



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

Final report

1 March 2019

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

- General practitioners
- Public Health Units
- Primary health networks
- Local councils
- Aboriginal medical services
- Practice nurses

Abbreviations

- AIR Australian Immunisation Register
- AMS Aboriginal Medical Service
- ATAGI Australian Technical Advisory Group on Immunisation
- CATI Computer Assisted Telephone Interviewing
- CHW The Children's Hospital at Westmead
- CRF Case report form
- FluCAN The Influenza Complications Alert Network
- MCHN Maternal and child health nurse
- NIC National Immunisation Committee
- NIP National Immunisation Program
- PAEDS Paediatric Active Enhanced Disease Surveillance
- PBAC Pharmaceuticals Benefits Advisory Committee
- PHN Primary Health Network
- PHU Public Health Unit
- RACP Royal Australasian College of Physicians
- TGA Therapeutic Goods Administration

Executive Summary

Influenza contributes substantially to the global burden of paediatric severe respiratory illness. Influenza vaccination has been recommended by the Australian Technical Advisory Group for Immunisation (ATAGI) since 2000 for all children from six months to less than five years of age. Under the National Immunisation Program (NIP) influenza vaccine is only funded in this age group for children at higher risk from influenza, namely those with medical risk factors and who are Aboriginal or Torres Strait Islander. In April 2018, NSW Health introduced a program which provided free influenza vaccine for all children in this age group.

We evaluated the implementation (process evaluation) and early impact (coverage and vaccine safety) of the 2018 influenza vaccination program for NSW children aged six months to less than five years.

Key findings

Process evaluation

The process evaluation was conducted in 3 modules.

Module 1

Opinions of general practitioners (GPs) and other professionals working in the primary health care area in NSW were sought via an online survey conducted from 15 October – 30 November 2018. This survey was distributed via HealthEd (a private health education provider).

Of the 229 respondents, 65.1% (149) were GPs, 17.5% (40) were practice nurses and the rest 17.5% (40) were other healthcare professionals of which 25 were registered nurses who worked in other settings (e.g. hospital).

The majority of respondents reported that parents of eligible children were aware that free influenza vaccine was available for children aged 6 months to less than 5 years (63.6% agreed or strongly agreed), but 25% (57) reported that parents were not aware of the program. Similarly, most respondents reported that the vaccination program was well accepted by parents of eligible children (68.7% [156] agreed or strongly agreed) with only 19.8% (45)

reporting that parents were not well accepting of the program. The vaccination program was well accepted by providers (85.1% [194] agreed or strongly agreed) with only 6.1% (14) reporting that providers were not well accepting of the program.

There were different ways used by respondents to inform parents of eligible children of the program. The majority (73.9% [161]) reported that they did not actively contact parents but provided opportunistic influenza vaccination to eligible children. Of the remainder 11.0% (24) reported sending letters to parents, 10.1% (22) contact via SMS text messages, 8.3% (18) via phone calls and 3.2% (7) via emails to parents. Other reported ways of providing information on the program to parents were: using recall lists on Medical Director; informing parents during consultation; educating parents when giving other vaccinations or services; posters in surgery/waiting rooms; handouts to parents; Facebook; and website posts.

Regarding reported vaccine shortages, two-thirds of respondents (144/219, 65.8%) reported not experiencing any issues with the supply of influenza vaccine for children aged 6 months to <5 years. However, 34.3% (75/219) reported experiencing supply issues of influenza vaccines for children.

Module 2

In the second module, 19 stakeholders were interviewed via telephone between October and November 2018. They included representatives of the NSW Health Immunisation Unit, representatives of PHNs and PHUs, and a key immunisation expert.

The use of, and familiarity with, program resources varied among the stakeholders. While NSW Health promoted the vaccination program through a number of information resources, many published on their website, not all respondents were familiar with these resources and their personal assessment about the quality of the resources varied.

Eight of 15 stakeholders reported parents' and health care providers' lack of awareness of the availability of free influenza vaccine, hesitancy around vaccination, and misperceptions regarding vaccination to be key barriers. Many stakeholders reported that they were informed about the program in early 2018. They knew about it either via email communication or through

regular teleconferences with the Ministry of Health. Seven of 15 said it was adequate notice for them to prepare, seven thought it was inadequate, while one stakeholder was unsure.

Ten of 15 stakeholders who were asked about challenges reported issues with supply including overall shortages, brand-specific shortages, delays in supply and wastage due to improper storage, while four others thought there were no supply issues and one was unsure. Noting that the shortages were more related to adult vaccines than paediatric, they were taken positively as a sign of good uptake. For instance, a PHU director thought the supply of a particular vaccine brand ran out because the campaign went well.

Issues with data uploading, extraction/retrieval, GP clinical management software and/or the Australian Immunisation Register (AIR) were reported by 10 of the 15 stakeholders who were asked about this; the remainder reported no issues. Issues identified ranged from human errors to issues with system upgrading.

Module 3

In the third module, parents of children (aged <18 years) hospitalised for influenza between 2 July – 25 October 2018 in five tertiary referral hospitals in five Australian jurisdictions in the PAEDS network, including the Children's Hospital at Westmead (CHW), NSW, participated in an online survey during or after discharge. Overall, 30 NSW parents participated in the survey. Most children aged over 6 months for whom influenza vaccination status could be verified (17/20, 85%) were not vaccinated. Of the 18 parents of children aged 6 months to <5 years and thus eligible for free vaccination in 2018, 14 (78%) were aware that vaccination was free for children their age.

These parents did not perceive access to vaccination to be a major barrier to influenza vaccination. Rather, the main barriers identified were:

- Concerns about the safety of influenza vaccine for children (parents were more hesitant and less supportive of influenza vaccination than other NIP childhood vaccines).
- Lack of recommendation from a health care provider.

Parents identified that they trusted health care providers to advise them about influenza vaccination and would generally do what their health care providers recommend about vaccines for their children. GPs were the most commonly reported source of information on and recommendation to vaccination. However, most parents did not receive a recommendation to vaccinate their child, despite 83% (25/30) reporting that their child had consulted a GP at least twice in the previous twelve months. The second most commonly recalled source of information regarding vaccination was the child's My Personal Health Record (the Blue Book). Some parents noted no mention of influenza vaccination in the Blue Book. Finally, despite their child having been hospitalised for influenza, only half (13/25, 52%) of the parents reported having received a recommendation to vaccinate their child in the future. Despite many not recalling receiving a recommendation, most parents surveyed planned to vaccinate their children in future years. Some, however, were still undecided and needed more information about the safety and efficacy of influenza vaccination.

Coverage

Early impact of the vaccination program was evaluated by estimating influenza vaccine coverage in NSW children aged between 6 months and <5 years. Using Australian Immunisation Register (AIR) data as at 30 September 2018, influenza vaccination coverage (including receipt of two doses of influenza vaccine in the first year of recorded influenza vaccination) was calculated by calendar year, age group and Indigenous status, and LHD. Overall, 116,771 children aged 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 – equivalent to 25.3% influenza vaccination coverage of NSW children aged 6 months to <5 years. This varied by LHD (from 15.5% in South Western Sydney to 33.7% in Hunter New England) and also decreased with increasing age (from 35.1% in children aged 6 month to <1 year to 21.8% in children aged 3 years to <5 years). While influenza vaccination coverage for Aboriginal children in NSW was below 10% between 2015 and 2017, it was consistently higher than in non-Aboriginal children (below 5%) in the same years. In 2018, influenza vaccination coverage

increased significantly for both Aboriginal and non-Aboriginal children, reaching 26.0% and 25.3% respectively. In 2018, the proportion of children recorded as receiving their first ever dose of influenza vaccine was also higher in all children compared to previous years. Additionally, compared to previous years, the proportion of both Aboriginal and non-Aboriginal children recorded in 2018 who appropriately received a second dose of influenza vaccine in their first year of vaccination increased substantially, reaching 53.2% and 66.6% respectively.

AusVaxSafety

AusVaxSafety's annual, active influenza vaccine safety surveillance captures adverse events following immunisation (AEFI) for seasonal influenza vaccines by soliciting information in the days following vaccination from vaccinated individuals or their parents/carers. This is done via SMS message distributed using one of two AusVaxSafety surveillance tools, SmartVax or Vaxtracker. There were 53 SmartVax sites in NSW that participated in AusVaxSafety influenza vaccine safety surveillance, which provided data for 8,351 influenza vaccination encounters in children aged 6 months to <5 years between 1 April and 2 September 2018. Overall, 6,354 parents/carers participated replied to the initial SMS message (participation rate 76.1%).

The majority of participants received either FluQuadri Junior (66.1%) or FluQuadri (28.6%) and 852 (13.4%) received at least one other vaccine at the same time as the influenza vaccine.

Following influenza vaccination, 395 participants (6.2%) reported an adverse event, with fever and injection site reactions (pain, swelling, and/or redness at the injection site) the most frequently reported. There was one report of altered level of consciousness (non-responsiveness/loss of consciousness), and no seizures were reported. Of the participants, 0.3% (16) sought telephone advice for the adverse event/s and 0.5% (31) sought medical attention. Of those who sought medical attention and provided further details, 84.6% saw a GP, while 15.4% presented to an emergency department. The most common adverse events reported among those who sought medical attention were fever and irritability. This overall safety profile was considered

consistent with that published for influenza vaccines in both clinical trials and observational studies.

Disease Burden (PAEDS-FluCAN Influenza Surveillance at the Children's Hospital at Westmead, 2018)

The Paediatric Active Enhanced Disease Surveillance (PAEDS) network is a hospital-based active surveillance system which contributes data to the national Influenza Complications Alert Network (FluCAN). In 2018, a total of 109 hospitalised influenza cases were identified at the NSW PAEDS-FluCAN site, the Children's Hospital at Westmead (CHW). Of these, 59 (54.1%) were children aged 6 months to <5 years with one influenza-associated death recorded in this age group. Influenza vaccination status was collected for both cases and influenza test-negative controls who had an acute respiratory infection. For children aged 6 months to <5 years where vaccination status was known, 1/56 (1.8%) cases and 24/62 (38.7%) controls had received at least one seasonal influenza vaccine. The preliminary estimate of vaccine effectiveness (VE) against influenza hospitalisation in NSW for 2018 was 83.5% (67.6%-91.6%) which was comparable with the preliminary national VE estimate of 75.5% (62.1%-84.2%).

Recommendations

Continue program

- While the observed vaccine effectiveness is encouraging, we recommend that the program is implemented for at least three years before attempts to measure the impact on the burden of disease.
- In the interim NSW Health should continue to offer funded influenza vaccine to children from 6 months up to 5 years of age, and try to increase knowledge and awareness amongst health professionals, and uptake by families.

Promote awareness of influenza vaccination amongst parents and providers

- Boost awareness among immunisation providers (especially GPs) and parents about influenza vaccine safety, effectiveness, and potential side effects through media campaigns (e.g. radio, TV, social media).

- Use photos of children of different ethnic backgrounds in campaign materials
 - Specifically target ethnic media
- Get midwives/Child & Family Health nurses/nurse immunisers to advise new parents about influenza vaccination and where it is available.

Vaccine supply

- Manage influenza vaccine supply carefully to avoid vaccine shortages.

Resources

- Develop videos and other effective communication resources for providers and parents outlining statistics on children with severe influenza and effectiveness and safety of the vaccine; these could be made available via NSW Health website.
- Improve clarity in resources for immunisation providers regarding influenza vaccination for seriously ill children (e.g. if on chemotherapy).

Recall systems

- Encourage immunisation providers, particularly GPs, to actively recall children for influenza vaccination e.g. by sending SMS to parents.

Planning and managing rollout of the vaccination program

- Designate a start date for the NSW influenza vaccination program and have the vaccine available for distribution before the start date.
- Provide an adequate lead time for the development of influenza vaccination resources and delivery of these resources.

Reporting to AIR

- Provide guidelines on uploading of influenza vaccine data to AIR

Introduction

Influenza contributes substantially to the global burden of paediatric severe respiratory illness.¹ A recent review of Australian influenza epidemiology showed that the influenza hospitalisation rate in children aged 2-4 years was similar to that in adults aged ≥65 years, with the rate in children aged 6-23 months more than twice as high.² A recent Australian retrospective study examined hospitalisations in children aged <16 years from three seasons (2011–2013) at two paediatric hospitals on opposite sides of Australia.³ The study reported that of the 740 hospitalisations, the majority were aged <5 years (476/740, 64%), and a substantial proportion (423/740, 57%) involved healthy children.³ This study also found that 8.5% (63/740) of the hospitalised children were admitted to an intensive care unit and 1.5% (11/740) developed encephalitis.³

The influenza vaccine has been recommended by the Australian Technical Advisory Group for Immunisation (ATAGI) since 2000 for all children from six months to under five years of age.⁴ Under the National Immunisation Program influenza vaccine is only funded in this age group for Aboriginal and Torres Strait Islander children and children with specified underlying medical conditions. In April 2018 NSW Health introduced a program which provided funded vaccine for all children in this age group.⁵ This new program is the focus of this evaluation.

This evaluation aimed to assess the implementation (process evaluation) and early impact (coverage and vaccine safety) of the influenza vaccination program for NSW children aged six months to less than five years during April to September 2018, including an assessment of vaccine coverage and safety data.

Chapter 1: Process evaluation

The process evaluation aimed to assess awareness, perceptions and experiences of relevant stakeholders during the first year of the implementation of the NSW Influenza Immunisation Program for children aged 6 months to <5 years.

The process evaluation was conducted in three modules:

- Module 1 — Online survey of general practitioners (GPs) and other primary health care staff
- Module 2 – Telephone survey of key stakeholders
- Module 3 – Online survey of parents of children hospitalised for influenza

Module 1: Online survey conducted from 15 October – 30 November 2018. Two hundred and twenty-nine GPs, practice nurses/managers and other professionals working in the primary health care area in NSW responded to this online survey. This survey was distributed via HealthEd (a private health education provider).

Module 2: Nineteen stakeholders were interviewed between October and November 2018, including representatives of the Immunisation Unit , NSW Health, representatives of Primary Health Networks and Public Health Units, and a key immunisation expert.

Module 3: Thirty parents of children (aged <18 years) hospitalised for influenza between 2 July – 25 October 2018 in five tertiary referral hospitals in five Australian jurisdictions, including the Children’s Hospital at Westmead (CHW), NSW participated in an online survey.

Key findings

Module 1 – Online survey of GPs and other primary health care staff

Aims

The aims of the online survey were to assess providers' awareness of the NSW Influenza Immunisation Program for children aged 6 months to <5 years and their perceptions of relevant influenza immunisation related issues.

