and 40%, respectively) of routine childhood vaccinations. The ACT Childhood Influenza Vaccination Program commenced in April 2018 to provide influenza vaccines to children 6 months of age to <5 years, funded by the ACT government.[5] Parents and carers were able to access the vaccine through their child's usual immunisation provider (GPs or ECI Clinics). [6] The program aimed to reduce the burden of disease caused by influenza in children aged 6 months to <5 years in the ACT and in other age groups (through reduced transmission); and to deliver at least one dose of influenza vaccine to 50% of children in the ACT aged between 6 months to <5 years (with a target of 50% of these receiving 2 doses). In order to achieve these aims, free influenza vaccines were provided to young children aged 6 months to <5 years, through GP-based delivery and ECI clinics; education sessions

were delivered to immunisation providers; a Governance Group comprising Health Protection Service (HPS) and Division of Women, Youth, and Children (DWYC) staff was established to guide implementation; and the vaccination program was promoted through mass media and material delivered to immunisation providers, childcare centres and other stakeholders.

Chapter 1: Process evaluation

Background

The process evaluation aimed to assess awareness, perceptions and experiences of relevant stakeholders during the first year of the implementation of the ACT influenza vaccination program for children aged 6 months to <5 years.

The process evaluation was conducted in two modules:

- Module 1 – Online survey of immunisation providers
- Module 2 – Telephone survey of key stakeholders

Module 1: Online survey conducted from 15 January – 12 February 2019. Eleven immunisation providers in the ACT responded to this online survey.

Module 2: Fourteen stakeholders were interviewed between 10 January and 6 February 2019, including representatives of the Immunisation Branch, ACT Health; DWYC; Community Health Intake (CHI); and the Capital Health Network (CHN).

Key findings

Module 1 – Online Survey of Immunisation Staff

Aims

To assess providers' awareness of the ACT childhood influenza vaccination program for children aged 6 months to <5 years and their perceptions of relevant influenza immunisation related issues.

Methods

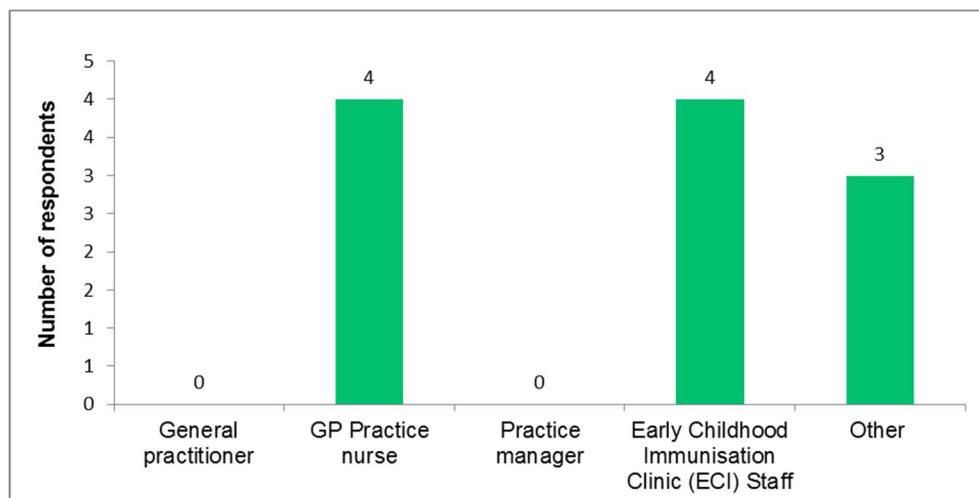
An online survey, targeted to immunisation providers in ACT (general practitioners, GP practice nurses, practice managers, and other professionals working in primary health care) was conducted using SurveyMonkey®. A hyperlink was provided to ACT Health which then emailed it to approximately 50 relevant professionals working in ACT health on 15 January 2019. Reminder emails were sent subsequently with the survey closing on 12 February 2019. The survey was also promoted to immunisation providers by the Capital Health Network via an electronic newsletter.

Results

Survey participants

Eleven healthcare providers from the ACT participated in the survey. **Figure 1** illustrates that 36% (4) of respondents were GP practice nurses, another 36% (4) were ECI staff and the remaining 27% (3) were other healthcare providers who worked in ECI clinics including an immunisation nurse, registered nurse and a nurse manager.

Figure 1. Number of respondents by professional category (n=11)



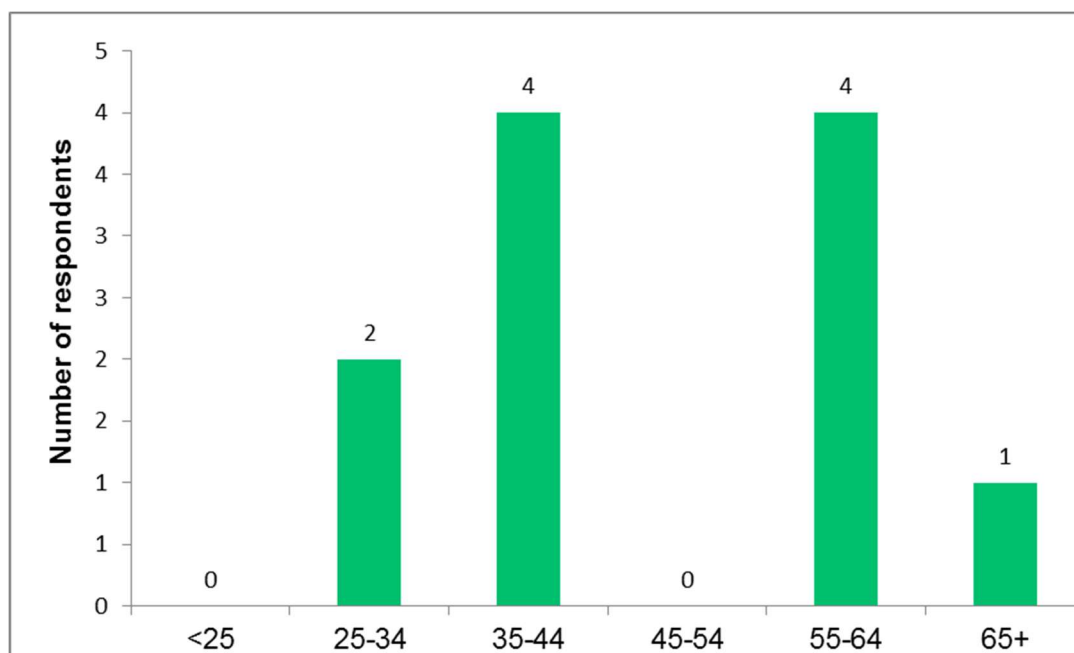
Sex

All respondents except one (91%) were females.

Age

Figure 2 shows that the majority (72.7%) of respondents were aged between 35-64 years.

Figure 2. Number of respondents by age group (n=11)



Type of practice

The majority (63.6%, 7/11) of respondents worked in ECI clinics, 18.2% (2) worked in group practices with 2-4 GPs and the other 18.2% (2) worked in large practices with ≥ 5 GPs.

Awareness and acceptance of the vaccination program

The majority of respondents reported that parents of eligible children were aware that free influenza vaccine was available for children aged 6 months to <5 years (90.9% [10] agreed or strongly agreed), only 9.1% (1) reported that parents were not aware of the program. Similarly, all respondents reported that the vaccination program was well accepted by parents of eligible children (54.6%, 6) agreed and 45.5% (5) strongly agreed), and all respondents reported that the vaccination program was well accepted by providers (63.6% agreed and 36.4% strongly agreed) (**Table 1**).

Table 1. Awareness and acceptance of the program

	Strongly disagree	Disagree	Agree	Strongly Agree	Unsure
	n (%)	n (%)	n (%)	n (%)	n (%)
Parents of eligible children were aware that free influenza vaccine was available for children aged 6 months to less than 5 years	0 (0)	1 (9.1)	8 (72.7)	2 (18.2)	0 (0)
Influenza vaccination for children aged 6 months to <5 years was well accepted by parents	0 (0)	0 (0)	6 (54.6)	5 (45.5)	0 (0)
Influenza vaccination for children aged 6 months to <5 years was well accepted by providers	0 (0)	0 (0)	63.6 (7)	4 (36.4)	0 (0)

Collaboration

Only eight individuals answered this question, the other three skipped the question. Of those who answered this question, 50% (4/8) reported liaising

with the DWYC, 38% (3/8) with public health units, another 38% (3/8) with primary health networks and 13%, (1/8) with other partners.

Education

The majority of respondents reported that they attended specific educational sessions (73%, 8/11), the rest (27%, 3/11) did not attend any educational sessions. Of those who attended educational sessions, all but one specified that these were provided by a primary health network and the other one reported receiving education from the DWYC.

Contacting parents of eligible children

There were different ways that respondents contacted parents of eligible children. The majority (64%, 7/11) reported that they did not contact parents but provided opportunistic influenza vaccination to eligible children, while 9% (1) reported contacting parents via emails and 27% (3) mentioned other ways of promoting the influenza vaccination program, including media campaigns and posters in clinics.

Five respondents (45%, 5/11) reported that the ways of contacting parents of eligible children for this program were not different to other vaccination programs, whereas 18% (2) reported that the approaches were specifically for the influenza program for children, and 36% (4) were unsure.

Supply of influenza vaccines

Eight (73%) respondents reported not experiencing any issues with the supply of influenza vaccine for children aged 6 months to <5 years. However, 27% (3/11) respondents reported experiencing transient delays with supply of influenza vaccine for children aged 6 months to <5 years.

Active follow-up for adverse events

Nine (82%) respondents reported not actively following up children for any adverse events, and two (18%) reported following up actively.

Recording and reporting influenza vaccinations

All respondents reported routinely documenting influenza vaccination for children aged 6 months to <5 years, if given, in their medical record.

Barriers and challenges to getting good uptake of influenza vaccination in children aged 6 months to <5 years

Table 2 below lists the barriers and challenges as reported by respondents. The key barriers were lack of awareness among parents, restricted age eligibility for free influenza vaccine, concerns about vaccine effectiveness or safety, adding annual vaccination to an already crowded schedule, busy clinic load and the vaccination being seasonal.

Table 2. Barriers and challenges to getting good uptake of influenza vaccination in children aged 6 months to <5 years

Barrier/Challenge	Number	%
Lack of awareness among parents	4	36%
Restricted age eligibility for free flu vaccine	3	27%
Concerns about vaccine effectiveness	3	27%
Adding annual vaccination to an already crowded schedule	3	27%
Busy clinic load	3	27%
Seasonal vaccine	3	27%
Systems for identifying and calling in eligible children	2	18%
Lack of awareness among providers	1	9%
Concerns about vaccine safety	1	9%
Anti-vaccination philosophy	1	9%

Recommendations

Only five people responded to this question in the online survey, with only two providing recommendation. One respondent said a greater stock of influenza vaccines is needed and the second stressed the importance of greater lead time to facilitate recruitment and training of staff.

Limitations

The total number of surveys completed (11) is relatively low, with no GPs participating. As a result, the data presented here may not be completely representative of the opinions and experiences of the broader healthcare provider groups.

Module 2 – Key Stakeholder Interviews

Aims

The key stakeholder interviews aimed to describe the implementation of the influenza vaccination program for ACT children aged 6 months to <5 years; describe the experiences of key stakeholders in the rollout; identify any strengths and challenges and provide recommendations; and identify any specific barriers to vaccine uptake and how to address these barriers.

