

Combining First Nations Research Methods with a World Health Organization Guide to Understand Low Childhood Immunisation Coverage in Children in Tamworth, Australia

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Volume 12, Number 2, 2021

URI: <https://id.erudit.org/iderudit/1081835ar>
DOI: <https://doi.org/10.18584/iipj.2021.12.2.10959>

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Publisher(s)

Scholarship@Western (Western University)

ISSN

1916-5781 (digital)

[Explore this journal](#)

Cite this article

Thomas, S., Allan, N., Taylor, P., McGrady, C., Bolsewicz, K., Islam, F., Cashman, P., Durrheim, D. & Creighton, A. (2021). Combining First Nations Research Methods with a World Health Organization Guide to Understand Low Childhood Immunisation Coverage in Children in Tamworth, Australia. *The International Indigenous Policy Journal*, 12(2), 1–21.
<https://doi.org/10.18584/iipj.2021.12.2.10959>

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July 2021

Combining First Nations Research Methods with a World Health Organization Guide to Understand Low Childhood Immunisation Coverage in Children in Tamworth, Australia

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Recommended Citation

Thomas, S., Allan, N., Taylor, P., McGrady, C., Bolsewicz, K., Islam, F., Cashman, P., Durrheim, D., & Creighton, A. (2021). Combining First Nations research methods with a World Health Organization guide to understand low childhood immunisation coverage in children in Tamworth, Australia. *The International Indigenous Policy Journal*, 12(2). <https://doi.org/10.18584/iipj.2021.12.2.10959>

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Abstract

In Australia, we used the World Health Organization's Tailoring Immunization Programmes to identify areas of low immunisation coverage in First Nations children. The qualitative study was led by First Nations researchers using a strength-based approach. In 2019, Tamworth had 179 (23%) children who were overdue for immunisations. Yarning sessions were conducted with 50 parents and health providers. Themes that emerged from this research included: (a) Cultural safety in immunisation services provides a supportive place for families, (b) Service access could be improved by removing physical and cost barriers, (c) Positive stories promote immunisation confidence among parents, (d) Immunisation data can be used to increase coverage rates for First Nations children. Knowledge of these factors and their impact on families helps ensure services are flexible and culturally safe.

Keywords

First Nations, children, immunisation, vaccine, primary health care, Australia, World Health Organization

Acknowledgments

We thank parents and service providers for sharing their knowledge and experiences and acknowledge the contribution of Belinda Tully from HNELHD Population Health, who facilitated one small group discussion. All authors were involved in the study design and developing the methods. Quantitative data analysis was performed by FI. Interviews and small group discussion were conducted by ST, NA, PT, CM, and AC. Qualitative analysis was performed by ST, NA, PT, CM, KB, and AC. Discussion and conclusions were developed by all authors. Overall governance of the study was provided by AC.

Funding

This is a NSW Regional Health Partners project. This project was supported by the Australian Government's Medical Research Future Fund (MRFF) as part of the Rapid Applied Research Translation program and by the Prevention Research Support Program funded by the New South Wales Ministry of Health.

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In Australia, immunisation coverage rates for Aboriginal and Torres Strait Islander (hereafter First Nations) children are generally high. Immunisation is well accepted and promoted in both First Nations and government strategic health plans. Despite this, previous studies have identified gaps in immunisation coverage between First Nations and other children (Lovie-Toon et al., 2016). While this gap has been closing (Ioannides et al., 2019), timeliness remains a challenge (Hendry et al., 2018). Timeliness is defined as being more than one month overdue for at least one scheduled vaccination (Lovie-Toon et al., 2016). Pockets of low immunisation coverage put children and communities at risk. First Nations children experience higher notifications and hospitalisation rates for vaccine preventable diseases than other children (Hendry et al., 2018; Lovie-Toon et al., 2016). First Nations infants have higher rates of *Haemophilus influenzae b* disease, rotavirus disease, mumps, meningococcal disease, invasive pneumococcal disease, and hepatitis B infection than non-Indigenous infants (Cashman et al., 2016). This highlights the importance of improving timeliness and vaccine coverage to protect children and strengthen herd immunity (Cashman et al., 2016; Lovie-Toon et al., 2016).