Methods

An online survey of general practitioners, practice nurses and practice managers, and other professionals working in the primary health care area across NSW was conducted using SurveyMonkey® via the HealthEd network. HealthEd has approximately 20,500 email addresses on its national electronic database, the majority of which are for GPs. This online survey was targeted to providers in NSW. HealthEd runs a rolling series of educational events aimed at general practitioners, practice nurses/managers and other professionals working in primary health.

The online survey was sent on 15 October 2018 by HealthEd to all their subscribers via an email that contained a hyperlink to the survey and a request to complete from Prof Kristine Macartney, Director of NCIRS.

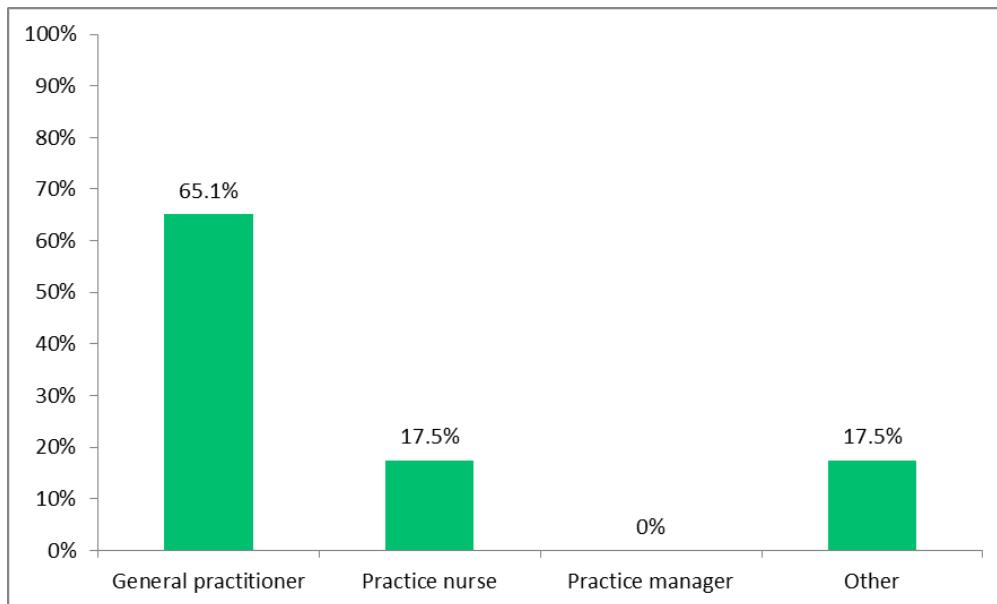
Reminder emails were then sent weekly by HealthEd with the survey closing on 30 November 2018.

Summary findings

Survey participants

There were 229 healthcare providers from NSW who participated in this survey. **Figure 1** shows that 65.1% (149) of respondents were general practitioners, 17.5% (40) were practice nurses and the rest 17.5% (40) were other healthcare providers of which 25 (10.9%) were registered nurses who worked in other settings (e.g. hospital).

Figure 1. Proportion of respondents by professional category (n=229)



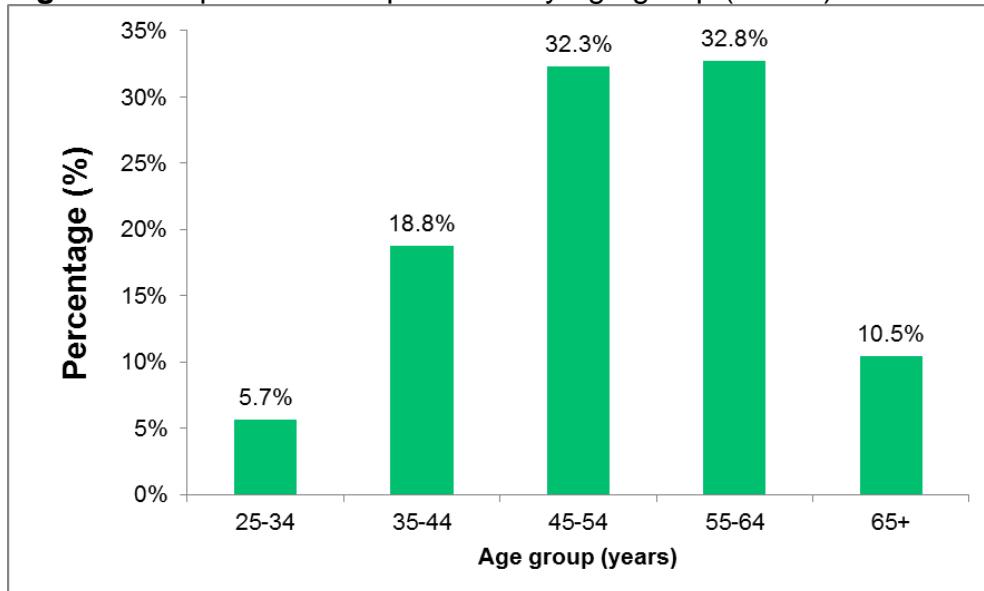
Sex

The majority of respondents (82.5%, 189) were females.

Age

Figure 2 shows that majority (65.1%, 149) of respondents were aged between 45-64 years.

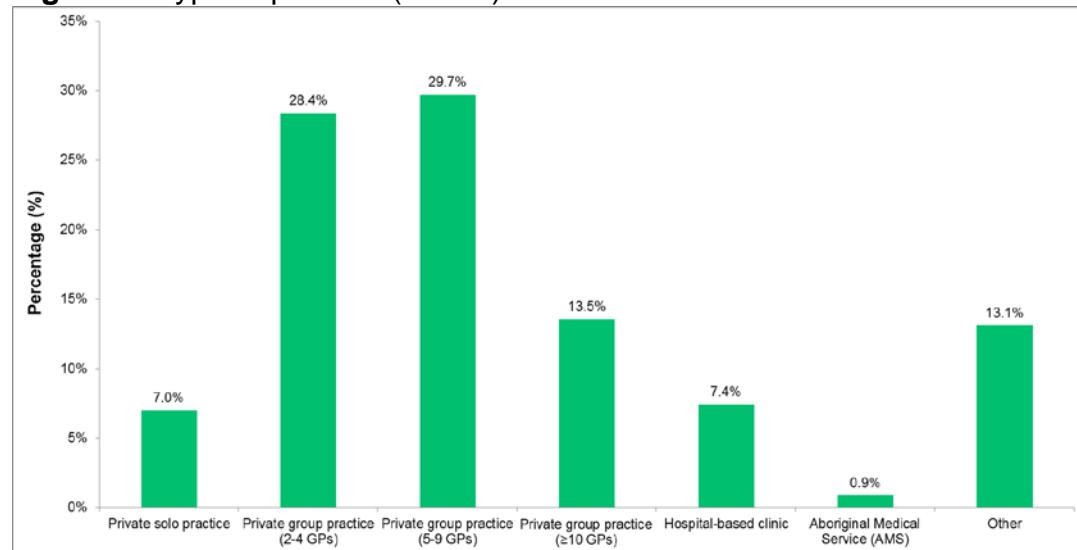
Figure 2. Proportion of respondents by age group (n=229)



Type of practice

The majority (29.7%, 68) of respondents worked in group practices with 5-9 GPs in their practice, 28.4% (65) worked in group practices with 2-4 GPs and 13.5% (31) worked in large practices with ≥ 10 GPs (See **Figure 3** below).

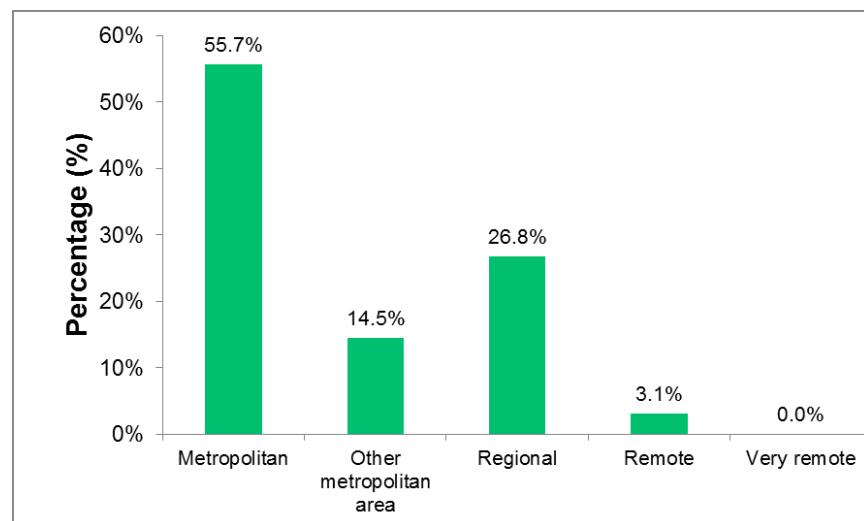
Figure 3. Type of practice (n=229)



Location of practice

One hundred and twenty-seven respondents (55.7%) reported working in practices in the metropolitan area whereas 26.8% (61) reported that they worked in regional locations. Only 3.1% (7) reported that they worked in remote locations (**Figure 4**).

Figure 4. Proportion of respondents by location of practice (n=229)



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 less than 5 years (63.6% agreed or strongly agreed), but 25.0% reported that parents were not aware of the program. Similarly, the majority of respondents reported that the vaccination program was well accepted by parents of eligible children (68.7% agreed or strongly agreed) with only 19.8% reporting that parents were not well accepting of the vaccination program. Most respondents reported that the vaccination program was well accepted by providers (85.1% agreed or strongly agreed) with only 6.2% reporting that providers were not well accepting of the program (**Table 1**).

Table 1. Awareness and acceptance of the program

	Strongly disagree %(n)	Disagree %(n)	Agree %(n)	Strongly Agree %(n)	Unsure %(n)
Parents of eligible children were aware that free influenza vaccine was available for children aged 6 months to <5 years	3.1% (7)	21.9% (50)	46.1% (105)	17.5% (40)	11.4% (26)
Influenza vaccination for children aged 6 months to <5 years was well accepted by parents	1.3% (3)	18.5% (42)	50.2% (114)	18.5% (42)	11.5% (26)
Influenza vaccination for children aged 6 months to <5 years was well accepted by providers	0.9% (2)	5.3% (12)	50.4% (115)	34.7% (79)	8.8% (20)

Collaboration

The majority of providers reported liaising with public health units (49%, 73) and primary health networks (43%, 64). Only one (0.7%) provider reported liaising with Aboriginal Medical Services.

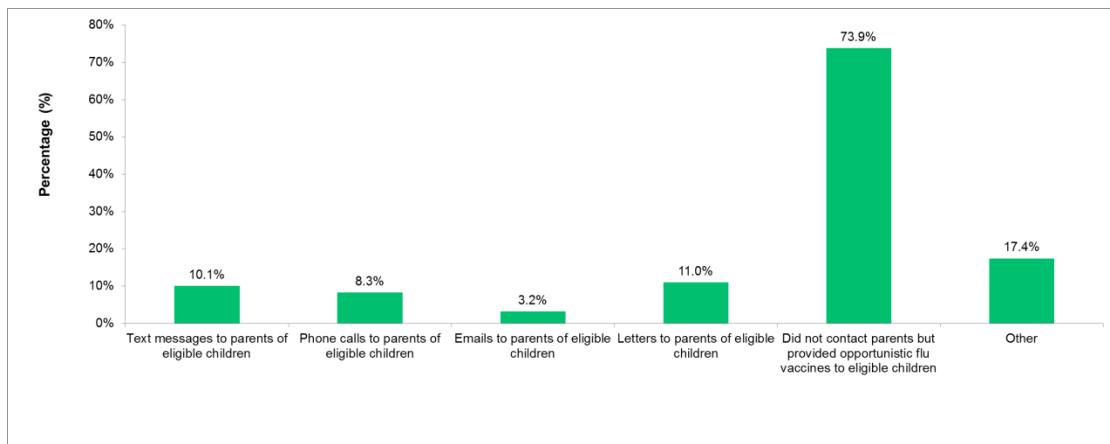
Education

The majority of respondents reported that they did not attend any specific educational sessions (80%, 180/225). Of those who attended educational sessions (45), 37.5% specified that these were provided by a primary health network and 22% by a public health unit.

Contacting parents of eligible children

There were different ways that respondents contacted parents of eligible children (**Figure 5**). The majority (73.9%, 161) reported that they did not contact parents but provided opportunistic influenza vaccination to eligible children, while 11.0% (24) reported contact via letters to parents, 10.1% (22) via SMS text messages, 8.3% (18) via phone calls and only 3.2% (7) via emails to parents. Other ways reported of contacting parents were: using recall lists on Medical Director; informing parents during consultation; educating parents when giving other vaccinations or services; posters in surgery/waiting rooms; handouts to parents; Facebook; and website posts.

Figure 4. Method of contacting parents of eligible children (n=218)



One hundred and twenty-three respondents (54.9%) reported that the ways of contacting parents of eligible children for this program were not different to other vaccination programs, whereas 20.1% (45) reported that the approaches were specifically for the influenza program for children.

Supply of influenza vaccines

One hundred and forty-four (144/219, 65.8%) respondents reported not experiencing any issues (vaccine shortage) with the supply of influenza vaccine for children aged 6 months to <5 years. However, 34.3% (75/219) respondents reported experiencing shortage of supply of influenza vaccine for children aged 6 months to <5 years.

Active follow-up for adverse events

One hundred and sixty-four (73.9%) respondents reported not actively following up patients for any adverse events.

Recording & reporting influenza vaccinations

Two hundred and seven (93.2%) respondents reported routinely documenting influenza vaccination for children aged 6 months to <5 years, if given, in their medical record.

However 5% (12) of respondents reported encountering problems with recording influenza vaccinations in 2018. Some of the respondents commented further as listed below:

- Best Practice software took a while to add vaccine details to menus
- Need to be entered by hand in immunisation register
- Initially trouble as wasn't on schedule and there were 2 doses but overcame
- If parents didn't bring *My Personal Health Record* (the Blue Book) for records, they were given printed record of the vaccine administered.
- Did not automatically record on AIR & AIR was often overloaded & unable to log in
- In the sense that it has not yet become routine in my psyche to record it... again just filling this survey has made that more reinforced
- Access- we ran out of vaccinations
- Shortage of supply of influenza vaccine by chemist if need to give children more than 5 years.

A few respondents (25; 11.6%) also had issues with transferring data to the Australian Immunisation Register (AIR), however most of these were not specifically related to influenza vaccination. Please see Appendix 1 for more details.

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.