Methods

Twenty-six key stakeholders (individuals involved in the program, including but not limited to immunisation providers) were invited to participate in a telephone interview between 10 January and 6 February 2019. Stakeholders were asked a series of questions to gather information regarding program development and roll-out.

Interviews were recorded and transcribed. Thematic analysis was undertaken to identify any common themes or patterns.

Results

Demographic information

A total of 14 key stakeholders from across ACT were interviewed. Two respondents from CHI provided information together in a telephone interview hence were treated as a single response. Of the 13 telephone interviews, six were from HPS, four from DWYC, two from CHI and one from CHN.

Information resources

ACT Health promoted the vaccination program through a number of information resources published on their website or circulated via emails. The information resources are: 'Frequently Asked Questions (FAQs)', 'Fact Sheet for Clinicians', 'Special Influenza Edition of the ACT Immunisation Newsletter', 'Media Release', 'Vaccine availability Media Release', 'Immunisation Education Session' (a PowerPoint presentation by a public health expert),

‘ACT Health Influenza Schedule PDF’, ‘Article for Capital Health Network’, ‘Childhood Influenza Vaccination Program A3-size poster’, ‘Childhood Influenza Vaccination Program pamphlet’, ‘Staff Bulletin (sent via e-mail)’, and ‘Chief Health Officer’s Letter to General Practitioners, Practice Nurses, and other immunisation providers’.

Five interviewees responded on the use of, and familiarity with, information resources, and rated their quality. The other eight respondents were not asked about the resources as the question was not relevant to them. Respondents’ familiarity and personal assessment about the quality of the resources varied, although they generally rated them to be good and none rated them as poor.

Three of five stakeholders who were asked about the FAQs reported that they had read the resource in full, one said they had partly read it and another was not aware of it; none reported that they had distributed it. Two users rated the resource as very good. The others did not make any comment on its quality but considered it to be the only way to find out any information they needed, although noting the delays in it being available to them. A CHI administration manager said:

Well, I did read it, because that was the only way we could find out any information, but we had to wait until it was actually on the website, remembering that it was all top secret until it – until the day it happened, so yeah. We were - if clients wanted any other information, we referred them to the webpage, or we would contact one of the maternal and child health nurses and get them to contact the caller.

In relation to the factsheet for clinicians, three reported they had read it, the other two were either unsure or had not read it, and none reported having distributed it. Of the three stakeholders that had read the resource, two rated it as very good or good and one did not provide a rating.

In relation to the ‘special influenza edition of the ACT immunisation newsletter’, two stakeholders reported reading and distributing it, the other

three were either unsure or unaware of it. Both of the stakeholders who had read this resource rated it as very good.

Three of five stakeholders reported that they were aware of the ACT government media release, with two of them reporting reading it, but no one said they had distributed it. Of the three stakeholders who were aware of the release, two rated it as good and one as very good. An immunisation nurse commented about the media release:

Yes, that was really important because then we got a lot more people interested.

Two of five stakeholders reported that they had read the media release on vaccine availability, both of whom rated it as good, but none reported that they had distributed it.

Two of five stakeholders reported that they had undertaken and distributed a link to the online immunisation education session by a public health expert titled '2018 Influenza Update'. One stakeholder rated this resource as very good while the other did not provide a rating.

Two stakeholders reported that they had read and distributed the 'ACT health influenza schedule PDF', and the article titled, 'Free flu vaccine for children under five years'. One stakeholder considered the 'ACT health influenza schedule PDF' to be good and one very good, whereas both of them rated 'Free flu vaccine for children under five years' as good.

Three stakeholders reported that they were familiar with the poster entitled, 'childhood influenza vaccination program' but only one of them reported that they had distributed it in their clinic. Two stakeholders rated the poster as good and one did not provide a rating. Two stakeholders reported that they had read and distributed the 'childhood influenza vaccination program' pamphlet, while another had only read it. All three rated the pamphlets as good, with two saying they are already distributing the pamphlets in 2019. An immunisation nurse working with DWYC said:

The pamphlets, yep. Actually, we are handing them out again for this year's lot of vaccines, you know kids that are going to be six months in March [2019].

Two stakeholders reported that they received and read the staff bulletin sent via e-mail but did not distribute it further. Both rated it as good.

Three stakeholders reported receiving and reading the Chief Health Officer's letter to GPs, GP practice nurses, and other immunisation providers but none reported distributing these documents further. One stakeholder rated it as good, with two not providing a rating. A CHI administration manager reported receiving this letter late and thinking it did not have any relevance to her staff:

".... we saw that, that was at the end of March we saw that. It was, but that meant nothing to us anyway, because that was just a letter from our chief medical officer that he was going to send out to the GPs. So, I had seen that, but it meant - it wasn't anything to do with us, so it didn't mean anything really."

Barriers

Stakeholders reported that parents or caregivers of children were generally aware of the vaccination program and accepted it. The fact that children could die of influenza motivated parents/caregivers to ensure vaccination of children. An immunisation nurse working with DWYC stated:

I think the fact that children died, I think that really gave people a scare up to immunise their children.

Stakeholders reported that the program was also generally accepted by immunisation providers, but a few providers were reluctant to give too many vaccines to children. An immunisation nurse at DWYC stated:

Some of my colleagues weren't keen to give kids four injections but I think we just have to do it. Don't we?

Six stakeholders identified barriers to achieving the desired uptake. A very short lead time was the main barrier mentioned. A DWYC administration manager said:

The short lead in time frame because what happened was that we tried to recruit internally and then they would not be released from their areas. Delay in advertising on the ACT jobs website externally. And also delay due to nowadays for nursing, it was just coming in big time around this time, was there was some big delays in police check and occupational medicine unit compliance. So, this threw out the recruitment process and there was no shortcuts. The recruitment was extremely difficult. It was difficult to roster to due to availability of staff and, if you've got a lot of part-timers, casuals, their availability – there's a mismatch between the space available to run clinics and the staff availability. It logistically, it was extremely difficult.

Issues with the supply of influenza vaccine of vaccine (transient perceived 'shortages') were reported to be a transient barrier that was ultimately managed. A practice improvement coordinator at CHN said:

I guess the shortage was a bit of a barrier. One of the practitioners - not that a lot of the practice nurses spoke to me about it. But the shortage of being able to get the vaccines, and then what they do with the ones that need it - particularly the little ones that need it the second time. But I know that ACT Health has been out to practices to talk to them about the shortage and what they've been pulling back and re-allocating. So, from what I understand, that was handled okay.

Stakeholders reported that most parents were happy to get their children vaccinated, but a few parents did not agree with the program and refused to get their child vaccinated. An immunisation nurse working with DWYC described her experience with a mother opposed to vaccination:

Most parents were happy to do it, but actually I had a mother this morning who is anti-flu vax. Because I said to her, it was an 18-month-old child that I immunised and I said to her the fluvax will be available again in April, May and she said I don't do that. And I said okay, I just

have to give you the information that it's available. And I said to her do your children go to childcare and she said yes, and I said well it is recommended they have the vaccine if they're going to childcare. And she said oh well I still don't think so. I said fine, I just have to give you the information.

A nurse working with DWYC thought that not being able to get an appointment could be a barrier.

Planning and educational sessions

The stakeholders interviewed said they were not involved in planning, but one, a practice improvement coordinator reported being involved in education. Interviewees reported that they were informed about the program sometime in early 2018, but most of them were not sure about the exact date. They knew about it either through their regular talks with ACT Health, via emails, or from the media. Two stakeholders thought the notice was inadequate, another was unsure.

When asked if they attended any educational sessions or received any training, two stakeholders reported attending some kind of educational session such as an immunisation course/s offered by HPS, both reported that the courses were helpful. An administration manager at CHI stressed the importance of in-service training:

Yeah, so I think probably a general in-service for the staff, because they are administrative staff, so that would have been helpful either from the maternal and child health service, or from the communicable diseases, the overarching ACT Health people. So, general in-service prior to the program going live and maybe like a month into it, because often questions come up then and it would have been easier than - rather than having send the emails all the time, saying what's this? What's that? So, some in-services would have been good.

The educational sessions for GPs and other immunisation providers were reported to be very popular and sometimes over-subscribed. A practice

improvement coordinator with CHN who organised educational sessions for immunisation providers said:

I think possibly were fronted to have 180 attendees at that event, and it was well and truly over-subscribed, which is why we videoed the presentations, to make those available afterwards.

Rollout/service delivery

Five stakeholders reported that there was inadequate resourcing for the program. Of the nine stakeholders that discussed the sufficiency of lead time, six felt there was insufficient lead time provided, two felt it was enough and one was unsure. The six stakeholders who felt that there was insufficient lead time provided worked at the HPS, DWYC, and CHI. For DWYC, the short lead time was reported to have made the process of recruitment and finding venues to give the vaccine very difficult.

A nurse at the HPS noted the short lead time:

There was a very short lead time and I think that was probably one of the problems, particularly for the maternal child health nurses.

In terms of staffing availability and human resources, a task force (comprising a senior policy staff member, a nursing staff member, and a junior policy staff member) was created within ACT Health to plan and implement the program. This resulted in two staff from the Immunisation Unit within HPS being taken away from their usual duties, which was reported to have impacted the Immunisation Unit, as a manager from HPS commented:

We've lost those staff for over a year now and so the rest of immunisation has been struggling quite severely since. So, staffing and resources for that program seemed okay, but it has impacted other immunisation plans, I suppose.

Two stakeholders from CHI reported a sudden increase in call volume once the program was rolled out. They said that the lack of additional human resources provided to support the implementation of the program placed staff members under a lot of stress. A CHI nurse reflected on the implementation of the program stating:

This program was implemented at short notice with little consultation with Community Health Intake. The actual workload and impact were not clearly identified. The human resources were not adequate to meet this sudden increase in call volume. There was not enough time to recruit staff.

An administration manager from CHI reported that parents/guardians were frustrated with the process of booking in for the vaccination. The lack of clinic space at the start of the program made the process of booking people in difficult:

So, there weren't a lot of clinics open for us to actually book into, so we had to ask callers to ring back or we would call them back, and that caused a lot of frustration.

Of the three stakeholders who discussed strategies to deliver the influenza vaccination program, one mentioned opportunistic vaccination, one mentioned that home visits did not occur, and one was unsure of what strategies were used.

All of the interviewed stakeholders reported that there was no active system to recall patients for the second dose. However, one nurse working for DWYC reported that they booked children in for a second dose straight after their first dose. Another nurse reported that they followed up with parents who hadn't brought their child in for their second dose by calling them and offering them another appointment.

Of the three stakeholders who were asked whether they considered the requirement of two doses to be a barrier to uptake; one said that it was a barrier, whilst the other two were unsure. A nurse from HPS believed that most of the children who required a second dose received it:

It appeared to me that a lot of children that I look at seem to have two doses recorded which looks appropriate for their age.

Of the nine stakeholders who were asked if any location, group or population was not well served by the program, four felt that the program covered most groups, three mentioned culturally and linguistically diverse people and two were unsure. A project manager from HPS commented that access to the program through general practices and immunisation clinics covered most locations and groups:

I would think that it was fairly well covered because you could access it through the GP but also through the immunisation clinics.

Collaborations

The task force from HPS had regular meetings with key staff at DWYC during the initial planning and implementation phase of the program. HPS stakeholders also engaged with other stakeholders within the ACT government, including the Minister's office, Education Department,, ACT Health Communications and Marketing and CHN. HPS also worked with the pharmaceutical companies producing the vaccine, to ensure stock was produced and set aside for the program. During the nationwide vaccine shortage, HPS liaised with other jurisdictions and the Australian Government Department of Health. During the season, they purchased 500 additional doses from New South Wales and a further 500 doses from the pharmaceutical company through the Australian Government Department of Health. A project manager from HPS highlighted that they missed CHI as a key stakeholder during the planning phase.

Our community, the intake line, which is the phone number that people call through to access or to book appointments. In the early stages of that, we missed them completely as a stakeholder. That was recognised fairly early on that they should have been involved earlier because that changed their workloads and resourcing for them.

Media and communications staff also worked with the business team to support the delivery and distribution of resources to general practices and immunisation clinics.

Culturally and linguistically diverse and Aboriginal and Torres Strait Islander populations

Of the nine stakeholders who discussed whether the program was tailored for people from culturally and linguistically diverse backgrounds, seven agreed that the program was not tailored specifically, whilst two mentioned the availability of a few translated resources and interpreter services. HPS staff recognised the importance of tailoring the program but stated that there wasn't time to do so. This was recognised as a limitation of the program by a program manager working at HPS:

We thought that was really important and we just didn't have the time to do it. I would say no, we didn't tailor the program at all and that was a limitation.

A communications officer reported that there were not enough tailored program resources for people from culturally and linguistically diverse backgrounds:

No there wasn't. We included the translating and interpreting service contact details on the pamphlet. Again, I could say this is because of the lack of time.

In terms of tailoring the program for Aboriginal and Torres Strait Islander peoples, seven stakeholders agreed that the program was not tailored specifically, whilst two were unsure. A project manager working for HPS stated that the program was not tailored due to the nationally-funded Indigenous vaccination program available:

No, no there was again nothing specific. Because the Aboriginal and Torres Strait Islander children are already captured in the national program, we didn't do anything more specific for that. We already have a whole heap of pre-existing information around flu for those cohorts anyway that we send out.

A communication officer also noted there were no resources developed specifically for Aboriginal and Torres Strait Islander peoples. Members of staff from HPS and DWYC reported engaging with Aboriginal stakeholders,

particularly the West Belconnen Child and Family Centre and Winnunga Community Centre, to offer opportunities for vaccinations for Aboriginal and Torres Strait Islander people. Stakeholders recognised the importance of continuing to work further in this area in the future, a nurse working at the HPS stated:

I'm sure that we could do more in that area specifically, and I'm sure next year that we get to do it.

Issues with vaccine supply and management

Five stakeholders reported that general practices sent their vaccine orders to HPS, whilst the ECI clinics had a standing order for the vaccine. Both general practices and ECI clinics could place an emergency order for additional stock if required. The ECI clinics, run by DWYC, placed emergency orders when required.

Seven of the nine stakeholders who were asked about issues with vaccine supply and/or management, acknowledged issues with the nationwide shortage of vaccines for the adult program;, while two others thought there were no supply issues and one was unsure. Stakeholders did not report any major issues with cold chain breaches.

A project manager from HPS said that the nationwide shortage of influenza vaccine was managed by retrieving stock from oversupplied general practices and prioritising the stock for ECI clinics:

We actually retrieved stock so that we could centrally manage it, and we just delivered less. But we were never unable to meet demand or orders, they might have flowed out a little slower than GPs wanted, and I'm talking about the whole influenza schedule and program, and we prioritised the childhood ones. So, the early immunisation clinics were always well stocked, and we made sure of that.

Two stakeholders (both working at HPS) also mentioned that management of stock during the shortage was difficult due to issues with vaccine labelling for children aged from >3 years to <5 years of age. FluQuadri used in the

program was not specifically marked as such and was therefore difficult to distinguish from the supply for the national program:

The thing that we did have issues with and other jurisdictions did too at the time of the shortage is that a lot of the FluQuadri that we had ordered for the kids program got sucked up. They weren't sort of differentially labelled from the rest of the FluQuadri I guess, that was being delivered through the NIP program

Issues with vaccine administration

Two stakeholders were aware of issues with the administration of the vaccine, whilst four stakeholders were not aware of any instances. Stakeholders reported no instances of leakage occurring. A nurse manager working at WYC reported three instances, including a needle stick injury, a child receiving three doses instead of the recommended two, and use of an incorrect vaccination site. A nurse from HPS reported one instance of an adult influenza vaccine being given to a child. This stakeholder provided a recommendation on how administration of the incorrect vaccine formulation could be reduced in future programs:

I guess labelling, very clear labelling on the flu vaccines, those sorts of vaccines for older people, which could be almost like a sticker on the packaging. Aside from that, the only thing I could think of is specifically quarantining them in the fridge with the childhood vaccines but then double checking.

Issues with recording data

Issues with recording data were reported by two stakeholders, the remaining twelve said there were no issues. The immunisation clinics run by DWYC used the ACT Patient Administration System (ACTPAS) data system to record immunisations, whilst general practices filled in a hard copy influenza recording sheet. Data was also uploaded to AIR by immunisation providers and HPS used VIMS. A project manager from HPS reported that not all hard copy influenza recording sheets from the general practices were returned:

We don't get 100% return on that. We get about 80%. But because the flu season is so busy, we often don't get to that data until probably November and then we do a report in February.

Two stakeholders from HPS also mentioned that the lack of clear labelling of the FluQuadri vaccine for the ACT government-funded childhood program resulted in issues with recording data in the VIMS system for the program. As a project manager from HPS states:

So, wastage again, we do wastage mostly through our vaccine inventory system. But again, the challenge with that was working out what was attributed to the Under Five Program and what was NIP program other than the FluQuadri Junior.

Stakeholders did not report any major issues with recording information on medical software or on AIR. Generally, stakeholders were satisfied with the process of collecting and recording data.

Strengths

Staff commitment

Three stakeholders reported that staff commitment was a strength of the program. The workforce had a wealth of experience and expertise in planning and implementing immunisation programs. Two stakeholders from DWYC also commented that it allowed them to train new immunisation providers, which enhances capacity for future vaccination programs. A project manager at HPS commented on this commitment:

Certainly, it's always the staff, the people that come together to make this happen despite all of the hurdles, because they really believe in it and because they're doing their job as really good public servants.

Jurisdiction capacity

Two stakeholders from HPS mentioned that ACT is a small jurisdiction, which was a strength for the program in various ways. Firstly, it allowed HPS to rely and build upon existing relationships with immunisation providers, particularly the staff at DWYC and general practices. Secondly, the process of getting

promotional material and resources out to immunisation providers was easily managed. A nurse at HPS noted:

I think we're lucky that we have a small jurisdiction. So, I think that helps us deliver.

Centralisation of stock

The centralisation of vaccine stock was mentioned as a strength of the program by two stakeholders. The vaccine stock was easily managed and quickly delivered to immunisation providers. A project manager at HPS noted that this was particularly important in a year with a vaccine shortage:

The way that we work in the ACT with the centralisation of vaccine stock, while that's a big workload for the immunisation program in delivering that and managing that, it means we retain a lot of control of delivery and that's a good thing, particularly in a year where there is a vaccine shortage.

Communication and resources

The promotional material and resources developed by the media and communications team were also identified as a strength of the program by two stakeholders. A general practice improvement coordinator working at CHN noted that general practices were satisfied with the resources they received:

The poster that they put together with the age groups, practices thought that was good. The resources that they provided to practices, those on the boxes and the baskets in the fridge.

Opportunity to educate the community

Another identified strength of the program was that it provided an opportunity to educate people on immunisation, which was thought likely to encourage parents to continue with both influenza vaccination and other vaccinations in the future. Generally, stakeholders felt that the program was important and was successfully implemented.

Challenges

Lead time

The short lead time was reported as a challenge by six stakeholders across organisations. Several stakeholders from HPS mentioned that the short timeframe around planning the program was difficult, particularly in relation to getting approval from internal stakeholders. As a project manager from HPS stated:

I suppose internal processes of getting stuff done up the line and approvals and those standard internal things that could be challenging.

Communication and resources

Another challenge was developing program promotions and resources in the short time frame allocated. The media and communications team had no time to pilot test the materials for acceptability, readability and content approval. A nurse manager working at WYC felt that the resources were slow in coming out, which was difficult for communicating with the community about the program:

The resources were a bit slow in coming as well. That's what didn't come until March. And the resources were not available until the 23rd of March and that was difficult because we were trying to get the message out to the community.

Human resources

Challenges around human resources were mentioned by five stakeholders. For stakeholders working at WYC the short lead time created issues around recruitment. Due to the program being short-term, it was difficult to recruit staff for temporary or casual work. The recruitment process itself was slow and many clinics right at the start of the program were not open because they couldn't be staffed. Rostering nursing staff throughout the program was also a challenge, as there was often a mismatch between clinic space and staff availability. A nurse manager from WYC commented on the challenge of recruitment:

For stakeholders at CHI, the lack of additional human resources was noted as a significant challenge. An administration manager at CHI commented:

The resources, the human resources are a challenge and I think having an actual date of when the program's going to start.

For stakeholders at HPS, taking two members of staff from the Immunisation Unit to work on the task force was a challenge for remaining staff members. A project manager from HPS stated:

Within population health, the taskforce drained a huge amount of staff resourcing for a period of time from business as usual operations. And not that anything fell over, people just worked harder and longer and that's not sustainable.

Recommendations of key stakeholders

Stakeholders were asked to give any recommendations for the planning and/or implementation of future immunisation programs. Below is a summary of the recommendations raised by interviewed stakeholders.

Planning and lead time

- A longer lead-in time is needed to support the planning and initial rollout of the program. (6 stakeholders; HPS, DWYC, CHI)
- Create an ongoing, national program for free influenza vaccinations for children aged greater than six months and under five years of age. (2 stakeholders; HPS, DWYC)
- Identify and secure additional clinic space, if needed. (2 stakeholders; DWYC)
- Engage with CHI early on in the planning phase of programs. (4 stakeholders; HPS, CHI)

Communication and resources

- Key messages should be consistent across all states and territories with similar programs. (1 stakeholder; Media and Communications)

- Provide greater time for the communications staff to develop an enhanced communications strategy and allow for pilot testing of resources. (1 stakeholder; Media and Communications).
- Distribute resources to immunisation providers prior to the rollout of a program. (2 stakeholders; DWYC)
- Develop and distribute more promotion materials targeting people from culturally and linguistically diverse populations.(2 stakeholders; HPS, DWYC)
- Develop specific resources for the Aboriginal and Torres Strait Islander population (2 stakeholders; HPS)
- Communicate clearly to the media (e.g. that the shortage of influenza vaccine in 2018 applied to adults not children). (1 stakeholder; CHI)
- Messaging to providers should also encourage them to check that children are up to date with all their vaccinations. (1 stakeholder; DWYC)

Human resources

- Provide additional human resources to CHI to support the program. (2 stakeholders; CHI)
- Provide greater lead time to allow for the recruitment and training of additional immunisation providers. (2 stakeholders; DWYC)

Vaccine

- Make sure that vaccine stock for the 3-5 year age group (FluQuadri) is clearly labelled for the ACT-funded childhood program, to distinguish it from the national supply and other programs. (2 stakeholders; HPS)
- CHN could provide weekly or fortnightly updates on vaccine distribution and uptake among different age groups, to help support uptake targets. (1 stakeholders; CHN)

Limitations

A limited number (14) of key stakeholders participated in this evaluation. The views expressed may therefore not be fully representative of stakeholders

more broadly and the full range of experiences with this program may not have been captured.