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	131	61.8%
Requirement for second dose of vaccine in first year vaccinated	121	57.1%
Adding annual vaccination to an already crowded schedule	89	42.0%
Concerns about vaccine safety	80	37.7%
Concerns about vaccine effectiveness	59	27.8%
Systems for identifying and calling in eligible children	54	25.5%
Restricted age eligibility for free flu vaccine (6 months to <5 years)	52	24.5%
Anti-vaccination philosophy	48	22.6%
Busy clinic load	45	21.2%
Seasonal vaccine (rather than at specific age)	35	16.5%
Lack of awareness among providers	29	13.7%

Recommendations

Table 3 below lists the recommendations by respondents.

Table 3. Recommendations

Awareness of parents and providers
<ul style="list-style-type: none"> • Awareness campaigns directed at parents, and education and awareness campaigns directed to health care providers. Educate providers and parents on vaccine safety, effectiveness and potential side effects. Educate GPs more.
<ul style="list-style-type: none"> • Boosting awareness among parents. More parent directed advertising especially to make them aware that it is free.
<ul style="list-style-type: none"> • Get midwives to advise new parents to ask about influenza vaccination at early childhood health centres
Vaccine supply
<ul style="list-style-type: none"> • Management of supply to avoid vaccine shortages. • Ensure adequate consistent vaccine supplies. <p><i>Limited supply of influenza vax was a huge issue.</i></p>

It is difficult when the vaccine is so widely promoted and then you cannot access enough stock. At one point during the season we could only order between 10 to 20 vaccines in this age group at a time. In a practice of 10 GPs this would be used up in a morning.

Parents were bringing their children in to receive vaccines only to be told that there was a nationwide shortage and we didn't have any left (and the government was not planning on bringing any more in). Really disappointing.

Vaccine shortage an issue as practice used up a large amount in short period at the peak of the season and were unable to get more for another month. This affected the timing of the other vaccinations in the schedule that were due as well. Therefore supply in the peak period was a problem.

Restrict vaccination by GP clinic not at pharmacy especially the large chain pharmacy such as Chemist Warehouse

Biggest issue was supply of the vaccine as everywhere ran out of stock and we had to turn some patients away who wanted to be vaccinated.

Promotion/Advertisement/Media

- More media coverage/ campaigns. Ongoing campaign regarding flu vaccines for kids.
- Advertise widely in schools/day care/preschool /radio/TV
- Ongoing advocacy for immunisation yearly
- Have more public advertising to make parents aware. More media involvement to promote awareness of availability as most parents were aware of adult/seniors vaccination.
- More direct 'marketing' to parents to raise awareness of who is eligible, and why it's important to get vaccinated. Paediatric flu clinics
- Child & Family Health nurses are in ideal situation to promote influenza vaccination when parents attend the early childhood health centre to have developmental checks on child
- Stress safety and importance in flu prevention when advertising
- Children of all different ethnic backgrounds should appear in photos
- Clearer promotional communication on ethnic media
- Television and internet advertising.

Eligibility

- Give free vaccinations for all children; offer to all age groups

- Free vaccine for children up to 18 years of age
- Make it part of national immunisation schedule.
- Increase age of eligibility
- Good initiative but will be good if all primary school children can be eligible
- At risk children should be prioritised (asthma/ significant prematurity/ lung disease/ other significant illness)
- Flu vaccine should be free for the whole family

My only question I would like to see answered is how do we know this recommendation is not a ‘knee jerk’ reaction to a particularly bad 2017 outbreak... is there enough evidence for ongoing routine flu vaccination yearly in this age group and why not then all age groups

Resources

- Videos about statistics of children with severe flu and effectiveness of vaccine
- Posters
- Clarity around seriously ill children for providers (e.g. chemotherapy)
- Ensure better prepared and education resources handy.

Provide overview of evidence base for supporting this strategy to providers

- Target and promote vaccination in day care/child care and preschools.
Distribution of pamphlets to the day cares and preschools
- Provision of consumer pamphlets to surgeries
- Television and internet advertising

Recall for vaccination

Encouraging GPs to be proactive in recalling / SMS to parents.

Hard to get parents to bring back for 2nd flu vaccine especially after September when they perceive no real need. Will be better next year when only need 1

Manage schedule changes

Scheduling flu vaccination:

Frequently had to negotiate with parents which vaccine to give first and which to delay as the change in the immunisation schedule on 1 July 2018 also resulted in multiple vaccines (sometimes 3-4 vaccines) being due. Some parents declined the flu vaccine for their children for these reasons.

If possible only one dose. One vaccine dose only for first time influenza recipients.

Add it to the blue book

Reporting to AIR

- *Please make the online AIR better. Please.*
- *If pharmacies are involved in distributing vaccine, make sure they are made to follow the same guidelines as GP practices with uploading of data to AIR and EMHR and that they don't charge for a vaccine that would be free in GP surgery*
- *Perhaps to give incentives for both parents and providers.*

Module 2 – Key stakeholder survey

Demographic information

A total of 19 key stakeholders from across NSW were interviewed (two respondents from a PHU provided information together in a telephone interview hence these were treated as a single response). Of the 18 telephone interviews, 11 stakeholders were from PHUs, 4 from PHNs, one was a key immunisation expert, one was the Manager for Immunisation at NSW Health and one was a senior communications officer who worked for the Health Protection Unit at NSW Health.

Information resources

NSW Health promoted the vaccination program through a number of information resources published on their website. The information resources available in the website are ‘Frequently Asked Questions (FAQs)’, ‘Information for GPs’, ‘Information for Immunisation Providers’ and ‘Premier’s Media Release’. Also available are: ‘Immunisation of young children against influenza – evidence review’, ‘product information on influenza vaccines’, and various provider communications that included fax reminders to GPs regarding the availability of free flu vaccine; flyers and stickers to label vaccines according to the age group.

Consumer resources namely posters were available in English, Arabic, Vietnamese, Simplified Chinese and Traditional Chinese. Social media via Facebook and Twitter publicised the vaccination program. The social media activity resulted in 671,609 impressions and reaching 94,736 unique people.

The use of, and familiarity with, information resources varied among the stakeholders. Not all of them were familiar with these resources and their personal assessment about the quality of these resources varied. For instance, nine of 15 stakeholders who were asked to comment on the quality of information resources were not familiar with the Premier’s media release, only three out of six who said they were familiar with it rated it as ‘very good’,

while one rated it as ‘good’ and the other two as ‘poor’. Ten of 15 stakeholders considered the FAQs to be very good, three considered it to be good and two were unsure. Nine of 15 considered ‘Information for GPs’ to be very good while two considered it good and four were unsure. Seven of 15 considered ‘Information for immunisation providers’ to be very good, four considered it to be good and four were unsure. Some stakeholders provided suggestions for potential improvements to all the resources. An Aboriginal immunisation health care worker working at a PHU stressed the importance of making the FAQs culturally more appropriate.

I think they really need a bit more, culturally appropriate resources to, you know actually show pictures of the actual younger families and things like that.

An Aboriginal immunisation support officer suggested different ways of getting messages out.

When you're looking at working with Aboriginal people different areas and different groups of people have different ways of getting messages out and I think that's why it was really important for the AMSs to work with the people in their community to actually come up with those plans of action and lay messages.

An immunisation coordinator at a public health unit felt that the resources need to be updated from time to time to meet on going public needs.

So, they probably need – especially the frequently asked questions probably need to be updated with new questions that are being asked by immunisation providers and the general public, because they're asking questions too.

Another immunisation coordinator at a public health unit stressed on improving physical appearance and font sizes of the resources and relevant websites.

But again, just at the moment, when you first come on to the page and you look at it, you've got the frequently asked questions and then it's all of the same stuff field down below. If they actually increased the print size and had that on the page and then it linked in to another part of the page behind that – it's just because the prints quite small and you'd have to appreciate some of us needed good glasses.

Similarly a director of a PHU reported experiencing difficulty in finding immunisation resources on the internet.

However, just in general, immunisation resources for GPs are very difficult to find on their internet site. So that's probably the most – yes that would really help it to be more useful and usable really and people would be able to find it. At the moment it's really – you just can't find it.

A GP support officer in a PHN suggested rebadging the resources to meet their local need.

We rebadged some of the stuff. With the information for the GPs and service providers, they're used to getting wordy stuff. It's not as crucial for them I guess. And then what we could do – say for example when we were promoting to Aboriginal communities, we've got some local artwork we've had.

Barriers

Eight of 15 stakeholders reported parents' and health care providers' lack of awareness of the availability of free influenza vaccine, hesitancy, and misperception to be key barriers. The requirement of a second dose was considered to be a key barrier by two stakeholders; another considered confusion among immunisation providers with different influenza vaccine brands to be a barrier. One stakeholder each reported fear of injections; time constraints; and lack of transport as barriers to vaccination. A public health unit director mentioned that GPs were not well aware of the program.

One is that GPs were either not aware or not – they didn't agree with the program. Therefore they weren't recommending it to their patients and then their patients' children.

An immunisation coordinator at a public health unit suggested that all children in an Aboriginal family should be vaccinated.

Aborigines won't have their young kids vaccinated for influenza if the whole family can't be done.

An Aboriginal immunisation health care worker said that waiting at a GP's surgery is an important barrier.

I think it's just going to the doctor, like if you've got little ones then getting them to the doctor just for flu vaccination can be quite hard and you've got to wait around

Planning

Stakeholders reported that they were informed about the program in early 2018. They knew about it either via email communication or through regular teleconferences with the Ministry of Health. Seven of 15 said it was adequate notice for them to prepare, seven thought it was inadequate, while one stakeholder was unsure.

An accredited nurse immuniser at a PHU thought the lead time was not adequate and that it increased their workload.

I just know it sort of happened, and so it increased our workload significantly, but we got no new staff, no new hours. Our immunisation clinics were just crazy. The uptake was so good that we had to open more clinics, but no more staff hours.

Similarly an Aboriginal immunisation health care worker, although they thought the notice was adequate, realised that the staff were overwhelmed by the workload.

I think it was, but I don't think they realised that they'd be overwhelmed with responses they had.

Education/training

When asked if the stakeholders attended any educational sessions, only five of 15 answered 'yes', one was unsure and nine reported not attending any.

Of those who attended educational sessions only one stakeholder reported attending an influenza session at the PHAA National Immunisation Conference session; two reported learning about influenza vaccine from teleconferences, and one reported listening to the video on 'Free flu shots for children aged 6 months to under 5 years' by Prof Kristine Macartney, the Director of NCIRS (<https://www.health.nsw.gov.au/immunisation/Pages/kids-flu-shot.aspx>).

An immunisation coordinator at a PHU reported time constraint to be a hindrance to attending educational sessions.

No, because we did rural and remote and travelled up to somewhere for an hour meeting or anything like that doesn't happen. It can take six hours to get to Sydney.

Rollout/service delivery

Of the 12 stakeholders who discussed about strategies to deliver influenza vaccination programs, four mentioned using opportunistic vaccination during a visit to GP or hospital, two reported using outreach programs such as at day care or at special school or during NAIDOC day, another offered a walk-in service i.e. providing influenza vaccination without an appointment; one provided education to early childhood nurses (regarding the importance of vaccination); two reported having no special strategy to offer influenza vaccination and two were unsure.

Regarding having an active recall system for the second dose, none of the interviewed stakeholders agreed that there was any active system to recall patients; however all stakeholders reported that their immunisation providers advise the parents to bring back their kids for the second dose. Two public health unit directors did acknowledge having some systems in place to send a reminder (for example via text message to parents whose children are overdue), a few others reported having such a system for selected children, such as those with high risk conditions or those from Aboriginal background or enrolled in special schools, but there was no active recall system in place.

Nine of 15 stakeholders who were asked the question considered that the requirement of two doses had been a barrier or a potential barrier; three said it was not a barrier, while three were unsure.

A nurse immuniser at a PHU did not consider missing the second dose as a big issue.

I mean, nothing happens if they only have the one, like you don't die if you only have the one dose; we know two doses are ideal, and we definitely try and give them the two doses, but - yeah.

Similarly an immunisation coordinator at a PHU preferred to distinguish this from barriers to vaccination.

But it's not a barrier to receiving the flu vaccine, but having had the two doses is a barrier in completing those two doses.

Cultural issues

Three of 14 stakeholders who were asked about cultural issues reported existence of some cultural resistance to uptake of vaccinations, nine others thought there wasn't and two were unsure.

An immunisation coordinator at a PHU working with a large culturally and linguistically diverse (CALD) community thought language is a barrier.

I think there are other cultural communities that don't understand that these vaccines are for free. I think language is a big barrier for many cultural communities

In contrast, another immunisation coordinator at a PHU and her manager working with a CALD community thought CALD parents proactively vaccinated their children.

We were talking to one of the nurses who works here in the office and she works at a baby clinic in the Auburn area. And she said in that flu season time she had a lot of parents from Chinese, Vietnamese and Indian background who came in who were quite keen to have the flu vaccine. They were requesting it.

Leakage

Four stakeholders agreed that there was vaccine leakage while seven disagreed and four were unsure.

An immunisation coordinator at a PHU narrates:

I'm sure there's plenty of leakage. If it means that a younger infant under the age of five is going to be immunized, I'm sure they'd give them plenty of vaccines to the other members of the family. And in most cases, the comment may be "I'm sure the vaccine's about to expire.

Issues with supply

Ten of 15 stakeholders who were asked about this acknowledged issues with supply including shortages, brand-specific shortages, delays in supply and wastage due to improper storage, while four others thought there were no supply issues and one was unsure.

Some of the issues with vaccine shortages were taken positively as a sign of good uptake. For instance a PHU director thought the supply of a particular vaccine brand ran out because the campaign went well.

I would say this year demonstrated that it sounded like the campaign went too well. In the sense that you had people going and trying to get a vaccine, and that was exactly what they were being asked to do and then supply ran out. And supply ran out for one particular brand and then a particular brand could only be kept for one particular age group.

This was echoed by another PHU director:

What happened was last season, because there was such a huge demand there was a shortage across the state. That was the thing that created a lot of backlash, people going in to get their vaccine and saying there's none available. While it was a hot issue for a little while, once we were able to get out there and explain exactly what had happened and why, and say supplies are coming, it took a lot of the heat out of it.

A clinical nurse consultant in immunisation at public health unit thought supply issues temporarily angered immunisation providers.

I guess the supply in community health where our nurse immunisers vaccinate, they were okay, but I had lots of phone calls from big GP practices that were angry because their supply was restricted in the early part of the program. They were only allowed to get like a certain number of doses.

Issues with data storage, retrieval, software and AIR

Issues with data storage, retrieval, software and/or AIR were reported by 10 of 15 stakeholders who were asked about this, the remaining said there were no issues. Issues identified ranged from human errors to issues with system upgrading. Some comments are listed below.