Chapter 2: Vaccination Coverage

Aim

Early impact of the childhood influenza vaccination program implemented during 2018 in the ACT was evaluated by estimating coverage of influenza vaccine in ACT children aged between 6 months and <5 years.

Methods

Using AIR data as at 30 September 2018, influenza vaccination coverage was calculated by calendar year (2014-2018), age group (6 months to <1 year; 1 year to <2 years; 2 years to <3 years; and 3 years to <5 years) and Indigenous status.

Indigenous status on the AIR is recorded as 'Indigenous', 'non-Indigenous' or 'unknown', as reported to Medicare. For this report, two categories of children were considered: 'Aboriginal' (Indigenous) and 'non-Aboriginal' (non-Indigenous). As the completeness of Indigenous status on the AIR has increased substantially over the years, the very small percentage of children whose Indigenous status was not specified were presumed to be non-Aboriginal for the purpose of the analyses conducted.

Residential postcode, as recorded on the AIR, was used to select the children to be included for the calculation of the influenza vaccination coverage estimates for the ACT.

Influenza vaccination coverage estimates were calculated as a proportion for each age group category by dividing the number of children with at least one dose of any influenza vaccine recorded on the AIR in the year of interest by the total number of children registered on the AIR in the relevant category. Of the children aged 6 months to <5 years who had an influenza vaccine dose recorded on the AIR, the proportion of children recorded as receiving a first dose was also calculated by calendar year, age group and Indigenous status. It is recommended that children aged 6 months to <9 years receive two doses of influenza vaccine in their first year of influenza vaccination. As such, the

proportion of vaccinated children receiving two doses of influenza vaccine in the first year of recorded influenza vaccination was also calculated by calendar year, age group and Indigenous status.

For 2018, further analyses of AIR data as at 30 September 2018 were undertaken to track the weekly (between 1 April – 30 September 2018) cumulative uptake of the influenza vaccine by ACT children aged 6 months to <5 years by age group and Indigenous status.

Vaccine Inventory Management System (VIMS)

Data from the in-house VIMS was provided by ACT Health. Using the number of FluQuadri and FluQuadri Junior influenza vaccine doses purchased and distributed to immunisation providers around the territory, the proportion of distributed FluQuadri and FluQuadri Junior influenza vaccine doses then recorded on the AIR as being administered to ACT children aged 6 months to <5 years was calculated.

ACT Patient Administration System (ACTPAS)

Data from ACTPAS, which is used by the ECI Clinics to document vaccine brand and dose number of vaccinations, was provided by ACT Health to NCIRS on 19 February 2019. Data was used to compare the proportion of doses recorded by ECI clinics to those recorded in the AIR.

Results

Following implementation of the territory-funded influenza vaccination program for all children aged 6 months to <5 years, a total of 19,128 influenza vaccine doses were recorded on the AIR as having been given to children in this age group residing in the ACT between 1 April and 30 September 2018 (**Table 2.1**). Of the ACT children aged 6 months to <5 years registered on the AIR, 11,569 (43.4%) were recorded on the AIR to have received at least one dose of any influenza vaccine between 1 April and 30 September 2018 (**Table 2.1**). Of these, 7,440 (64.3%) were recorded to have received a second dose. The proportion of ACT children recorded on the AIR to have received at least

one dose of any influenza vaccine between 1 April and 30 September 2018 decreased with increasing age – 70.6% in children aged 6 months to <1 year to 35.4% in children aged 3 years to <5 years. Coverage was higher in non-Aboriginal compared to Aboriginal children across each age group and overall (**Table 2.1**).

Figure 2.1 shows the cumulative proportion of Aboriginal (A) and non-Aboriginal (B) children aged 6 months to <5 years vaccinated with at least one dose of any influenza vaccine between 1 April and 30 September 2018 as recorded on the AIR. Vaccine uptake was highest during the month of May for each age group in both Aboriginal and non-Aboriginal children. Overall vaccine uptake was highest in the 6 months to <1 year age group in both Aboriginal and non-Aboriginal children.

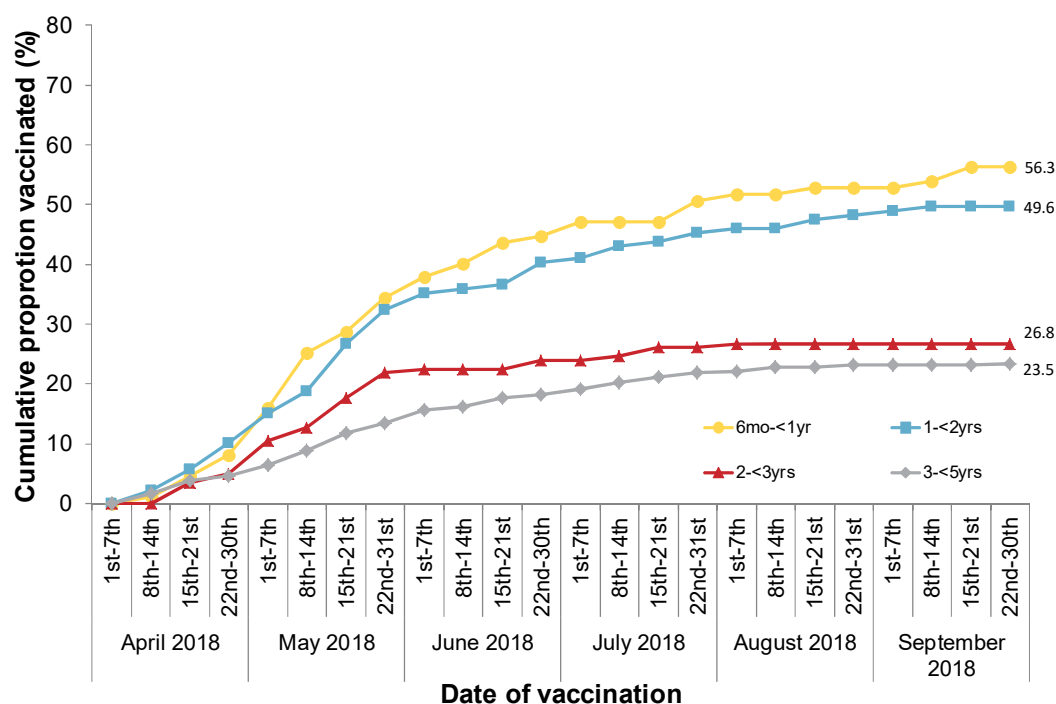
Table 2.1. Total number of influenza vaccine doses and number and proportion of ACT children with at least one dose of influenza vaccine recorded on the AIR in 2018 (1 April to 30 September) for children aged 6 months to <5 years by age group and Indigenous status.

	Total number of recorded doses (1 April – 30 September, 2018)			Number of children with at least one dose recorded (1 April – 30 September, 2018)			Proportion of children with at least one dose recorded (1 April – 30 September, 2018)		
	Aboriginal	Non- Aboriginal	All Children	Aboriginal	Non- Aboriginal	All Children	Aboriginal	Non- Aboriginal	All Children
6mo - <1yr	85	3,526	3,611	49	1,985	2,034	56.3	71.0	70.6
1yr - <2yr	109	5,017	5,126	69	2,942	3,011	49.6	51.2	51.1
2yr - <3yr	57	3,632	3,689	38	2,232	2,270	26.8	39.0	38.7
3yr - <5yr	111	6,591	6,702	72	4,182	4,254	23.5	35.7	35.4
6mo - <5yr	362	18,766	19,128	228	11,341	11,569	33.8	43.7	43.4

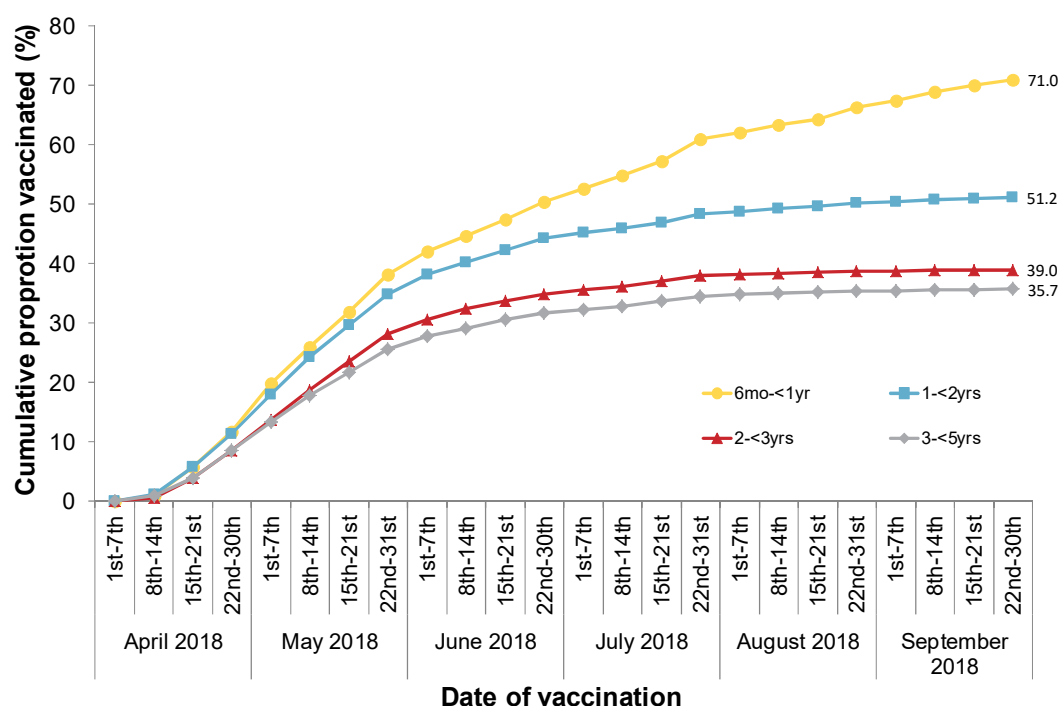
Source: Australian Immunisation Register, data as at 30 September 2018.

Figure 2.1. Cumulative proportion of Aboriginal children (A) and non-Aboriginal children (B) aged 6 months to <5 years in the ACT with at least one dose of influenza vaccine recorded on the Australian Immunisation Register in 2018 (1 April to 30 September) by age group, data as at 30 September 2018.

(A)

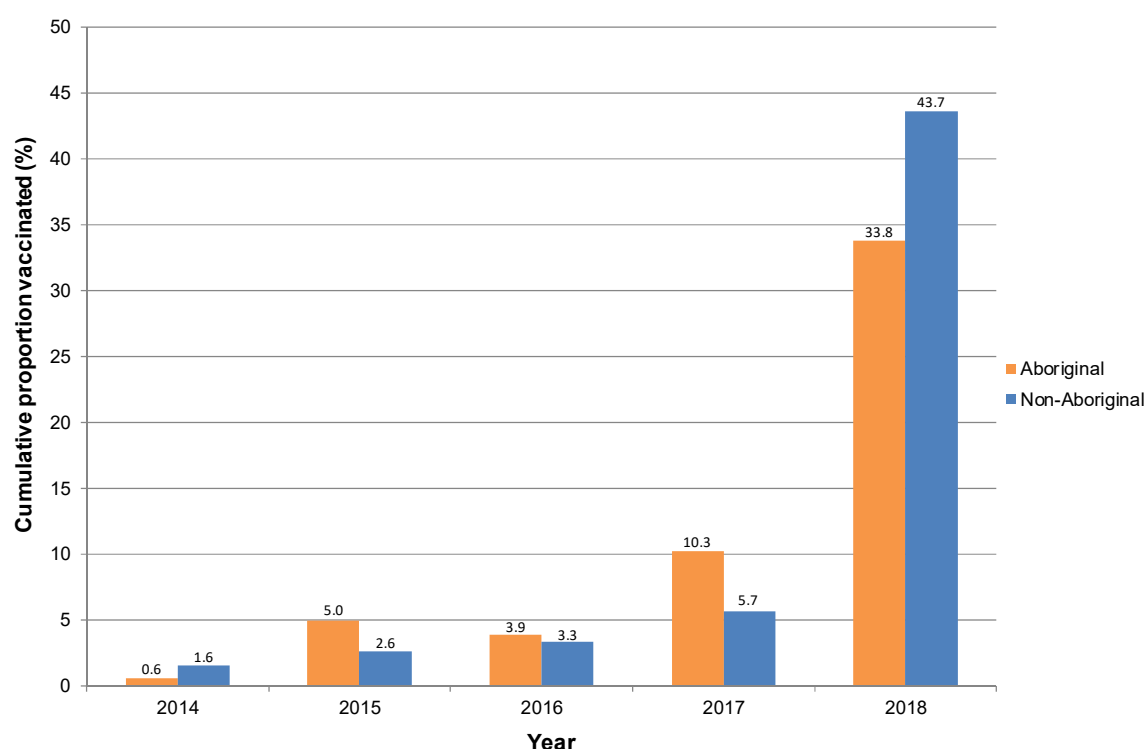


(B)



Despite influenza vaccine being funded on the National Immunisation Program for Aboriginal and Torres Strait Islander children aged 6 months to <5 years since 2015, **Figure 2.2** shows that only a very small percentage of ACT Aboriginal children in this age group were recorded on the AIR to have received at least one dose of the influenza vaccine in 2015 and 2016. In 2017, just over 10% of ACT Aboriginal children were recorded on the AIR to have received at least one dose of the influenza vaccine which was almost double the percentage of non-Aboriginal children vaccinated. Following implementation of the ACT-funded influenza vaccination program for all children aged 6 months to <5 years, the proportion of children vaccinated with at least one dose of influenza vaccine increased substantially in 2018 for both Aboriginal and non-Aboriginal children, and as at 30 September had reached 33.8% for Aboriginal children and 43.7% for non-Aboriginal children (**Figure 2.2**).

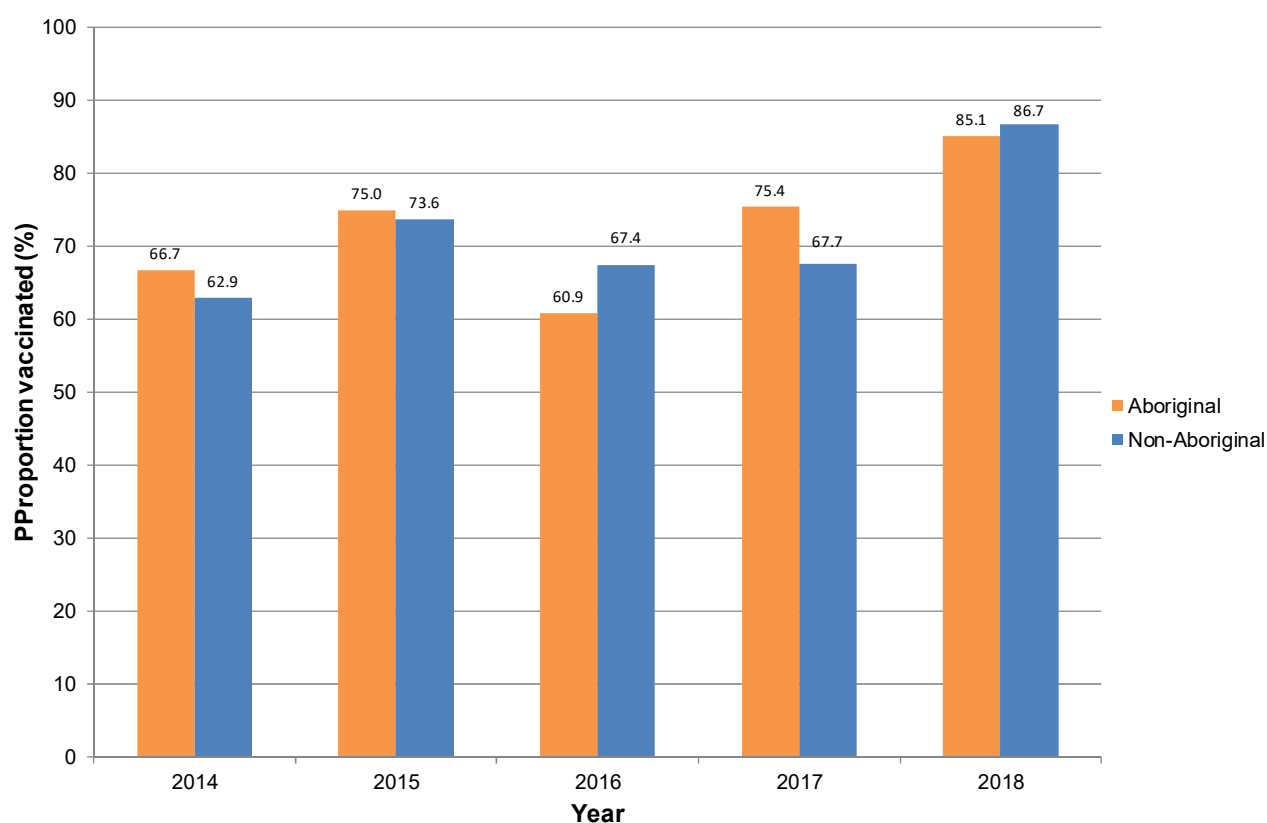
Figure 2.2. Proportion of children aged 6 months to <5 years in the ACT with at least one dose of influenza vaccine recorded on the Australian Immunisation Register by Indigenous status and year of vaccination, 2014 – 2018.



Source: Australian Immunisation Register, data as at 30 September 2018.

Among the ACT children aged 6 months to <5 years recorded on the AIR as having received influenza vaccine in 2018, over 85% (85.1% for Aboriginal children and 86.7% for non-Aboriginal children) were recorded as first time recipients (**Figure 2.3**). This was a substantial increase of first time recipients compared to the 2014-2017 period, in which the proportion of first time recipients ranged from 60 to 75%.

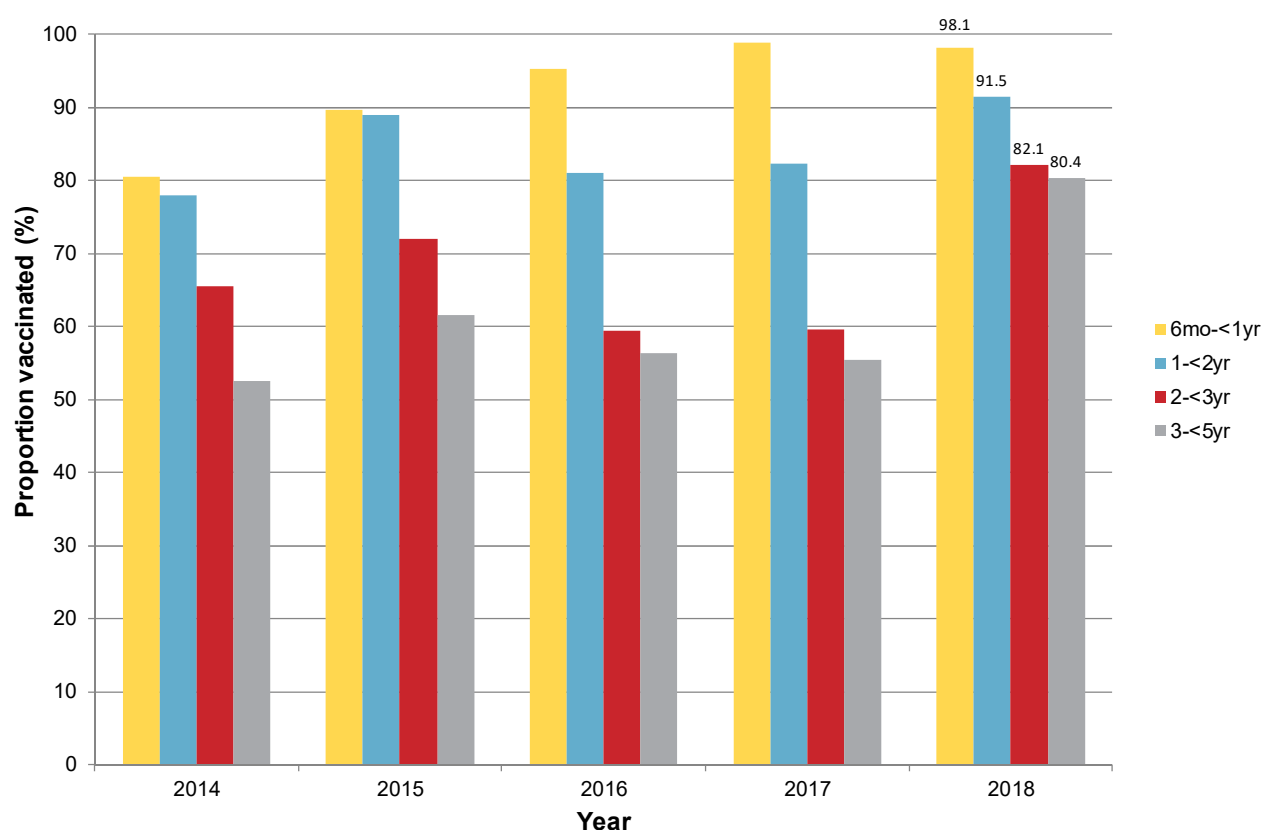
Figure 2.3. Proportion of influenza-vaccinated children aged 6 months to <5 years in ACT recorded on the Australian Immunisation Register as first time recipients, by Indigenous status and year of vaccination, 2014 – 2018.



Source: Australian Immunisation Register, data as at 30 September 2018.

Between 2014 and 2018, the proportion of influenza-vaccinated children in the ACT recorded on the AIR as first time recipients has been consistently highest in the 6 months to <1 year age group and has been lower in each consecutive age group (**Figure 2.4**). The proportion of first time recipients was substantially higher in 2018 compared to previous years for ACT children in the 1 to <2 years, 2 to <3 years and 3 to <5 years age groups (**Figure 2.4**).

Figure 2.4. Proportion of all influenza-vaccinated children aged 6 months to <5 years in the ACT recorded on the Australian Immunisation Register as first time recipients, by age group and year of vaccination, 2014 – 2018.