- *Sometimes it was difficult to extract the data from AIR, because the software has changed a few of its fields in recent times, so when it put batch numbers in and Aboriginal data it ruined what was programmed, and that required some modifications to load things down.*
- *Childhood nurses enter their vaccine history record and visits on a program called CHOC (short for Community Health and Outpatient Care), an electronic medical record program within the health service. They also enter it then on AIR, so it is a double handing of data.*
- *Occasionally the staff just pick the wrong drop-down box in their medical software and then the error goes through to AIR.*
- *At times a child is known to receive an adult dose when in fact it is just a wrong recording on AIR. It is also known that there are some GPs, for whatever reason, do the mistake while attempting to do it correctly but cannot do it or something happens with the system upload leading to an entry error.*
- *A lot of system errors with AIR happen, with the immunisation all up, wrong number of children entered.*
- *Sometimes kiddies who have had vaccines that have been done but not recorded in AIR. AIR is down for five seconds if they are trying to send something across at that time it does not go across.*
- *GP practices are not keeping up to date with their practice software. Sometime they fail to understand that if they have done something as a bugger up and they are trying to go across to AIR that it blocks every other immunisation that is meant to go across to AIR as well.*

Strengths

The key strengths of the program identified by stakeholders were as follows:

- *The message did get across that children in that age-group are particularly vulnerable to disease and infection, so the main strengths of the program is the fact that it could reach critical audiences*
- *Media had a massive influence on the implementation and the success of this program*
- *The program targeted an age group who is in the vaccine routine*
- *The vaccines are being given out for free: the most important thing is that it shows that that cohort is important, that those children are a priority, and it really promoted awareness of the risk to that group that was not there in the community*
- *NSW Health advertised it widely*
- *There were stickers in boxes to make sure that providers were labelling the vaccines of different age groups correctly and they do that via their delivery system*
- *The availability of the vaccines was another strength*
- *The strength definitely was the information, the resources that the NSW Health were trying to put together and to get to public health units, to GPs was robust*

Challenges

The key challenges identified by stakeholders were as follows:

- *The workload increased significantly: capacity and an understanding of the program with different brands of vaccine were challenges*
- *Educating the health professionals to be supportive of it*
- *A lot of information, a lot of changes, a lot of different brands of flu vaccines for children- overwhelmed the providers*
- *The challenges are actually getting the providers to encourage families for vaccination*
- *Insufficient lead time to prepare for rollout*

- *Unlike other immunisation programs obviously the fact that this vaccine has to be given every single year is a challenge*
- *Clinician investment was challenge*
- *People's health belief and misconceptions, and hesitancy regarding flu vaccination*
- *Raising awareness amongst the target population and convincing GPs to change their clinical practice because they wouldn't necessarily have been vaccinating this population before*
- *Vaccine shortage at some stages*
- *Data or reporting of data, coverage data were not available in real time.*

Recommendations of key stakeholders

The key recommendations from stakeholders were:

- *Continuing to raise awareness amongst immunisation providers and parents*
- *Extend the age group for Aboriginal children; currently the five years to 15 years are not funded. Until they are funded there are a lot of the Aboriginal people who will not have the family vaccinated. If the government is not going to pay for the whole family the Aboriginal families are not going to go and get vaccinated.*
- *More funding to public health visits should be ensured. If we were provided with more funding we would be able to do a lot more community outreach and vaccinate some vulnerable populations that cannot get to their primary care providers.*
- *Have as much lead time as possible into the development of resources, the delivery of the resources, and what's expected from the different service providers. Have a designated starting date and have the vaccine available for distribution before the starting date.*
- *From a provider's point of view it is capacity and an understanding of the program. The capacity to meet the new demand and an understanding of the program to enter it and do it should be ensured.*
- *Maybe combining vaccines (if technically possible) because we want to reduce number of needles to the children, they are quite full on in the schedule.*
- *Encouraging providers with those key pieces of information*

- *Data are strong tools. Ensure availability of data from parents and families who are either taking it up or not taking it up, and finding out whether or not there is anything that can be done to try and circumnavigate any of those questions or concerns that they have*

Module 3 – Online survey of parents of children hospitalised for influenza

Aims

To understand the barriers to vaccination among parents of children who were hospitalised with severe influenza and not vaccinated prior to admission.

Methods

We identified children (aged <18 years) hospitalised for influenza between 2 July and 25 October 2018 in five tertiary referral hospitals in five Australian jurisdictions, including the Children's Hospital at Westmead (CHW), NSW. Children were identified through the Paediatric Active Enhanced Disease Surveillance (PAEDS) network. Parents of these children were sent an SMS text message with an invitation and link to participate in an online survey about their attitudes about and access to influenza vaccination. Non-respondents were sent up to 3 reminder SMS text messages spaced 48 hours apart. Demographic and clinical data on hospitalised children were separately collected in a Case Report Form (CRF) under the broader PAEDS-FluCAN surveillance and NHMRC-funded study of child influenza, and also used in our analysis.

Survey development

The survey sought to determine reasons for non-vaccination. Survey items were developed using the results from in-depth qualitative interviews conducted by Carlson et al (*under review*) in 2017, other published studies assessing attitudes and access to vaccination, and our additional assessment of common barriers to influenza vaccination experienced by Australian parents early in the 2018 influenza season, as expressed publicly on social media. From these sources, we identified 8 distinct domains (1. inconvenient vaccination pathway 2. absence of all-inclusive child influenza vaccination promotion 3. missing recommendations 4. the social norm 5. hierarchy of views on vaccines and diseases 6. concerns about safety 7. a preference for 'natural' ways 8. imperfect interpretations of information) which we measured using 48 items. The survey questions were extensively pilot tested with the research team, seven public health experts, and nine parents.

Data Analysis

Stacked horizontal column bars were generated in Microsoft Excel to show the distribution of attitudes for each item; the percentage of those who agreed with the statements are on the right of the zero and the percentage of those who disagreed with the statements are on the left of the zero. To detect differences between respondents and non-respondents, STATA was used to undertake a chi-square analysis. Fisher's exact test was used where appropriate. A P value of <0.05 was considered significant.

Results

Only results for children hospitalised in NSW are presented in this report.

Summary of results

30 parents participated in the survey. Of the 25 children aged over 6 months (21, 84%) were not vaccinated. Of the 17 parents of children aged 6 months to less than 5 years and thus eligible for free vaccination in 2018, 13 (76%) were aware that vaccination was free for children their age.

Access to vaccination was not perceived to be a major barrier to influenza vaccination for parents of children hospitalised for influenza. The main barriers identified were:

1. Concerns about the safety of the influenza vaccine for children (parents were more hesitant and less supportive of influenza vaccination than other NIP childhood vaccines).
2. Lack of recommendation from a health care provider

Parents identified that they trusted health care providers to advise them about influenza vaccination and would generally do what their health care providers recommend about vaccines for their children. General practitioners (GPs) were the most commonly recalled sources of information and the most common source of recommendation to vaccinate. However, most parents *did not* receive a recommendation to vaccinate their child, despite 83% (25/30) reporting that their child had been consulted by a GP at least twice in the previous twelve months. The second most commonly recalled source of information regarding vaccination was the child's My Personal Health Record (the Blue Book). Finally, despite their child having been hospitalised for influenza, only half (13/25, 52%) of the parents had received a recommendation to vaccinate their child in the future.

Despite many not recalling receiving a recommendation, most parents surveyed planned to vaccinate their children in future years. Some, however, were still undecided and needed more information about the safety and efficacy of influenza vaccination. Vaccination status of all children will be assessed using AIR data following the 2019 influenza season.

Detailed results

Respondents

In 2018, 109 children were hospitalised for laboratory-confirmed influenza at CHW. We invited 99 of these parents (91%) to participate in the study, of whom 30 did (30% response rate). Of the respondent's children, 63% (19/30) did not have a medical comorbidity that increases the risk of influenza (as per the Australian Immunisation Handbook) (Table 1). The majority of children (17/30, 57%) were aged between 6 months and 5 years. Nearly all children (26/29, 90%) were fully immunised for vaccines other than influenza as per the National Immunisation Program Schedule. Most children aged >6 months did not receive an influenza vaccine in 2018 prior to hospitalisation (22/25, 88%).

Most respondents were the mother of the child (28/30, 93%). The mothers were aged between 35–44 years (12/23, 52%), had a total of two children at home (12/23, 52%), were married/defacto/partnered (21/23, 91%), had a postgraduate university degree (10/23, 43%), were employed full time (8/23, 35%) and/or had a partner who worked full time (14/21, 67%). Most parents reported that their children usually don't receive a flu vaccine every year (15/23, 65%).

Based on the information collected in the CRF for those who participated, most parents (20/29 69%) spoke English at home, and the majority of mothers (17/29, 59%) and fathers (20/29, 69%) were born outside of Australia. A similar over-representation of parents born outside of Australia was seen in both respondents and non-respondents.

The characteristics of participants and non-participants were similar (all p-values were >0.05).

Table 1. Characteristics of survey participants and non-participants

	Respondent	Non-Respondent	P-value
	N (%)	N (%)	
Total	30 (30)	69 (70)	
Patient			
Comorbidity			
Yes	11 (37)	22 (32)	0.64
No	19 (63)	47 (68)	
Age			
<6 months	5 (17)	8 (12)	0.65
6 months - <5 years	17 (57)	37 (54)	
5 years - <18 years	8 (27)	24 (35)	
Sex			
Male	14 (47)	35 (51)	0.71
Female	16 (53)	34 (49)	
Immunisation status			
Fully immunised	26 (90)	57 (83)	0.88
Partially immunised	3 (10)	10 (15)	
Unimmunised	0 (0)	0 (0)	
<6 weeks when hospitalised	0 (0)	2 (3)	
Influenza vaccination in 2018 for those >6 months (verified)			
Yes	3 (12)	3 (5)	0.35
No	22 (88)	58 (95)	
Identifies as Aboriginal and/or Torres Strait Islander			
Yes, Aboriginal	0 (0)	1 (2)	1.00
Yes, both Aboriginal and Torres Strait Islander	0 (0)	1 (2)	
No	27 (100)	65 (97)	
Country of Birth			
Australia	26 (90)	60 (87)	1.00
Other	3 (10)	9 (13)	
Respondent/Family			
Language Spoken at Home			
English	20 (69)	42 (65)	0.68
Other	9 (31)	23 (35)	
Mother's Country of Birth			
Australia	12 (41)	120 (36)	0.61
Other	17 (59)	36 (64)	
Father's Country of Birth			
Australia	9 (31)	14 (25)	0.55
Other	20 (69)	42 (75)	
SEIFA Rank (2016 Decile for NSW)			
1 – 3	7 (23)	16 (23)	0.52
4 – 6	8 (27)	12 (17)	
7 – 9	13 (43)	30 (43)	
10	2 (7)	11 (16)	

Recollection of an influenza vaccination recommendation

Less than half (13/30, 43%) of parents received a recommendation to vaccinate their child in the year of the survey. A general practitioner (GP) was the most commonly recalled as providing a recommendation (6/13, 46%), followed by medical specialist (3/13, 23%) and a family member (3/13, 23%). Some parents (6/30, 20%) were told not to vaccinate their child in 2018. However, appropriately, two of these parents were of children aged less than 6 months. A medical specialist (3/4, 75%) and a friend (3/4, 75%) were the most common people to recommend not to vaccinate children aged older than 6 months.

Since the hospitalisation of their child for influenza, just over half (13/25, 52%) of the parents had received a recommendation to vaccinate their child in the future. A GP (6/13, 46%) and medical specialist (6/13, 46%) were most commonly recalled. Some parents (5/22, 23%) recalled receiving a recommendation to not vaccinate their child in the future (post-hospitalisation). A family member (3/5, 60%) was the most commonly recalled.

Information Sources

Twenty-three of the 30 respondents (77%) provided information on their sources of information regarding vaccination in general. The sources were GP (14/23, 61%), their child's Blue Book (10/23, 43%), hospital websites (9/23, 39%), Google scholar/science articles (8/23, 35%), government website (8/23, 35%), medical specialist websites (8/23, 35%), specialist health websites (7/23, 30%), friends (5/23, 22%), nurse (5/23, 22%), social media (5/23, 22%), family (4/23, 17%), school (4/23, 17%), information provided by child care/kinder/preschool (3/23, 13%), and books (1/23, 4%).

Twenty-three of the 30 respondents (77%) could also recall seeing or hearing advertising about the 2018 influenza vaccine. The most common place where participants could recall seeing advertising was a poster at a medical clinic (16/23, 70%), followed by radio (7/23, 30%) and television (6/23, 26%).

Awareness of funding program

Of the 17 parents of children aged 6 months to less than 5 years and thus eligible for free vaccination in NSW in 2018, 13 (76%) were aware that vaccination was free for children their age (Table 2).