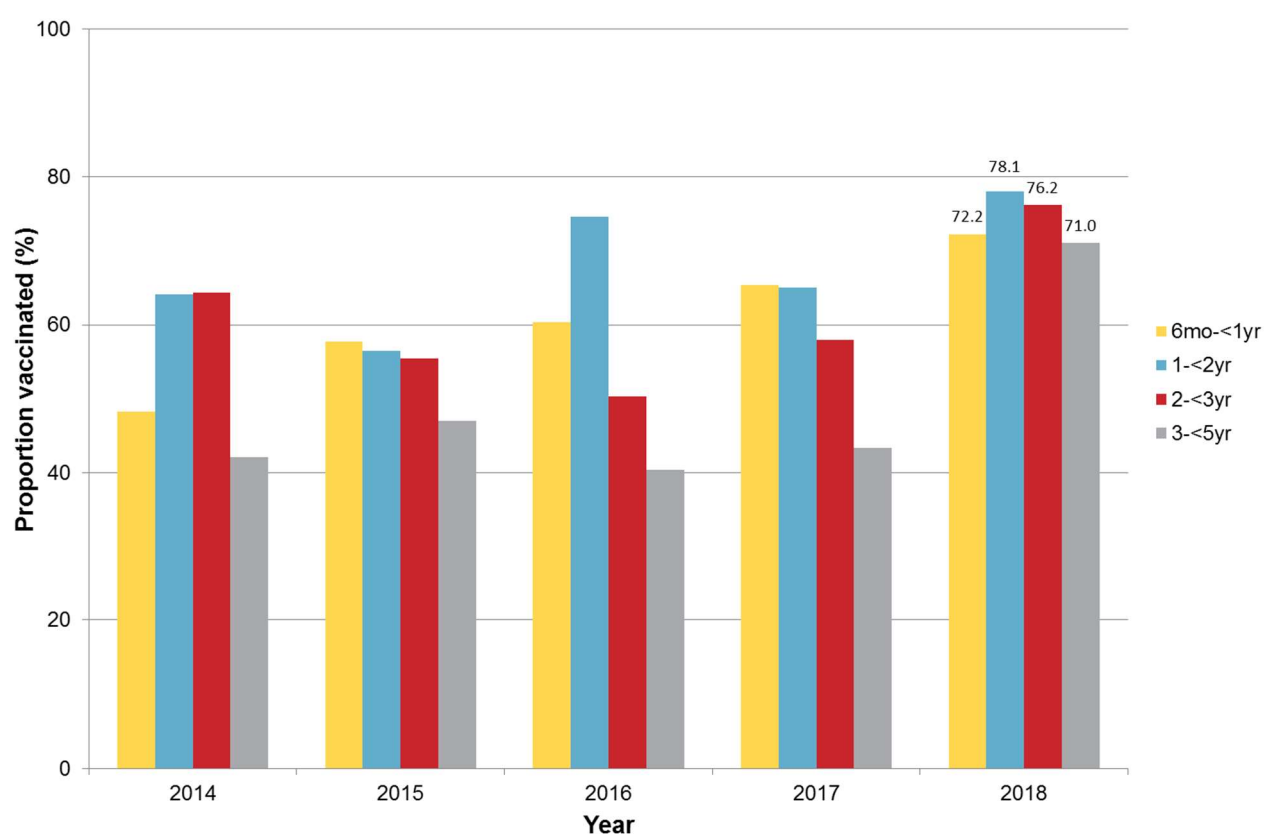


Source: Australian Immunisation Register, data as at 30 September 2018.

Figure 2.5 shows that between 2014 and 2017 less than 75% of children aged 6 months to <5 years in the ACT who were recorded on the AIR as first time recipients of influenza vaccine went on to have a second dose recorded in the same year, as recommended. The proportion of children receiving two doses of influenza vaccine in their first year of vaccination was lowest in the 3

to <5 years age group in each year assessed. In 2018, the percentage of first time recipients who had a second influenza vaccine dose recorded in the same year increased substantially in each age group, reaching above 70% in the 6 months to <1 year and 3 to <5 years age groups, and above 75% in the 1 to <2 years and 2 to <3 years age groups (**Figure 2.5**). Overall, in children aged 6 months to < 5 years in the ACT recorded on the AIR as receiving their first dose of an influenza vaccine in 2018, 74.2% received two doses in the same year as is recommended. .

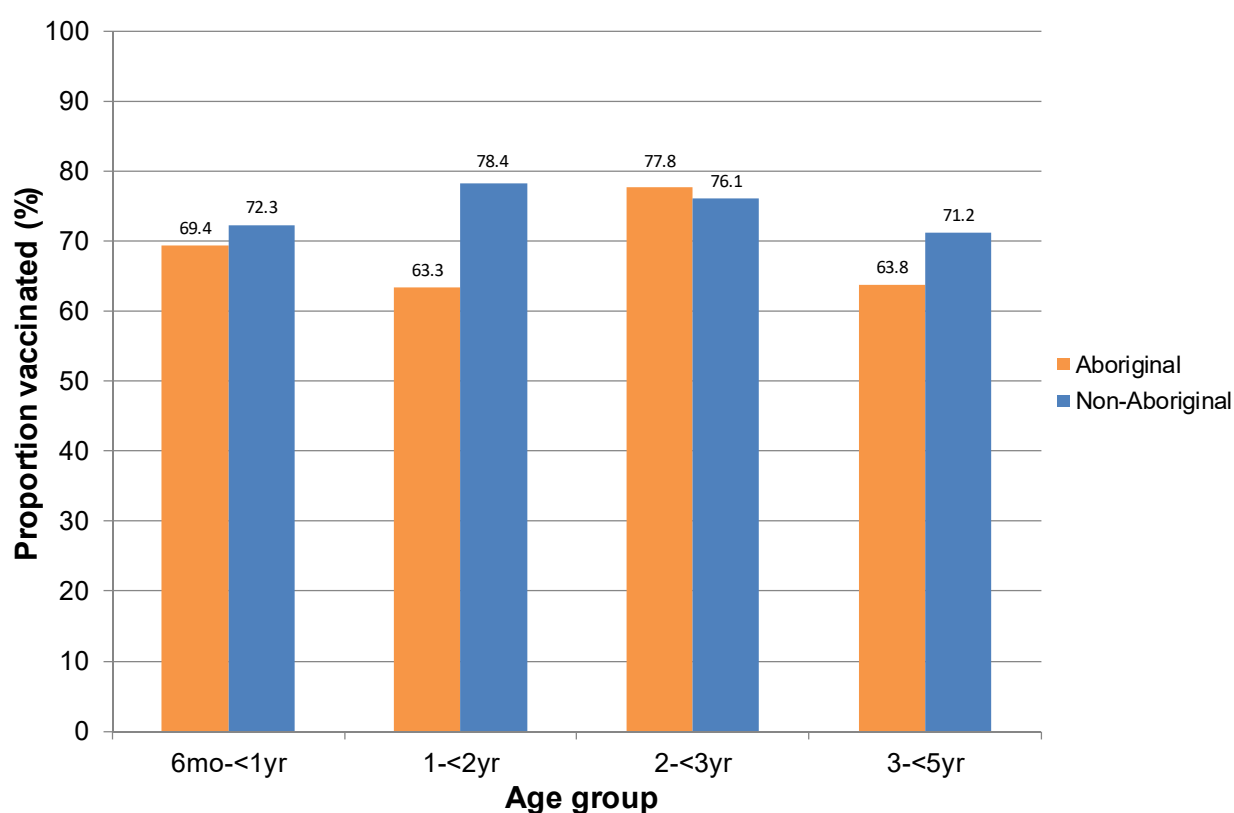
Figure 2.5. Proportion of children aged 6 months to <5 years in the ACT recorded on the Australian Immunisation register as first time recipients who had two influenza vaccine doses in the same year, by age group and year of vaccination, 2014 – 2018.



Source: Australian Immunisation Register, data as at 30 September 2018.

In 2018, the proportion of Aboriginal children recorded as first time recipients who had two influenza vaccine doses was lower than for non-Aboriginal children and lower in all age groups except the 2 to <3 years age group (**Figure 2.6**). Overall, the proportion of first-time vaccinated Aboriginal children aged 6 months to <5 years receiving two doses in 2018 was lower than first-time vaccinated non-Aboriginal children (67.0% versus 74.3% respectively). When based on the population size of Aboriginal and non-Aboriginal children aged 6 month to <5 years residing in the ACT, 19.3% and 28.1% respectively were recorded on the AIR to have received two doses of influenza vaccine in 2018.

Figure 2.6. Proportion of children aged 6 months to <5 years in the ACT recorded on the Australian Immunisation register as first time recipients who had two influenza vaccine doses in the same year, by Indigenous status and age group, 2018.



Source: Australian Immunisation Register, data as at 30 September 2018.

In 2018, 74.7% of influenza vaccine doses administered to children aged 6 months - <5 years were given in General Practice settings and 24.6% in Community Health Service settings. A very small percentage (0.7%) of influenza vaccine doses were given in Council, Hospital or Public Health Unit settings.

VIMS

Using the in-house VIMS provided by ACT Health, 19,356 single doses of the 20,000 FluQuadri and FluQuadri Junior influenza vaccines purchased for this program were distributed to immunisation providers around the ACT. In addition, 2241 of the 2550 doses of FluQuadri and FluQuadri Junior influenza vaccines purchased for the NIP program for Aboriginal and Torres Strait Islander children aged 6 months to <5 years were distributed. A total of 17,484 FluQuadri and FluQuadri Junior influenza vaccine doses were recorded on the AIR as having been administered to children aged 6 months to <5 years in the ACT in 2018. A total of 21,597 FluQuadri and FluQuadri Junior influenza vaccine doses were reported by ACT Health to have been distributed as part of the territory-funded influenza vaccination program and the NIP combined, for use in children aged 6 months to <5 years.

ACTPAS

Flu vaccine doses administered through the ECI Clinics were recorded on the ACTPAS dataset. There were 4,940 administered flu vaccine doses recorded on the dataset provided by ACT Health. On the AIR, 4,813 doses of flu vaccine were reported to have been administered by immunisation providers in Council, State Health/Public Health Unit and Community Health settings. As ACTPAS and AIR data are not linked, we are unable to determine the number of doses recorded in both datasets.

Limitations

The influenza vaccination coverage estimates presented here may underestimate true coverage to some degree, due to potential for under-reporting to the AIR. Conversely, high demand for vaccine and other measures may have improved reporting to AIR relative to previous seasons. Unlike most other childhood vaccines, immunisation providers do not receive payments for influenza vaccination notifications to the AIR. Practice management software compatibility and data transfer issues have also been identified as contributing to under-reporting of vaccines in general to the AIR, and may be particularly important in relation to influenza vaccine. In addition, despite recommendations to enter every vaccine of any type administered onto the AIR, anecdotal evidence suggests that some immunisation providers may omit to do this specifically for influenza vaccine. As such, influenza vaccine coverage data presented here should be regarded as the minimum estimate. Additionally, when comparing VIMS and AIR data, we were unable to distinguish between doses administered under the NIP and ACT-funded program, and thus had to provide a combined estimate.

Chapter 3: Vaccine Safety

Background

Passive surveillance was used to monitor the safety of the ACT influenza vaccination program for children aged 6 months to <5 years. Medical and nurse practitioners working in the ACT are required to notify adverse events following immunisation (AEFI) to the Chief Health Officer under the *Public Health Act* 1997. The Immunisation Section of HPS keeps a local record of reported AEFI and routinely report to the Therapeutic Goods Administration (TGA).