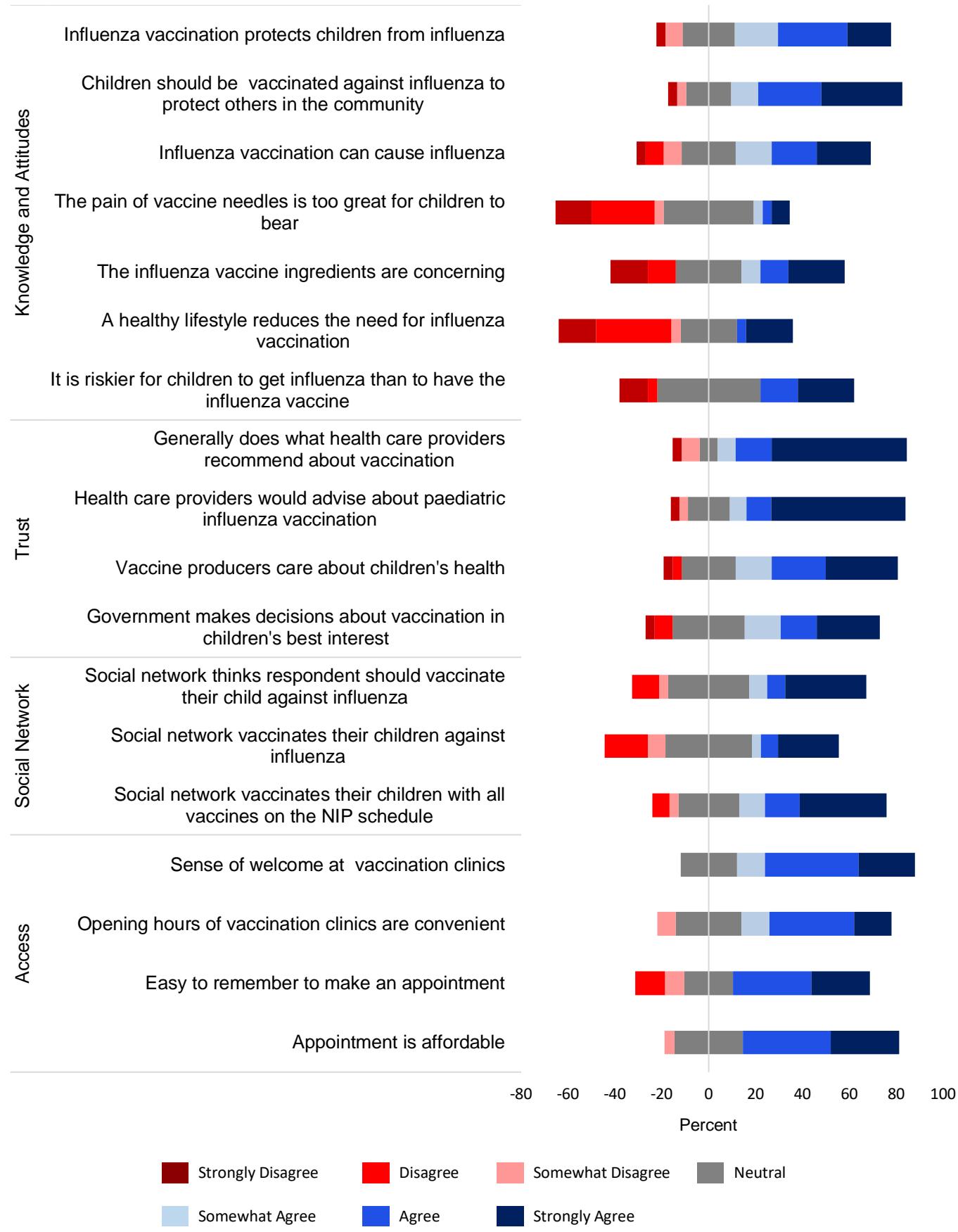
Table 2. Knowledge of state-funding for influenza vaccination of children

	Child's Age Group		
	<6 months N (%)	6 months - <5 years N (%)	5 years - <18 years N (%)
Of belief that vaccination was free for age group	4 (80)	13 (76)	2 (25)
Of belief that vaccination was not free for age group	0 (0)	1 (6)	0 (0)
Unsure	1 (20)	3 (18)	6 (75)

Knowledge and Attitudes

This survey identified that parents of children hospitalised for influenza have some concerns about the safety of influenza vaccine. Most parents somewhat or strongly agreed with the statement “the flu vaccine can cause the flu in some people” (Figure 1). The level of concern about influenza vaccine ingredients was evenly distributed. Some parents disagreed that it is riskier for children to get influenza than to be vaccinated. Despite their safety concerns, these parents understood the value of the vaccine’s effectiveness. Most somewhat-strongly agreed that the flu vaccine does protect children from the flu, and that to protect others in the community, it is important for children to be vaccinated (Figure 1).

Figure 1. Parent's knowledge and attitudes, levels of trust, perceptions of vaccination their network, and perceptions of access to influenza vaccination



Trust

These parents showed a high degree of trust for the authorities (health care providers, government, and vaccine producers). Less trust was shown with government when compared to health care providers and vaccine producers (Figure 1).

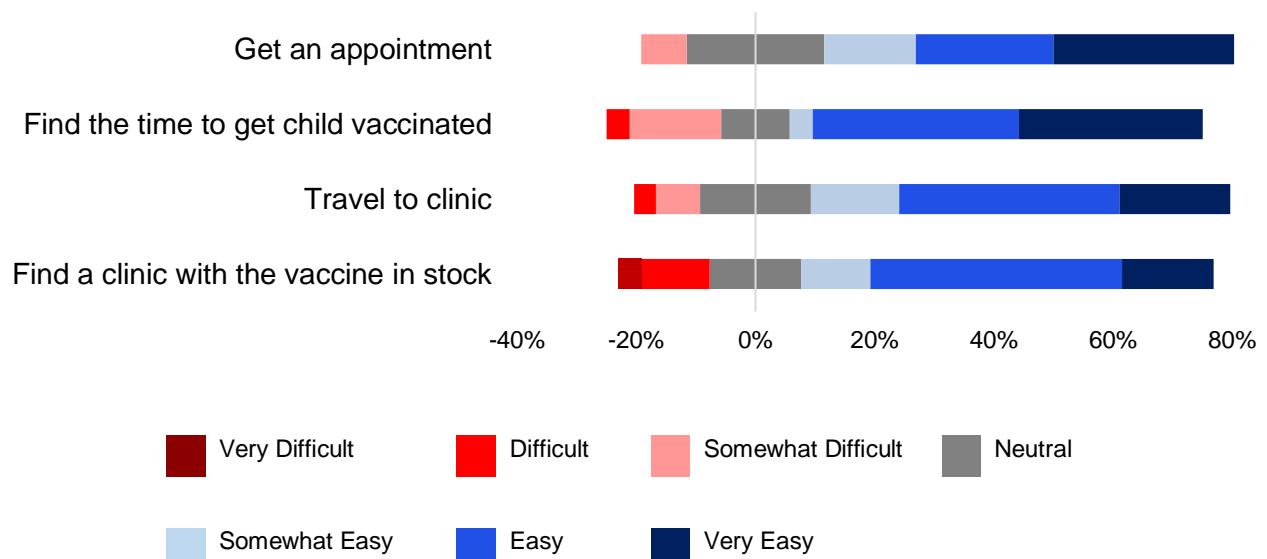
Social network

Most parents agreed or strongly agreed that their family and friends' children would be vaccinated with all the vaccines on the NIP schedule (Figure 1). Fewer parents agreed or strongly agreed that their family and friends' children would be vaccinated for influenza. Most however agreed that those who are important to them would think that they should vaccinate their child against influenza (Figure 1).

Access to vaccination

The majority of parents reported that the cost of an appointment was not a barrier, nor was remembering to make an appointment. No parents felt unwelcome at places that provide influenza vaccination for children, and the majority felt that the opening hours of clinics were convenient (Figure 1). Parents mostly believed that they had the time to get their child vaccinated, could easily travel to the clinic, and that it would be easy to get an appointment. Some parents had difficulties in finding a place that had the vaccine in stock (Figure 2).

Figure 2. Perceptions of access to influenza vaccination



Support and hesitancy

The degree of hesitancy regarding influenza vaccination was almost evenly divided, with 52% somewhat or very hesitant, and 48% not at all or not too hesitant. Overall, however, parents were more hesitant about influenza vaccination than general childhood vaccination (Figure 3a). Despite this hesitancy, 65% of parents generally or strongly supported influenza vaccination, although this was lower than for vaccination in general (87% support, Figure 3b).

Figure 3a. Degree of hesitancy about vaccination

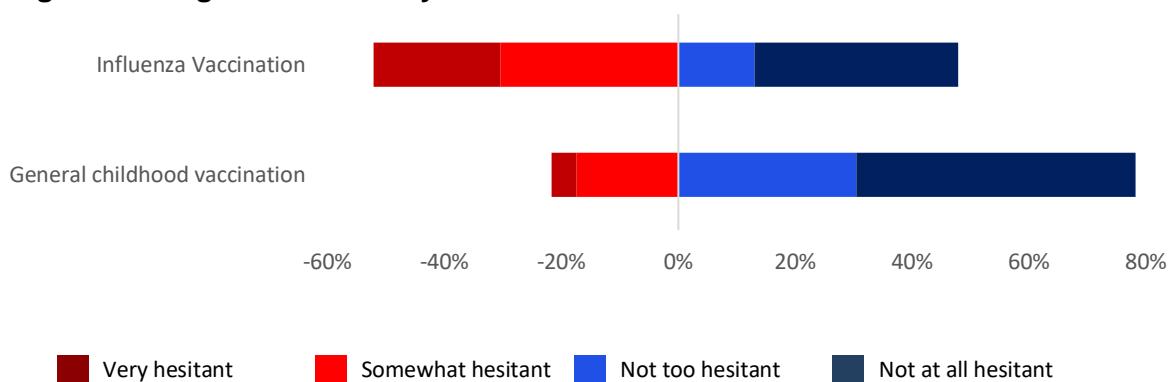
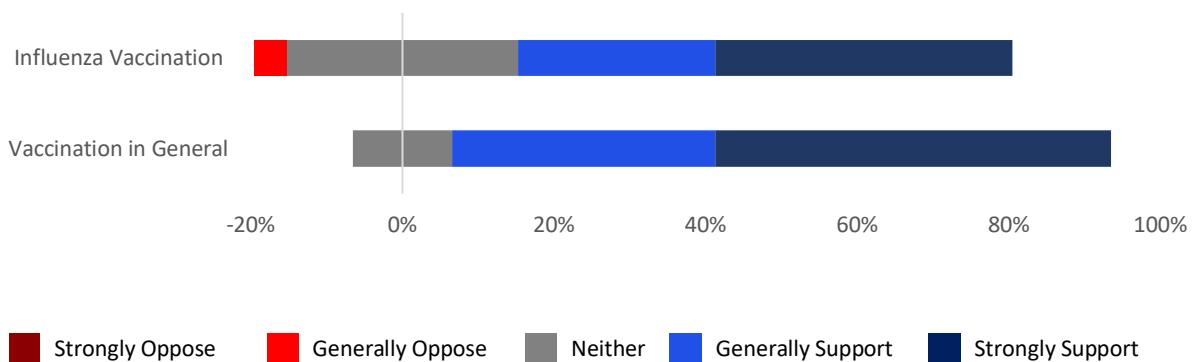


Figure 3b. Degree of support for vaccination



Future Intentions

Most parents (18/25, 72%) said they plan to have their child vaccinated for influenza in future seasons. This will be checked on the Australian Immunisation Register in 2019 (consent has been provided). Importantly, 5/25 (20%) had not yet decided about future vaccination. These are parents who have just experienced how severe influenza can be by having a child hospitalised for influenza. These are the responses given when asked what would help to make the decision:

- *"I'm not sure I'll need to speak to a Dr about it first"*
- *"He is only 15 weeks old, I am unsure at which age the flu vaccine should be given"*
- *"Haven't heard much from family with kids that had flu vaccine on what's the effect. I [have] much concern of the effect after having the flu vaccine whether it's good or bad."*

Chapter 2: Vaccination coverage

Early impact of the vaccination program was evaluated by estimating coverage of the influenza vaccine for NSW children aged between 6 months and <5 years. Using Australian Immunisation Register (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 Aboriginal status was not specified were presumed to be non-Aboriginal for the purpose of the analyses conducted.

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 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 dose recorded on the AIR, the proportion of children recorded as receiving their first ever 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 were undertaken to track the weekly cumulative uptake of the influenza vaccine by NSW children aged 6 months to less than 5 years by age group and Indigenous status. The proportion of all NSW children aged 6 months to less than 5 years vaccinated with at least one dose of

influenza vaccine 1 April and 30 September 2018 was also calculated by age group and local health district (LHD).

Results

Following implementation of the state-funded influenza vaccination program for all children aged 6 months to <5 years, a total of 185,839 influenza vaccine doses were recorded on the AIR as having been given to NSW children in this age group between 1 April and 30 September 2018 (Table 2.1). Of these, 119,669 doses (64.4%) were recorded in AIR as FluQuadri Junior influenza vaccine given to children aged 6 months to < 5 years. In 2018, a total of 247,430 FluQuadri Junior influenza vaccine doses were reported by NSW Health to have been distributed for children aged 6 months to < 3 years as part the state-funded influenza vaccination program. In this 6 months to < 3 years age group, a total of 117,244 influenza vaccine doses were recorded on the AIR between 1 April and 30 September 2018 (Table 2.1), with 115,173 doses (98.2%) being recorded as FluQuadri Junior influenza vaccine. This equates to 46.6% (115,173/247,430) of the doses distributed by NSW Health for children aged 6 months to < 3 years.

Overall in NSW, 116,771 children aged 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 – equivalent to 25.3% coverage of the total NSW population of children aged 6 months to <5 years (Table 2.1). The proportion of children recorded on the AIR to have received at least one dose of influenza vaccine between 1 April and 30 September 2018 decreased with increasing age – 35.1% in children aged 6 months to <1 year to 21.8% in children aged 3 years to <5 years. Similar coverage was seen in Aboriginal and non-Aboriginal children across each age group and overall (Table 2.1). Substantial variation in coverage was seen across the NSW LHDs (Table 2.2) – ranging from 33.7% in Hunter New England to 16.9% in the Mid North Coast for all children aged 6 months to <5 years. Almost 50% of children in the 6 months to <1 year age group received at least one dose of influenza vaccine in Hunter New England and Western NSW (Table 2.2).

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 influenza vaccine between 1 April and 30 September 2018 as recorded on the AIR. Similar patterns of uptake are seen in both Aboriginal and non-Aboriginal children in each age group category. Vaccine uptake was highest during the month of May, with over 50% of doses given by the first week of June in each age group in both Aboriginal and non-Aboriginal children. Weekly vaccine uptake in Aboriginal and non-Aboriginal children began to plateau in August for all age groups except the 6 months to <1 year age group. From early July, weekly uptake was highest in this age group in both Aboriginal and non-Aboriginal children compared to older age groups.

Table 2.1. Total number of influenza vaccine doses and number and proportion of NSW 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.

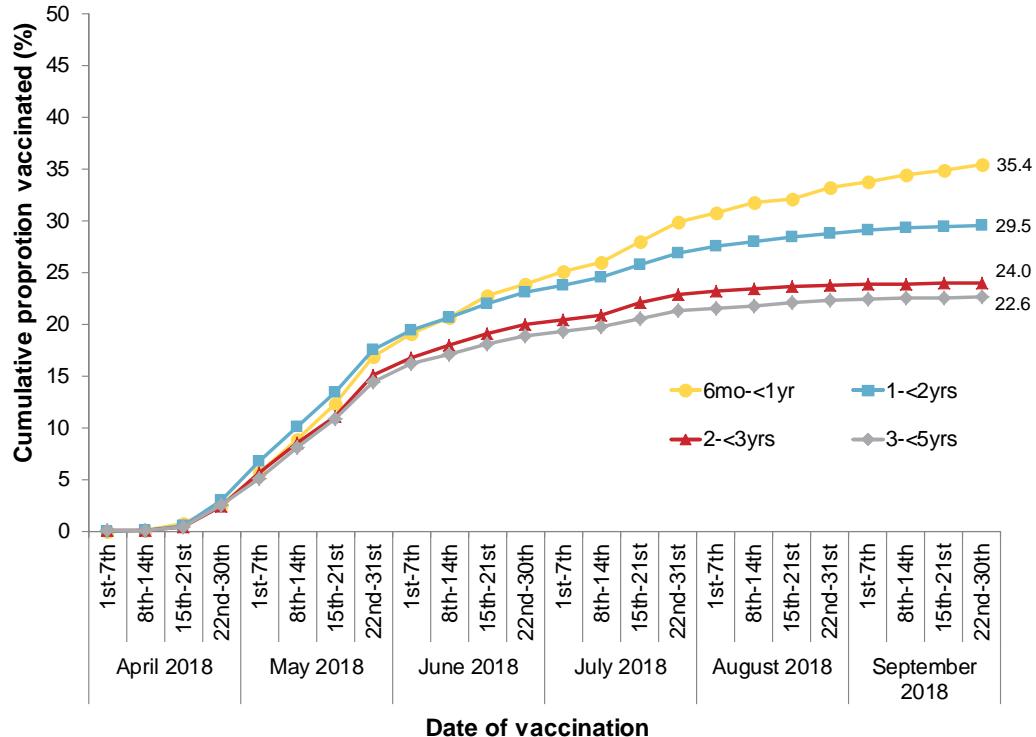
	Total number of recorded doses (1 April – 30 September, 2018)			Number of children with at least one dose recorded (1 April – 30 September, 2018)			Proportion of children with at least one dose recorded (1 April – 30 September, 2018)		
	Aboriginal	Non- Aboriginal	All Children	Aboriginal	Non- Aboriginal	All Children	Aboriginal	Non- Aboriginal	All Children
6mo - <1yr	1,589	27,929	29,518	1,000	16,264	17,264	35.4	35.1	35.1
1yr - <2yr	2,482	45,317	47,799	1,666	27,316	28,982	29.5	28.5	28.6
2yr - <3yr	1,928	37,999	39,927	1,327	23,677	25,004	24.0	24.7	24.7
3yr - <5yr	3,316	65,279	68,595	2,423	43,098	45,521	22.6	21.8	21.8
6mo - <5yr	9,315	176,524	185,839	6,416	110,355	116,771	26.0	25.3	25.3

Table 2.2. Proportion of all NSW children aged 6 months to <5 years with at least one dose of influenza vaccine recorded on the Australian Immunisation Register in 2018 (1 April to 30 September) by age group and NSW Local Health District.

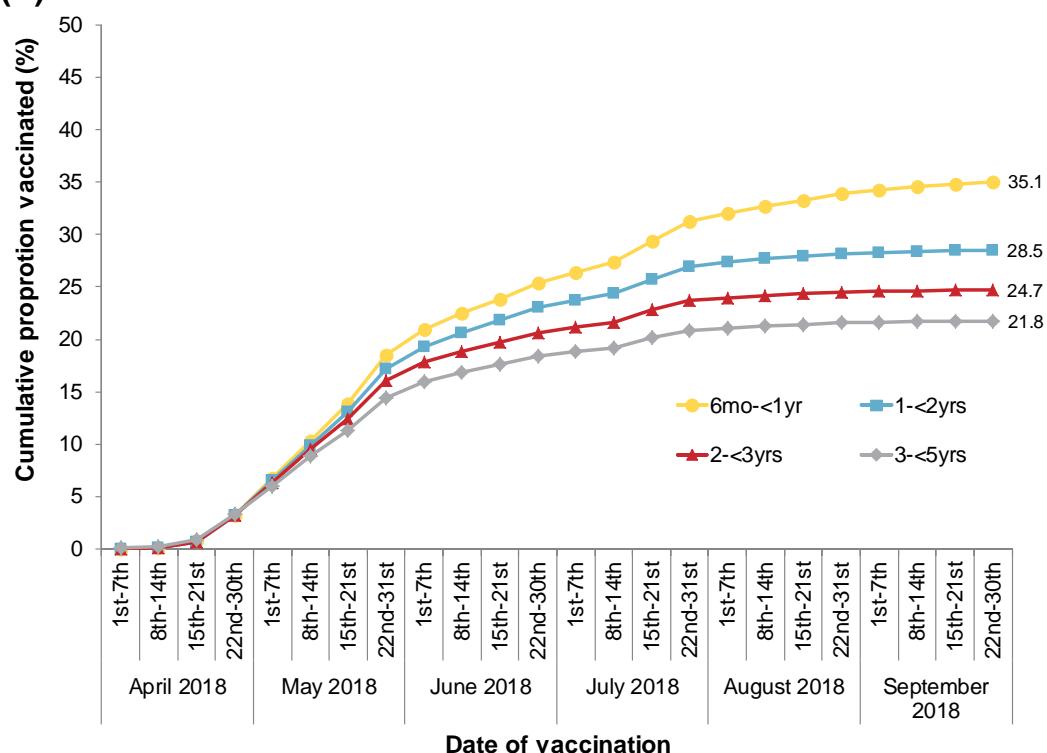
	Local Health District																		
	CC	FW	HNE	IS	MN	MM	NBM	NV	NN	NS	SES	SWS	SN	SYD	WN	WS	NSW		
6mo - <1yr	37.6	30.9	49.0	36.0	23.1	36.5	28.3	47.5	24.9	45.6	38.1	18.2	46.0	43.3	49.5	27.0	35.1		
1yr - <2yr	30.4	29.1	38.9	26.8	18.3	29.9	24.1	35.1	21.1	36.7	31.0	16.4	30.2	34.1	37.9	24.1	28.6		
2yr - <3yr	22.5	21.3	31.4	24.3	16.4	26.3	22.3	30.8	16.7	30.8	26.9	15.9	28.0	29.5	29.3	22.3	24.7		
3yr - <5yr	21.2	23.3	28.9	21.0	15.1	22.4	18.8	24.7	16.7	26.6	22.7	14.2	22.5	24.5	26.0	20.5	21.8		
6mo - <5yr	25.2	25.0	33.7	24.5	16.9	26.4	21.8	30.8	18.5	31.7	27.2	15.5	27.8	30.0	31.8	22.4	25.3		

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

(A)



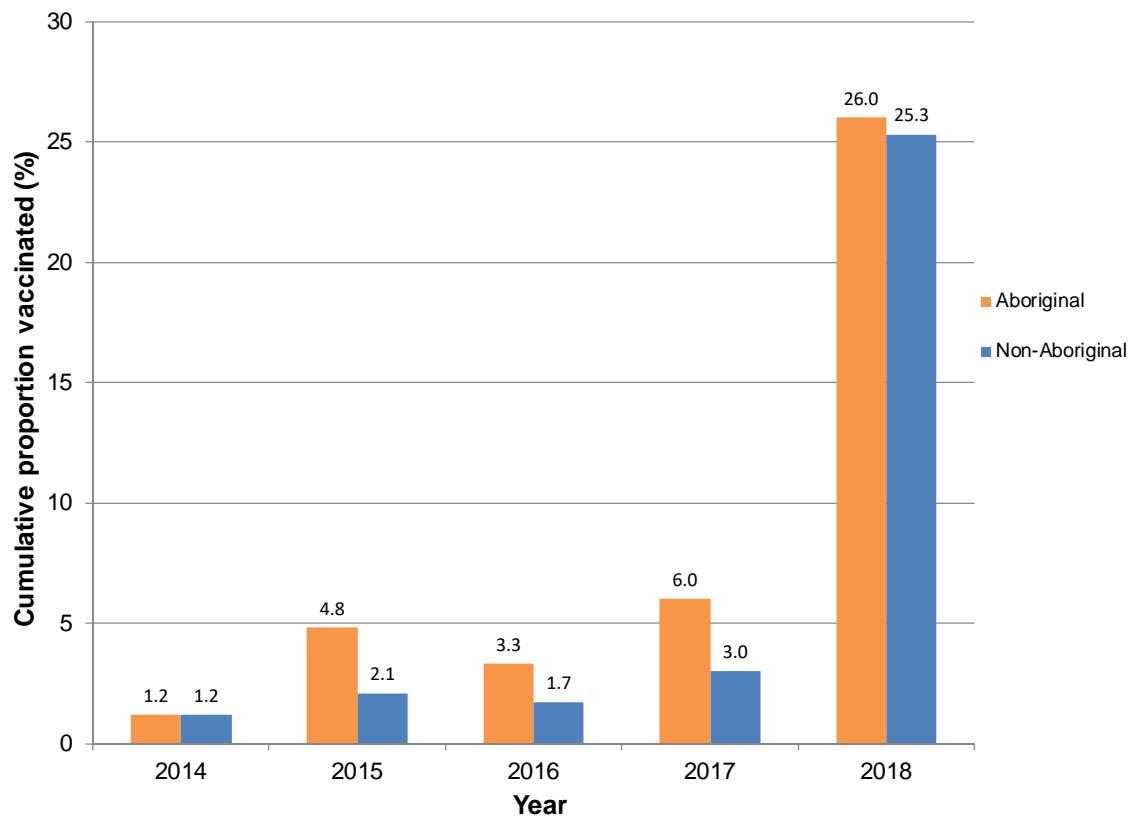
(B)



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 small percentage of NSW Aboriginal children in this age group are recorded on the AIR to have received at least one dose of the influenza vaccine between 2015 and 2017. However, the percentage of NSW Aboriginal children aged 6 months to <5 years vaccinated with at least one dose of influenza vaccine was approximately double that of their non-Aboriginal counterparts in each of these years. Following implementation of the NSW state-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, and as at 30 September had reached 26.0% for Aboriginal children and 25.3% for non-Aboriginal children (Figure 2.2).

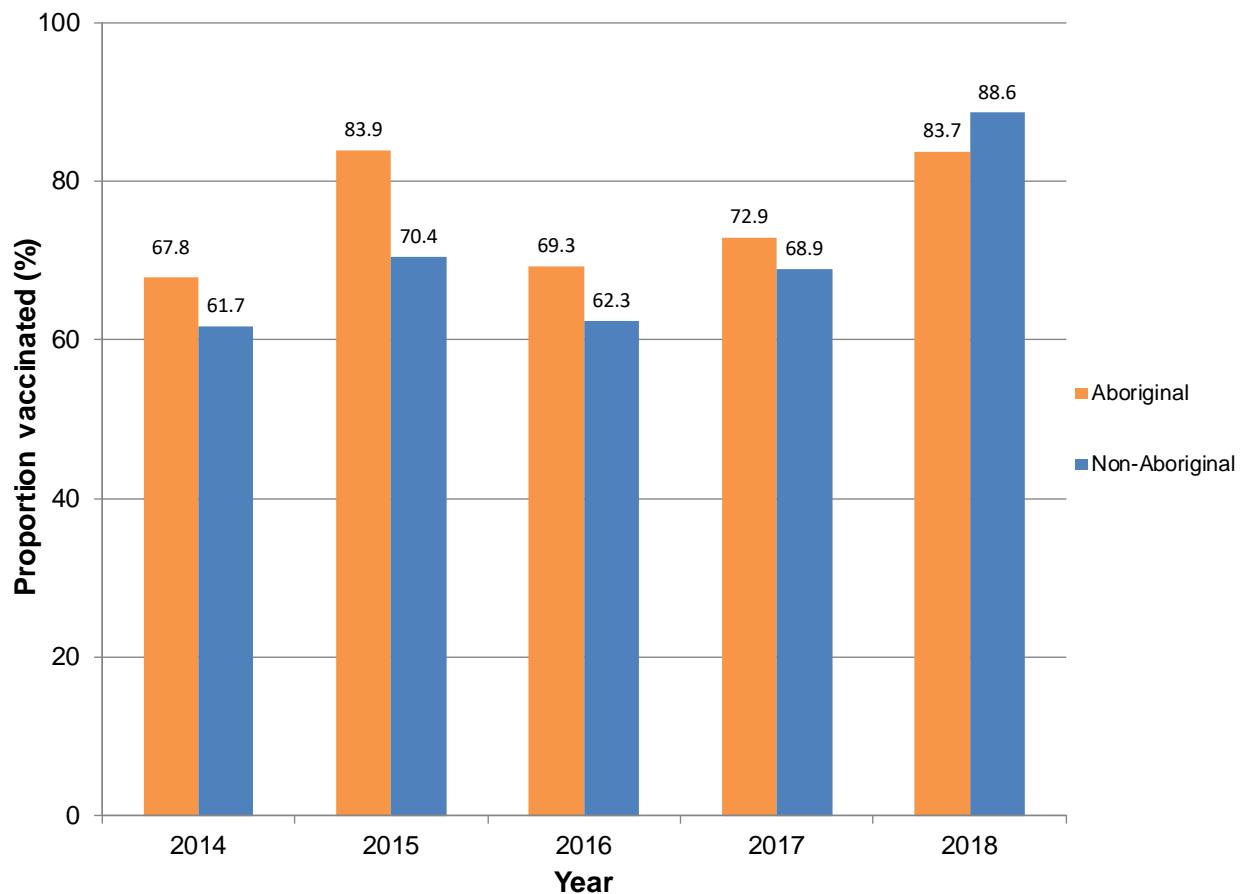
Figure 2.2. Proportion of children aged 6 months to <5 years in NSW with at least one dose of influenza vaccine recorded on the Australian Immunisation Register by Indigenous status and year of vaccination, 2014 – 2018.



Among the NSW children aged 6 months to <5 years recorded on the AIR as having received the influenza vaccine in 2018, over 80% (83.7% for Aboriginal children and 88.6% for non-Aboriginal children) were recorded as first time

recipients (Figure 2.3). This is a substantial increase compared to 2016 and 2017.

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



Between 2014 and 2018, the proportion of NSW children recorded on the AIR as receiving their first ever dose of influenza vaccine 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 NSW 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 vaccinated children aged 6 months to <5 years in NSW recorded on the Australian Immunisation Register as receiving their first ever dose of influenza vaccine by age group and year of vaccination, 2014 – 2018.