Aim

We assessed adverse events following influenza vaccination for children aged 6 months to <5 years, 2010 –2018.

Methods

AEFI data from 2010-2018 reported for children aged 6 months to <5 years were collected by the Immunisation Section of HPS and sent to NCIRS for analysis. Data included vaccine brand, symptoms experienced, and outcome. For denominator data, influenza doses administered to children aged 6 months to <5 years by vaccine brand were extracted from the AIR from 2010-2018.

Rates of AEFI were calculated as the number of AEFI divided by total number of doses of vaccine given. 95% confidence intervals were calculated for rates using STATA statistical software for Windows, Release 14.2 College Station, TX: StataCorp LP.

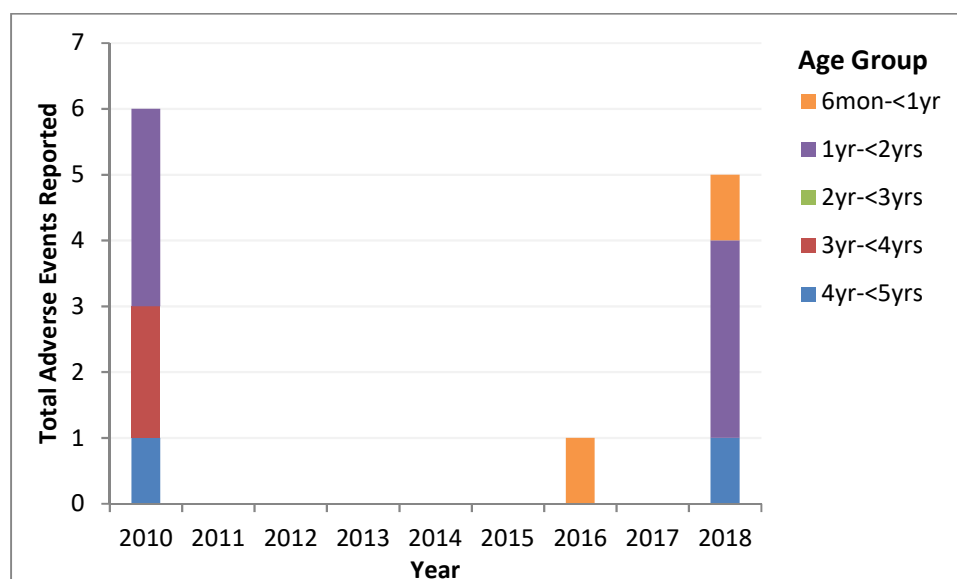
Results

Total AEFI

Between 2010-2018, there were 12 AEFI reported for influenza vaccinations in children aged 6 months to <5 years. Six AEFI were reported in 2010, one in

2016 and five in 2018 (**Figure 3.1**). In 2010, there were 310 doses of influenza vaccination administered, with a rate of 1.94 (95% CI 0.71-4.17) AEFI per 100 vaccines administered. In 2016, there were 1,312 influenza vaccine doses administered, with a rate of 0.08 (95% CI 0.01-4.24) AEFI per 100 vaccine doses administered. During the rollout of the 2018 influenza vaccination program for children aged 6 months to <5 years in the ACT, 19,874 influenza doses were administered, giving an AEFI rate of 0.03 (95% CI 0.01-0.06) per 100 vaccine doses administered.

Figure 3.1: Total number of adverse events reported as a result of influenza vaccination, by age group, 2010-2018.



Vaccine Types

In 2018, there were 5,088 FluQuadri and 13,144 FluQuadri Junior doses given to children aged 6 months to <5 years of age. One adverse event was reported in 2018 following a dose of FluQuadri, resulting in an AEFI rate of 0.02 (95% CI 0.01-0.10) per 100 vaccinations administered, and four AEFI were reported following a dose of FluQuadri Junior, with an AEFI rate of 0.03 (0.01-0.08) per 100 vaccinations.

In 2017, there were no adverse events following influenza vaccination reported in children aged 6 months to <5 years. There was one adverse

event, however, reported in 2016, with 691 administered doses of FluQuadri Junior, with an AEFI rate of 0.15 (95% CI 0.01-0.80) per 100 doses. No AEFI were reported from 2011-2015. In 2010 there were six AEFI reported, three of which were attributed to the pandemic influenza vaccine Panvax and three to Fluvax.

Clinical Presentations of Adverse Events Reported

Five AEFI were reported in 2018, with signs and symptoms reported including rash (4), fever (1), injection site reaction (1), paleness (1), nausea (1), and abdominal cramps (1). All children fully recovered from these adverse events.

AEFI were also reported in 2010 and 2016. In 2010, six AEFI were reported with signs and symptoms including: fever (3), vomiting (2), febrile convulsion (1), rigors (1), lethargy (1), abdominal pain (1), diarrhoea (1), cough (1), and runny nose (1). All children fully recovered from the adverse events. The single adverse event reported in 2016 was in an infant between 6 months and <1 year of age, with reported symptoms including howling, wheezing, trouble breathing, and vomiting. The infant fully recovered after one week.

Of the 12 AEFI reported in 2010, 2016, and 2018, none were reported as serious or resulting in death.

Limitations

It is possible that not all AEFI were reported to medical and nurse practitioners or notified to the Chief Health Officer. Our figures stated above may therefore be an underestimation of the incidence of AEFI.

Chapter 4: Disease Burden

Aim

We aimed to assess the disease burden (influenza notifications and hospitalisations) in 2018, and to compare that to the previous eight years to evaluate the impact of the ACT influenza vaccination program for children aged 6 months to <5 years for children aged 6 months to <5 years.

Methods

The National Notifiable Disease Surveillance System (NNDSS) provides national notification data on all reported cases of influenza in Australia. The Influenza Complications Alert Network (FluCAN) provides hospitalisation data on admitted cases of influenza to hospitals including influenza subtype, length of stay, risk factors, vaccination status, and mortality.

Data from 2010–2018 were extracted for the ACT from both datasets to identify the disease burden of influenza in 2018 in comparison to the previous eight years. Notifications and hospitalisations were analysed by age group (6 months to <1 year; 1 year to <2 years; 2 years to <3 years; 3 years to <4 years; and 4 years to <5 years), sex, and Indigenous status.

Australian Bureau of Statistics estimated resident population (ERP) data were used as denominator data to calculate rates of influenza notifications and hospitalisations.

Rates of notifications and hospitalisations were calculated as number of events divided by the corresponding population, multiplied by 10,000.

Results

Notifications

There were 62 notifications of influenza in children aged 6 months to <5 years in 2018 in the ACT (**Table 4.1**). This was a 78% decline compared to 2017, when 295 notifications were recorded (115.2 per 10,000 population), and 56% lower than the average annual notification rate over the previous 5 years (2013 to 2017, 55.2 notifications per 10,000 population). Notification rates per 10,000 population ranged from 5.2 in 2010 to 115.2 in 2017.

Table 4.1. Annual influenza notification and hospitalisation rates per 10,000 population, by sex and Indigenous status, children aged 6 months to <5 years, Australian Capital Territory, 2010-2018

Year	Sex		Indigenous Status		Total N (rate ¹)
	Male N (rate ¹)	Female N (rate ¹)	Aboriginal N (rate ¹)	Non-Aboriginal N (rate ¹)	
Notifications					
2010	4 (6.9)	7 (3.6)	0 (0)	11 (5.3)	11 (5.2)
2011	15 (5.7)	6 (13.4)	1 (16.2)	20 (9.5)	21 (9.7)
2012	59 (48.4)	53 (50.2)	1 (15.4)	111 (50.3)	112 (49.3)
2013	29 (16.8)	19 (23.8)	0 (0)	48 (21.0)	48 (20.4)
2014	64 (43.8)	51 (51.5)	3 (42.8)	112 (47.9)	115 (47.7)
2015	58 (43.9)	52 (45.6)	1 (13.9)	109 (45.7)	110 (44.8)
2016	57 (44.5)	54 (43.6)	1 (13.5)	110 (45.0)	111 (44.0)
2017	141 (124.6)	154 (106.4)	5 (64.9)	290 (116.7)	295 (115.2)
2018	39 (18.6)	23 (29.3)	0 (0)	62 (24.9)	62 (24.1)
Hospitalisations					
2010	4 (3.6)	1 (1.0)	0 (0)	5 (2.4)	5 (2.4)
2011	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2012	18 (15.3)	16 (14.6)	0 (0)	34 (15.4)	34 (15.0)
2013	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2014	12 (9.7)	7 (6.0)	1 (14.3)	18 (7.7)	19 (7.9)
2015	14 (11.0)	11 (9.3)	1 (13.9)	24 (10.1)	25 (10.2)
2016	15 (11.5)	18 (14.8)	2 (27.1)	31 (12.7)	33 (13.1)
2017	17 (12.8)	26 (21.0)	0 (0)	43 (17.3)	43 (16.8)
2018	2 (1.5)	3 (2.4)	0 (0)	6 (2.4)	6 (2.3)

Note: ¹Rates are per 10,000 population

In 2018, 62.9% (39) of notifications in children aged 6 months to <5 years were in males and 37.1% (23) were in females. Of the total 885 notifications

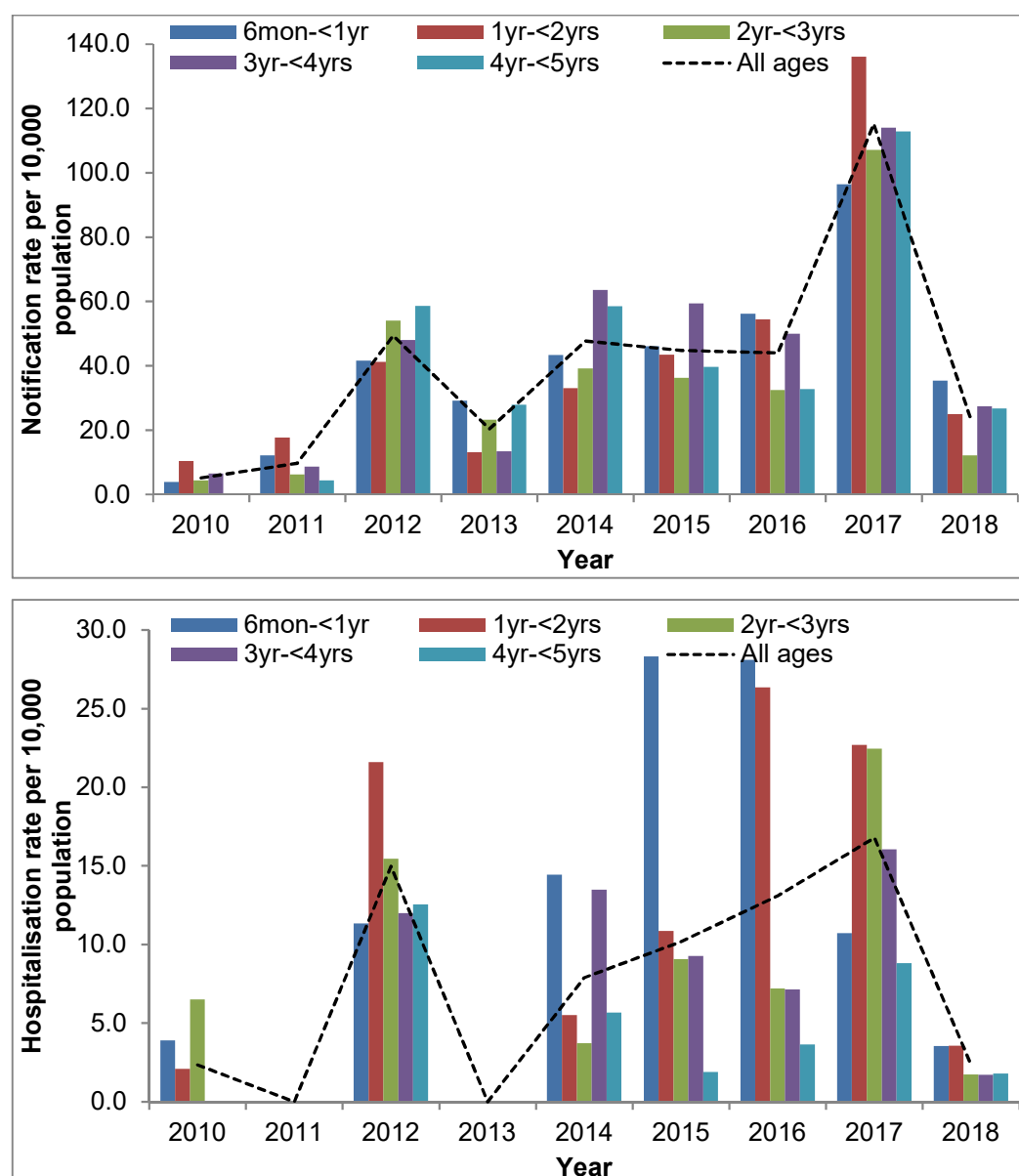
from 2010-2018, 52.3% (n=466) were in males and 47.7% (n=419) were in females.