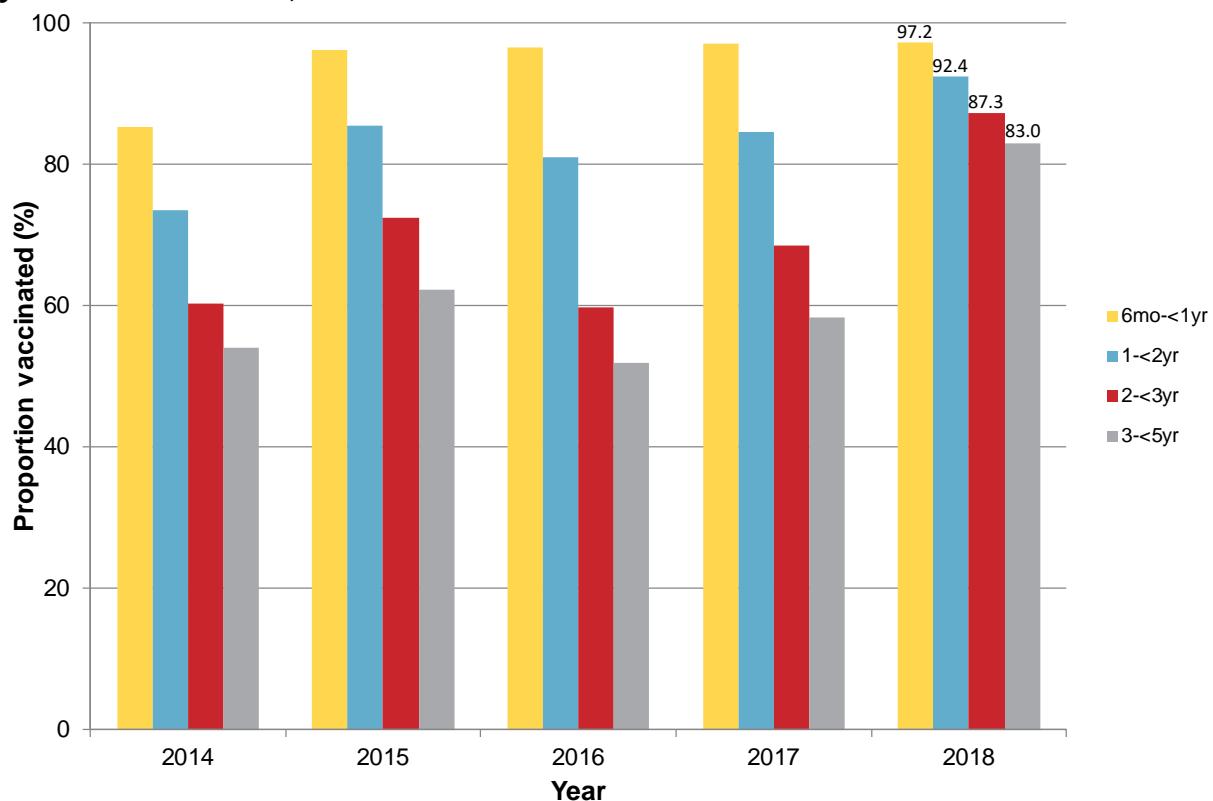
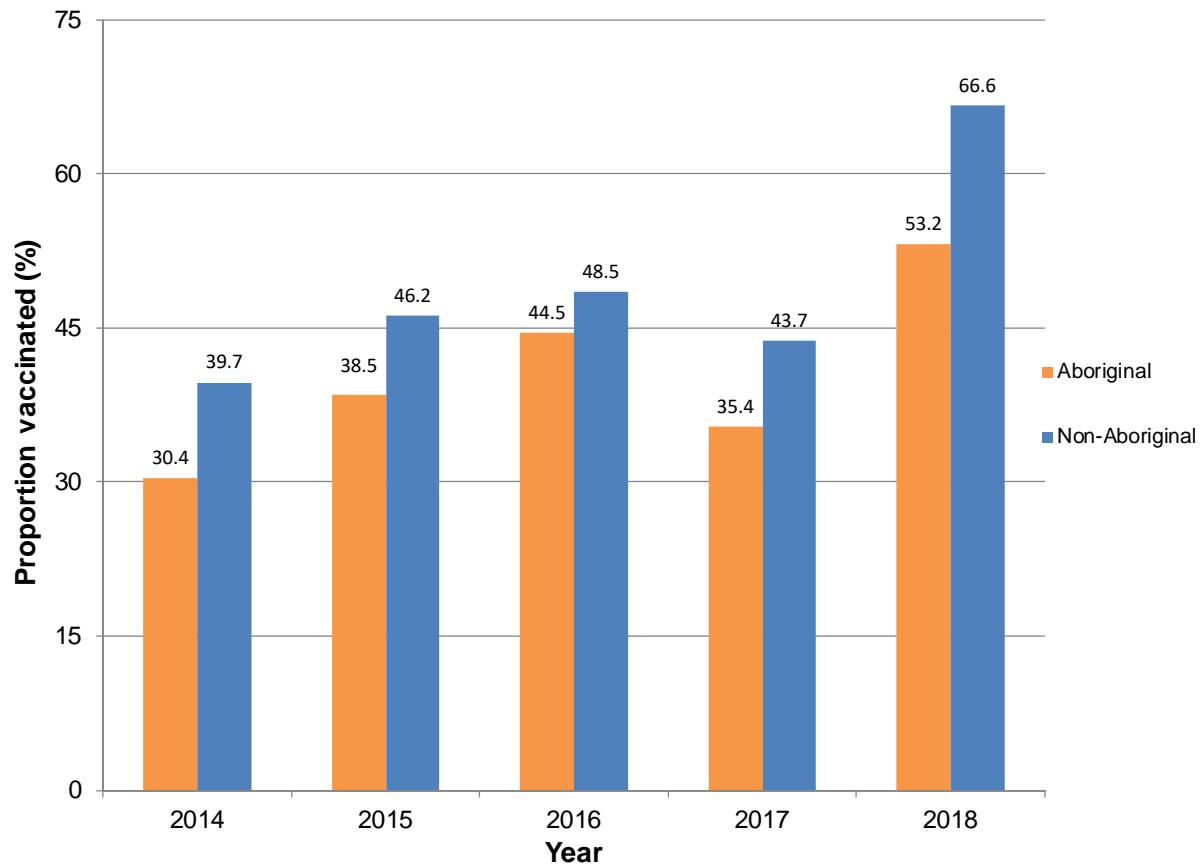


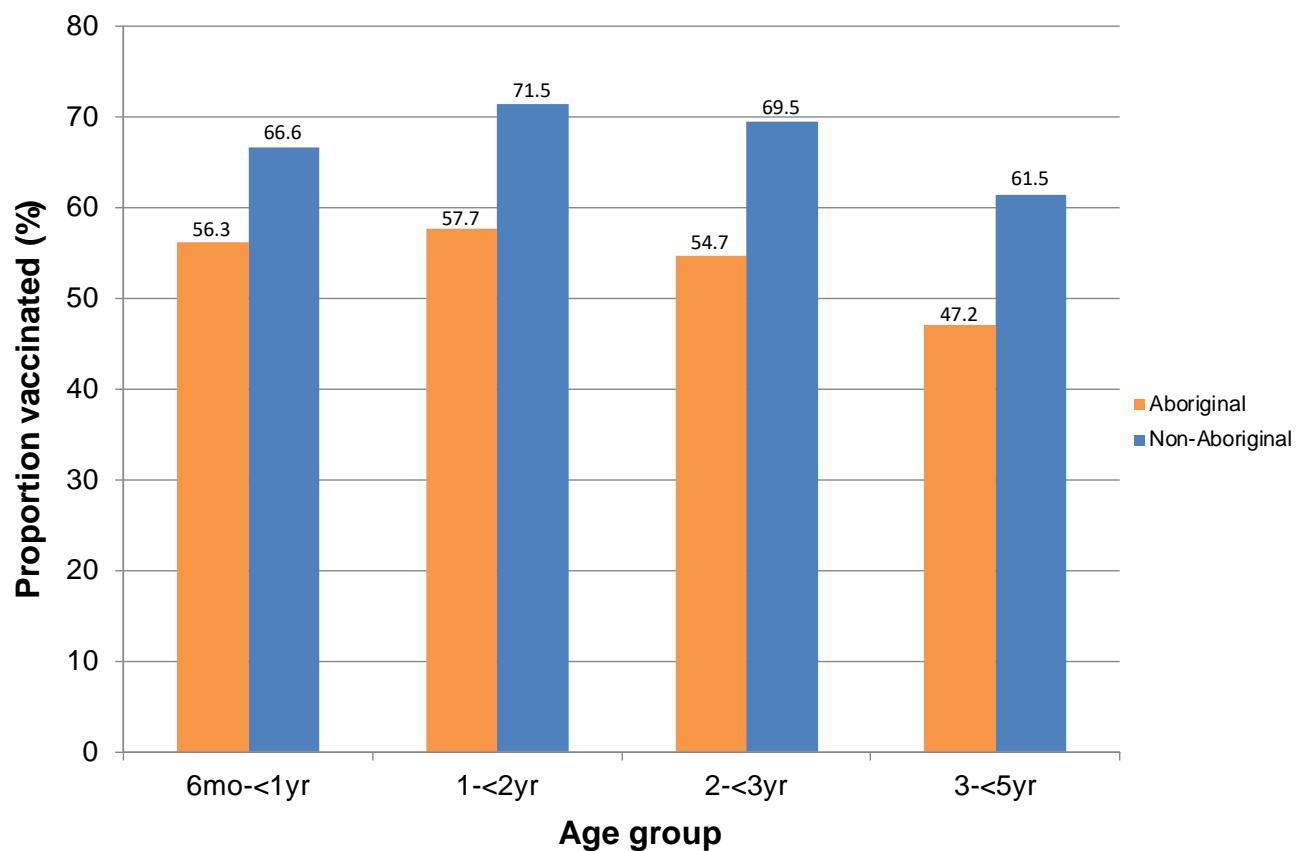
Figure 2.5 shows that between 2014 and 2017, less than 50% of non-Aboriginal children and less than 45% of Aboriginal children in NSW who were recorded on the AIR as having received their first ever dose went on to have a second dose recorded in the same year. Compared to non-Aboriginal children, the proportion of Aboriginal children recorded as receiving two doses of influenza vaccine in their first year of vaccination was consistently lower between 2014 and 2018. In 2018, the percentage of first time recipients recorded as receiving two doses increased substantially for both non-Aboriginal and Aboriginal children, reaching 66.6% and 53.2% respectively.

Figure 2.5. Proportion of vaccinated children aged 6 months to <5 years in NSW receiving two doses of influenza vaccine in the same year as first ever dose recorded on the Australian Immunisation register, by Indigenous status and year of vaccination, 2014 – 2018.



The proportion of Aboriginal children recorded as receiving two doses of influenza vaccine in their first year of vaccination was consistently lower than for non-Aboriginal children across all age groups (Figure 2.6). 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 for both Aboriginal and non-Aboriginal children (Figure 2.6).

Figure 2.6. Proportion of vaccinated children aged 6 months to <5 years in NSW receiving two doses of influenza vaccine in the same year as their first ever dose recorded on the Australian Immunisation Register, by Indigenous status and age group, 2018.



Chapter 3: AusVaxSafety vaccine safety surveillance

AusVaxSafety's annual, active influenza vaccine safety surveillance captures adverse events following immunisation (AEFI) for seasonal influenza vaccines by soliciting reports of any adverse events experienced in the days following vaccination from vaccinated individuals or their parents/carers, via SMS message distributed by one of two surveillance tools, SmartVax or Vaxtracker. Since 2014, AusVaxSafety has conducted seasonal influenza vaccine safety surveillance for children aged 6 months to <5 years of age. From 2017, surveillance expanded to include all individuals aged 6 months and older vaccinated at any AusVaxSafety sentinel surveillance site, including general practices, hospitals, community health clinics and Aboriginal Medical Services.

Those who respond "yes" or "no" to the initial SMS asking whether any adverse event occurred are classified as participants (with parents/carers participating by reporting adverse events experienced by their children). Those who respond "yes" are sent a second SMS inquiring about seeking medical attention for the adverse event, as well as a link to a short online survey, which asks the participant to specify the adverse event/s experienced. De-identified data for influenza vaccination encounters are received by NCIRS weekly for cleaning and descriptive analysis. In addition, rates of fever and medical attendance are used in weekly safety signal detection analyses conducted by collaborators at the Telethon Kids Institute. Results are summarised in weekly reports to the Australian Government Department of Health and aggregated results are available online (www.ausvaxsafety.org.au).

In 2018, AusVaxSafety conducted national safety surveillance for seasonal influenza vaccines administered to individuals aged 6 months and older vaccinated from 1 April until 2 September. All 2018 routine data were contributed by SmartVax.

The data presented here describe 2018 AusVaxSafety influenza vaccine safety surveillance results for children aged 6 months to <5 years vaccinated

at New South Wales (NSW) sentinel SmartVax immunisation provider sites. Analysis was conducted in Stata and graphs were produced in MS Excel.

2018 NSW AusVaxSafety seasonal influenza vaccine safety surveillance for children aged 6 months to <5 years

In 2018, there were 53 SmartVax sites in NSW that participated in AusVaxSafety influenza vaccine safety surveillance, providing data for 8,351 influenza vaccination encounters in children aged 6 months to <5 years between 1 April and 2 September 2018. Children aged 6 months to 8 years are recommended to receive two influenza vaccine doses in their first year of vaccination, so may have two vaccination encounters included in this data set. Of the 8,351 vaccination encounters, 6,354 parents/carers participated on behalf of their child by replying to the initial SMS message inquiring about whether any adverse events were experienced, yielding a participation rate of 76.1%. Table 3.1 provides basic demographic details about the participating children.

Table 3.1. Demographic details of children aged 6 months to <5 years participating in 2018 NSW influenza vaccine safety surveillance

Demographic variable	Result n/N (%)
Female	3,048/6,351 (52.0%)
Aboriginal and Torres Strait Islander	252/5,174 (4.9%)
Age (median) (range)	27 months (6-48 months)

Note: Denominators are based on number of respondents.

Vaccine details

The majority of participating children received either FluQuadri Junior (66.1%) or FluQuadri (28.6%). Table 3.2 details vaccine brand by age group.

Table 3.2. Vaccine brands received by 2018 NSW influenza vaccine safety surveillance participants, by age group

Vaccine brand	Age group (n[%])		Total
	6 months-2 years	3-4 years	
FluQuadri Junior	5,371/5,408 (99.3%)	128/2,943 (4.3%)	5,499/8,351 (65.8%)
FluQuadri	26/5,408 (0.5%)	2,365/2,943 (80.4%)	2,391/8,351 (28.6%)
Fluarix Tetra	2/5,408 (0.04%)	444/2,943 (15.1%)	446/8,351 (5.3%)
Other	6/5,408 (0.1%)	1/2,943 (0.03%)	7/8,351 (0.1%)
Fluad	0/5,408 (0.0%)	3/2,943 (0.1%)	3/8,351 (0.00%)
Afluria Quad	0/5,408 (0.0%)	2/2,943 (0.1%)	2/8,351 (0.02%)
Influvac Tetra	2/5,408 (0.04%)	0/2,943 (0.0%)	2/8,351 (0.02%)
Fluzone	1/5,408 (0.02%)	1/2,943 (0.03%)	1/8,351 (0.01%)

Note: In 2018, FluQuadri Junior (Quadrivalent; Sanofi-Aventis) was recommended for children aged 6 months to <3 years. FluQuadri (Quadrivalent; Sanofi-Aventis) was recommended for those aged 3 years and over. Fluarix Tetra (Quadrivalent; GlaxoSmithKline) was recommended for children aged 3 years and older. Influvac Tetra (Quadrivalent; Mylan Health) and Afluria Quad (Quadrivalent; Seqirus) were recommended for those aged 18 years and over. Trivalent vaccines Fluzone High Dose (Sanofi-Aventis) and Fluad (Seqirus) were recommended for those aged 65 years and over. The above table reports what was extracted by the SmartVax tool and represents the information entered by immunisation providers into their practice software.