In 2018, no notifications were identified as being in Aboriginal children. Notification rates were lower in Aboriginal compared to non-Aboriginal children for all years except 2011.

In 2018 the highest notification rate was in those aged 6 months to <1 year at 35.4 per 10,000 population. Rates were similar in children aged 1 year to <2 years, 3 years to <4 years, and 4 years to <5 years at 24.9, 27.4, and 26.7 per 10,000 population, respectively.

Overall, from 2010-2018, the highest number of notifications were in children aged 3 years to <4 years (211), lowest in those aged 6 months to <1 year (101). Notification rates varied substantially by year, with rates highest for all ages in 2017 (**Figure 4.1a**).

Figure 4.1a & 4.1b. Annual influenza notification and hospitalisation rate per 10,000 population by age group, children aged 6 months to <5 years, Australian Capital Territory, 2010-2018.



Hospitalisations

There were six hospitalisations coded as due to influenza in children aged 6 months to <5 years in 2018 in the ACT (**Table 4.2**), compared to 43 in 2017 and 165 in total from 2010-2018. Of the six hospitalisations in 2018, only one child (aged 6 months to <1 year) was reported to be vaccinated. PCR-testing confirmed two cases of Influenza A (H1), while the other four cases were an

unknown subtype of Influenza A. None of the cases had previous risk factors or were treated in intensive care. All six children survived their illnesses.

The hospitalisation rate in children aged 6 months to <5 years in 2018 (2.3 hospitalisations per 10,000 population) declined by 86% compared to 2017 (16.8 hospitalisations per 10,000 population) and also declined by 76% compared with the previous 5 years (2013 to 2017, 9.8 hospitalisations per 10,000 population). From 2010-2018, the hospitalisation rate per 10,000 population ranged from 0 (n=0) in 2010 and 2013 to 16.8 (n=43) in 2017.

In 2018, 40.0% (2) of hospitalisations in children aged 6 months to <5 years were in males and 60.0% (3) in females. Of the 165 hospitalisations from 2010-2018, 49.7% (82) were males and 50.3% (83) were females.

No hospitalisations were identified as being in Aboriginal children in 2018. Of the 165 hospitalisations from 2010-2018, 2.4% (4) were identified as Aboriginal. In 2018, the highest hospitalisation rates were in those aged 1 year to <2 years (3.6 per 10,000 population) and 6 months to <1 year (3.5 per 10,000 population). Rates were lower in children aged 2 year to <3 years, 3 years to <4 years, and 4 years to <5 years at 1.7, 1.7, and 1.8 per 10,000 population, respectively. From 2010-2018, the highest number of hospitalisations was in children aged 1 year to <2 years (51), and the lowest in those aged 4 years to <5 years (18). Hospitalisation rates also varied substantially by year (**Figure 4.1b**).

Table 4.2. Summary of hospitalised, PCR-confirmed influenza cases in children aged 6 months to <5 years, Australian Capital Territory, 2018

	Total Cases				
	Age Group	Sex	Indigenous Status	Influenza Type	Vaccinated
Case 1	6 months to <1 year	Female	Non-Aboriginal	A (Unk ¹)	Yes
Case 2	1 year to <2 years	Female	Non-Aboriginal	A (Unk ¹)	No
Case 3	1 year to <2 years	Male	Non-Aboriginal	A (H1)	No
Case 4	2 years to <3 years	Unknown	Non-Aboriginal	A (Unk ¹)	No

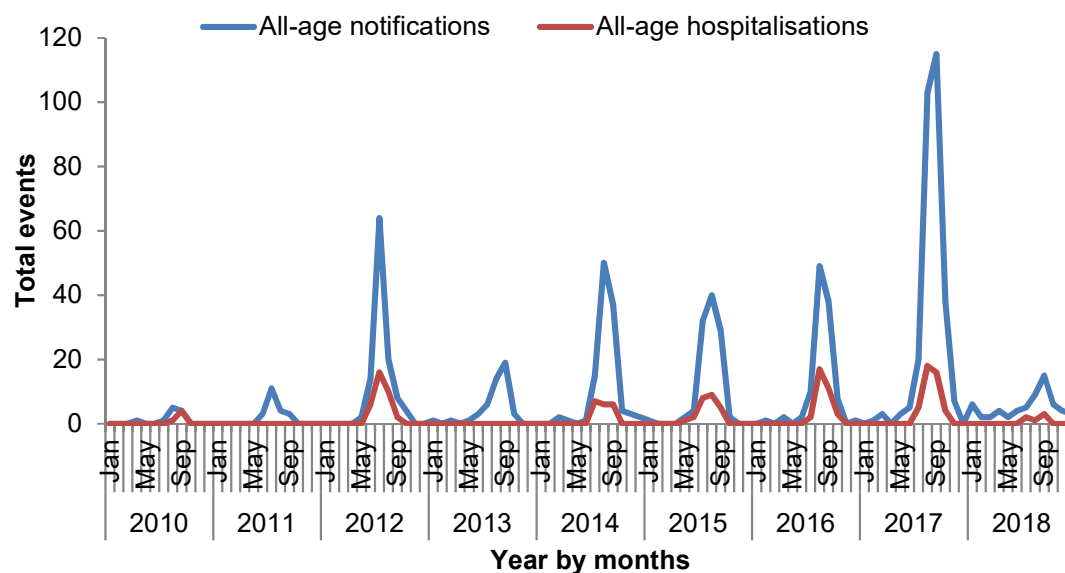
Case 5	3 years to <4 years	Male	Non-Aboriginal	A (H1)	No
Case 6	4 years to <5 years	Female	Non-Aboriginal	A (Unk ¹)	No

¹Influenza A subtyping unknown.

Seasonality

In 2018, influenza notifications peaked in September. Over the period 2010-2018, influenza notifications peaked between July-September (**Figure 4.2**). Hospitalisations coded as due to influenza showed similar seasonality from 2010-2018, peaking between July-September (**Figure 4.2**).

Figure 4.2. Influenza notifications and hospitalisations in children aged 6 months to <5 years by month, Australian Capital Territory, 2010-2018



Limitations

It is likely that the figures presented here underestimate true burden. Not all children with influenza present for medical attention, and of those that do not all are tested and/or notified. Coded hospitalisation data are also known to underestimate true burden.

Discussion

This evaluation report shows that the ACT influenza vaccination program for children aged 6 months to <5 years in 2018 resulted in substantially higher vaccination coverage in both Aboriginal and non-Aboriginal children compared with 2017, although the increase in coverage was more marked in non-Aboriginal children. Overall coverage of at least one dose of influenza vaccine in 2018 (43.4%) was slightly below the program target of 50%, although coverage recorded on AIR likely underestimates true coverage due to underreporting. Coverage in the ACT was substantially higher than the comparable national figure (25.6%). Of the 11,569 children recorded on the AIR as receiving at least one dose of influenza vaccine in 2018, 7,440 (64.3%) received a second dose; which exceeded the program target of 50%. However this may not represent the ideal target given that not all children require two doses. Of ACT-resident children aged 6 months to <5 years recorded on the AIR as receiving a first dose of influenza vaccine in 2018, 74.2% received a second dose, as is recommended. ACT coverage of at least one dose of influenza vaccine was higher than the comparable national figure, both overall (43.4% vs 25.6%) and for Aboriginal (33.8% vs 29.5%) and non-Aboriginal (43.7% vs 25.3%) children. ACT coverage of two doses of influenza vaccine in children recorded as first time recipients in 2018 was also higher than the comparable national figure, both overall (74.2% vs 64.4%) and for Aboriginal (67.0% vs 49.2%) and non-Aboriginal (74.3% vs 65.3%) children. Only a few minor adverse events were reported during the program, and much lower notification and hospitalisation rates were observed in the ACT during 2018 compared with 2017.

Limitations of this evaluation include the relatively small number of people who participated in the surveys, which may mean that the views expressed are not fully representative of the broader stakeholder population. 2018 was also a relatively mild influenza season compared to 2017, which makes it difficult to definitively assess the impact of the program on disease burden.

Conclusion

The ACT influenza vaccination program for children aged 6 months to <5 years was rolled out largely successfully, despite a relatively short lead time for implementation. A number of recommendations are provided above to optimise implementation and coverage in future years' programs.

References

1. Plotkin, S., et al., *Plotkin's Vaccines 7th Edition*. 2017, Philadelphia, PA: Elsevier.
2. Rajaram, S., et al., *Impact of increased influenza vaccination in 2-3-year-old children on disease burden within the general population: A Bayesian model-based approach*. PloS one, 2017. **12**(12): p. e0186739-e0186739.
3. Australian Government Department of Health. *ATAGI advice on seasonal influenza vaccines in 2018*. 29 November 2018]; Available from: <https://beta.health.gov.au/resources/publications/atagi-advice-on-seasonal-influenza-vaccines-in-2018>.
4. Australian Government Department of Health. *Flu (influenza) immunisation service*. 20 February 2019]; Available from: <https://beta.health.gov.au/services/flu-influenza-immunisation-service>.
5. National Centre for Immunisation Research and Surveillance (NCIRS). *Significant events in influenza vaccination practice in Australia*. 20 February 2019]; Available from: <http://www.ncirs.org.au/sites/default/files/2018-11/Influenza-history-July-2018.pdf>.
6. ACT Health. *Winter wellbeing and flu*. 20 February 2019]; Available from: <https://www.health.act.gov.au/about-our-health-systempopulation-health/winter-wellbeing-and-flu>.