Of the 6,354 participating children, 852 (13.4%) received at least one other vaccine at the same time as the influenza vaccine. The most commonly reported concomitant vaccines received were diphtheria-tetanus-acellular pertussis-hepatitis B-inactivated polio vaccine-*Haemophilus influenza type b* vaccine (DTPa-hepB-IPV-Hib); diphtheria-tetanus-acellular pertussis (DTPa); measles-mumps-rubella-varicella (MMRV); and diphtheria-tetanus-acellular pertussis-inactivated polio vaccine (DTPa-IPV).

Adverse events reported

Following influenza vaccination, 395 participants (6.2%) reported any adverse event, with fever and injection site reactions (pain, swelling, and/or redness at the injection site) the most frequently reported adverse events (Table 3.3).

There was one report of altered level of consciousness (non-responsiveness/loss of consciousness), and no seizures were reported. Of the participants, 0.3% (16) sought telephone advice for an adverse event and 0.5% (31) sought medical attention for an adverse event (Table 3.3). Of those who sought medical attention and provided visit details, 84.6% saw a GP, while 15.4% presented to an emergency department. The most common

adverse events reported among those who sought medical attention were fever and irritability.

Table 3.3. Summary of adverse events reported by 2018 NSW influenza vaccine safety surveillance participants, by age group of child

Adverse event	Age group (n[%])		
	6 months-2 years	3 years-4 years	6 months to 4 years (overall)
Any adverse event	252/4,138 (6.1%)	143/2,216 (6.5%)	395/6,354 (6.2%)
Medical advice	14/4,011 (0.4%)	2/2,134 (0.1%)	16/6,145 (0.3%)
Medical attention	22/4,111 (0.5%)	9/2,199 (0.4%)	31/6,310 (0.5%)
Fever	72/4,011 (1.8%)	32/2,134 (1.5%)	104/6,145 (1.7%)
ISR	37/4,011 (0.9%)	33/2,134 (1.6%)	70/6,145 (1.1%)
Rash	10/4,011 (0.3%)	3/2,134 (0.1%)	13/6,145 (0.2%)
Irritability	67/4,011 (1.7%)	21/2,134 (1.0%)	88/6,145 (1.4%)
Seizure	0/4,011 (0.0%)	0/2,134 (0.0%)	0/6,145 (0.0%)
Altered level of consciousness	1/4,011 (0.02%)	0/2,134 (0.0%)	1/6,145 (0.02%)
Other	94/4,011 (2.3%)	43/2,134 (2.0%)	137/6,145 (2.2%)

Notes:

ISR: Injection site reaction

Denominators are based on number of respondents.

Fever is subject to a self-report of fever.

Other adverse event(s) includes tiredness, sleep pattern change, headache, vomiting, diarrhoea, rigors, and free text responses.

Telephone advice includes telephoning a health clinician or healthcare hotline for guidance.

Medical attendance is defined as physically presenting to a general practice or emergency department or being hospitalised.

Chapter 4: Disease burden (PAEDS-FluCAN Influenza Surveillance)

PAEDS-FluCAN Influenza Surveillance at the Children's Hospital at Westmead, 2018

Background and Methods

The Paediatric Active Enhanced Disease Surveillance (PAEDS) network is a hospital-based active surveillance system employing prospective case ascertainment for selected serious childhood conditions including influenza leading to hospitalisation. PAEDS data is used to better understand certain childhood conditions of public health importance, inform policy and practice under the NIP, and support rapid public health responses. PAEDS enhances data available from other Australian surveillance systems by providing prospective, detailed clinical and laboratory information. The Children's Hospital at Westmead (CHW) is one of seven sentinel PAEDS sites across Australia and the only site in New South Wales.

In 2018, all seven PAEDS sites contributed paediatric cases of hospitalised influenza to the national Influenza Complications Alert Network (FluCAN). The reporting period was 3 April to 26 October 2018. At each PAEDS site, specialist nurses screened hospital admissions, emergency department records, laboratory and other data, on a daily basis to identify children meeting the eligibility criteria. A case is any child aged from birth to <18 years who is hospitalised, clinically suspected of having influenza and is confirmed influenza polymerase chain reaction (PCR) positive.

Vaccine effectiveness

We used an incidence density test negative design to estimate vaccine effectiveness, where controls were selected from influenza-test negative subjects with acute respiratory illness (ARI) tested contemporaneously with a case. Controls could be test-negative for all pathogens or have an alternative respiratory pathogen detected. Vaccine effectiveness (VE) was estimated as 1 minus the odds ratio of vaccination in influenza positive cases compared to test-negative control patients. Only children ≥ 6 months of age and tested

within seven days of admission were included in VE estimates. A conditional logistic regression model using influenza case status as the dependent outcome was constructed from influenza vaccination. The model was adjusted for potential confounders (age group [6-11months, 12-23months, 2-4years, 5-9 years, ≥10 years], Indigenous status, comorbidities and stratified by site and month of illness.

Summary of the Season

Influenza activity at CHW (as measured by paediatric influenza hospitalisations) was low in the first few months of the season increasing in July with peak activity seen in September (Figure 1). Influenza A (H1) was the dominant subtype throughout the season. Overall, activity was substantially lower than the previous 2017 season.

In 2018, a total of 109 hospitalised, PCR-confirmed influenza cases were included in CHW PAEDS-FluCAN surveillance representing all hospitalised, laboratory confirmed cases identified (Table 4.1). This is in contrast to 2017 where 125 non-PCR laboratory confirmed (antigen test-positive) hospitalised cases were omitted from surveillance.

Figure 4.1. Hospitalised, PCR-confirmed influenza cases at CHW by week, 2018

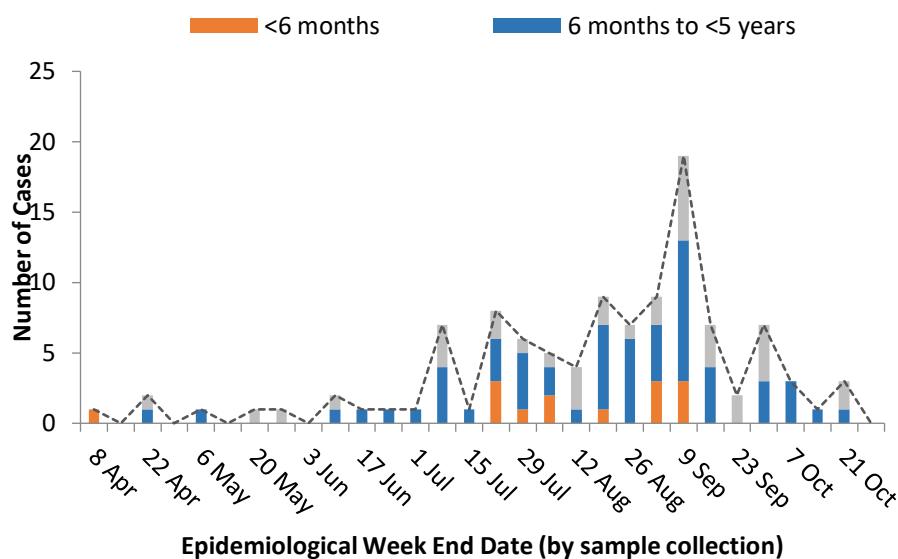


Table 4.1. Summary of hospitalised, PCR-confirmed influenza cases at CHW by age group, 2018

Age Group	Total Cases (%)	Influenza Type ¹ (%)				Clinical Details (%)			
		A (H1)	A (H3)	A (NS) ²	B	Vaccinated ³	Risk Factors ⁴	ICU	Deceased
All Ages	109	95	3	6	6	10	46	11	1
	(100.0)	(87.2)	(2.8)	(5.5)	(5.5)	(9.9)	(42.2)	(10.1)	(0.9)
<6 months	14	12	0	1	1	2	4	2	0
	(12.8)	(85.7)	(0.0)	(7.1)	(7.1)	(15.4)	(28.6)	(14.3)	(0.0)
6 months to <5 years	59	53	1	3	2	1	21	4	1
	(54.1)	(89.8)	(1.7)	(5.1)	(3.4)	(1.8)	(35.6)	(6.8)	(1.7)
5 to <18 years	36	30	2	2	3	7	21	5	0
	(33.0)	(83.3)	(5.6)	(5.6)	(8.3)	(21.9)	(58.3)	(13.9)	(0.0)

¹A single case from week 39 tested positive for both A (H1) and A (H3) in a child aged 5 to <18 years, hence influenza type counts and percentages do not add up to the total.

²Influenza A not subtyped or subtyping unknown.

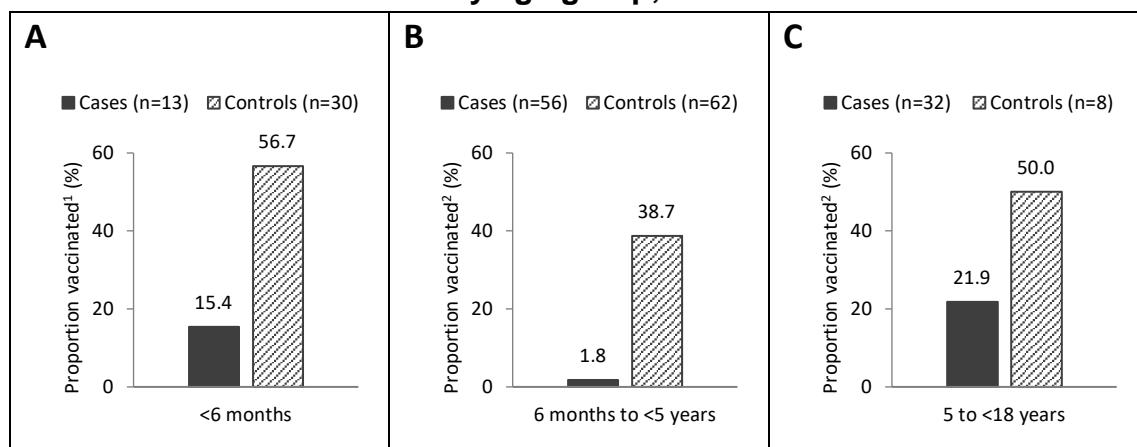
³For infants aged <6 months, ‘vaccinated’ refers to the validated receipt of influenza vaccine in the mother at any time during pregnancy. For children aged 6 months to <18 years, ‘vaccinated’ refers to the validated receipt of at least one dose of influenza vaccine in 2018. Vaccination status is determined following assessment of the Australian Immunisation Register and parental interview, if vaccination status is unverified ‘unknown’ will be recorded. Proportion vaccinated is calculated as a proportion of PAEDS-FluCAN cases where vaccination status is known. At the time of this report vaccination status was known: <6 months n=13, 6 months to <5 years n=56, and, 5 to <18 years n=32.

⁴Significant risk factors as defined by FluCAN.

Vaccine Uptake Amongst CHW PAEDS-FluCAN Recruits

Data on influenza test-negative children with acute respiratory infection is also collected as part of PAEDS-FluCAN surveillance in order to calculate vaccine effectiveness (VE). At CHW, 109 influenza test-negative children (controls) were recruited to PAEDS-FluCAN surveillance. Where available, vaccination data for cases and controls has been incorporated into the figure below to show vaccine uptake in the respective groups (Figure 4.2). Vaccine uptake is calculated as a proportion of PAEDS-FluCAN cases where vaccination status is known (n). For infants aged <6 months (Figure 4.2.A), maternal vaccination was received in 2/13 cases and 17/30 controls. For children aged 6 months to <5 years (Figure 4.2.B) vaccination was received in 1/56 cases and 24/62 controls. For children aged 5 to <18 years (Figure 4.2.C) vaccination was received in 7/32 cases and 4/8 controls. The preliminary VE estimate in NSW for 2018 is 83.5% (67.6%-91.6%) and the preliminary national VE estimate is 75.5% (62.1%-84.2%). These estimates are inclusive of nosocomial cases. In 2018, there was a surge in the number of nosocomial cases.

Figure 4.2. Maternal and child influenza vaccine uptake in CHW PAEDS-FluCAN cases and controls by age group, 2018



¹For infants aged <6 months, ‘vaccinated’ refers to validated receipt of influenza vaccine in the mother at any time during pregnancy.

²For children aged 6 months to <18 years, ‘vaccinated’ refers to validated receipt of at least one dose of influenza vaccine in 2018.

Acknowledgements and Funding

We acknowledge all PAEDS investigators, collaborators, surveillance nurses and laboratory teams who contributed to CHW PAEDS-FluCAN surveillance in 2018. The report was prepared by Gemma Saravanos, Jocelynne McRae and Helen Quinn on behalf of CHW PAEDS Investigators. PAEDS-FluCAN surveillance at CHW is funded by the Australian Government Department of Health. This summary is based on preliminary data extracted from the PAEDS-FluCAN database on December 14, 2018 and is provided in confidence to recipients. The data is subject to change following data completion, cleaning and further analysis.

The authors acknowledge Associate Professor Christopher Blyth (PAEDS) and Professor Allen Cheng (FluCAN) for assistance with the vaccine effectiveness (VE) analysis. Also, the national VE estimates were made possible by multi-partner and NHMRC funding under NHMRC Partnership Grant #1113851 (CIA Professor Kristine Macartney).

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Appendix 1

Comments by stakeholders on AIR:

- If often does not upload not sure why or it says partially processed for a long time.
- We have a lot of problems with the AIR. Immunisations that have been uploaded that don't appear. Phone calls to resolve issues which involve conversations with admin staff, not clinicians, who have no understanding of vaccines. Refusal to accept vaccinations given a couple of days early, e.g. 3 days before 12 months. Difficulties with acceptance of overseas immunisations.
- Sometimes not picked up by the register (?software issue)
- There have been times, totally <10% of encounters, when AIR has not been automatically updated by practice software
- Have had many issues, immunisations not transferring with correct doses. Do not have access to AIR to update them myself. Very frustrating as staff at AIR will no longer make changes.
- Difficult for adults and children immunised overseas
- Yes general network access issues
- Have had to re-enter on several occasions, and on a few occasions multiple times for same patient
- Does not always get there
- Occasional backlog
- Technical issue with the website. Has had multiple contacts with tech support. The issue remains unresolved. Very unhappy.
- often the system "glitches" and does not attribute correct vaccine to patient
- If immunisations are given later than expected timing the info needs to placed in manually
- Often rejected
- AIR does not recognise overseas vaccines from Best Practice. always issues with errors in recorded dose number
- We use paper and fax
- We have to do it manually at our practice and system frequently down. also no capacity to correct own mistyped entries - have to contact AIR
- Data not going through