The National Immunisation Strategy for Australia 2019 to 2024 aims to achieve 95% coverage for First Nations children who are recognised to be at increased risk of vaccine preventable diseases, particularly in areas where coverage is low (Australian Government Department of Health, 2019b). There is little evidence to indicate that First Nations people are reluctant to immunise their children. One study reported First Nations parents were less likely to be hesitant than other parents (Abbott et al., 2013). Other factors affecting timeliness include having other children and a mother who is unemployed, most likely indicating inadequate finances, transport, and social support (Lovie-Toon et al., 2016). Lack of access to culturally appropriate health services was also identified as a factor (Ioannides et al., 2019). System-level barriers exist including inaccurate recording of Aboriginal and Torres Strait Islander status at birth (Hendry et al., 2018), leading to incorrect estimates of the true burden of vaccine preventable diseases (Ioannides et al., 2019). A skilled workforce including First Nations health practitioners and the implementation of follow-up programs to encourage timely vaccination are among the strategies used to facilitate access to immunisation services for First Nations children (Australian Government Department of Health, 2019b). Personalised calendars were found to be both an effective and culturally appropriate way to improve timeliness at low cost and with the flexibility to adapt to local needs (Abbott et al., 2013).

There have been improvements in timeliness and immunisation coverage in First Nations children. National data from the Australian Immunisation Register (AIR) showed the proportion of First Nations children fully immunised for their age compared to all children as of September 2020 as follows: 1-year-olds (93.5% vs. 94.7%), 2-year-olds (91.2% vs. 92.4%), and 5-year-olds (97.0% vs. 94.9%; Australian Government Department of Health, 2019a). In 2020, in New South Wales (NSW), rates were even higher: 1-year-olds (94.5% vs. 94.6%), 2-year-olds (93.3% vs. 92.1%), and 5-year-olds (97.6% vs. 94.8%; NSW Government, 2020). The 2019 Hunter New England Local Health District (HNELHD) in NSW, where this study took place, had rates that were similar: 1-year-olds (94.9% vs. 95.6%), 2-year-olds (92.0% vs. 93.4%) and 5-year-olds (98.1% vs. 96.7%; NSW Government, 2020). Despite high coverage rates overall and a focus on First Nations children in strategic plans, pockets of low coverage exist, putting these children and communities at risk (Australian Government Department of Health, 2019b).

First Nations people often face greater barriers when accessing health services. NSW Health's commitment to Closing the Gap, outlined in the *NSW Aboriginal Health Plan 2013–2023*, acknowledges health disparities between First Nations people and other Australians, and it recognises the profound impact of colonisation and social determinants, including racism and socio-economic factors, on health outcomes (NSW Ministry of Health, 2012).

In 2012, NSW Health funded the Aboriginal Immunisation Healthcare Worker (AIHW) program with positions, proportionate to the First Nations birth cohort, based in public health units across the state. Their role is to reduce the gap in coverage and timeliness between First Nations and other children by improving use of existing services, pre-calling parents whose children are due for scheduled immunisation, using the AIR to identify overdue children and follow-up, and promoting immunisation in their communities. Between 2008 and 2016, this approach helped reduce the gap from 4.6% to 2.2% for those aged 15 months, and 8.5% to 0.6% for those aged 51 months (Hendry et al., 2018).

To identify and understand previously unknown pockets of low childhood immunisation coverage in the HNELHD, we used the World Health Organization's (2019) *Tailoring Immunization Programmes Guide* (TIP). TIP uses social science and community engagement and is underpinned by the COM-B (capability, opportunity, and motivation) model of behaviour change, adapted for vaccination and the TIP approach. COM-B encompasses individual factors that influence behaviour, including capability and motivation, and contextual factors, including opportunity, which may be social (cultural norms, demands, support) or physical (access to services; Brewer et al., 2017). TIP uses quantitative methods in a *situational analysis* to identify areas of low coverage within a population, and qualitative methods in a *research phase* to determine barriers and drivers to vaccination in that community. The final *intervention design* phase uses new insights to co-design an evidence-based strategy to achieve high and equitable vaccination uptake, equivalent to the general population regardless of factors such as income, education, geography, and cultural background (World Health Organization, 2019). This is followed by monitoring and evaluation of the new strategy. This article reports on the situational analysis and the research phase in the First Nations community in Tamworth, a regional town in NSW, Australia. The study aim was to identify a pocket of low immunisation coverage in HNELHD and to gain a deeper understanding of the barriers to timely immunisation for First Nations children in that community.

Methods

Quantitative

Data from the AIR were analysed from 2015 to 2019 to identify areas in HNELHD with a high number of children less than 5 years of age who were 30 days or more overdue for at least one vaccine by SA2 areas (Statistical Area 2). Population census data (2012 and 2016) from the Australian Bureau of Statistics (ABS) were used to calculate the rate of overdue children in SA2 areas. Data were analysed for Aboriginal and/or Torres Strait Islander status. Areas were sorted by number and rate of overdue children.

Immunisation team members reviewed the data and identified the community that had the greatest need and agreed to collaborate. The SA2 areas comprising Tamworth with 240 (30%) First Nations children overdue were chosen (see Results section). Tamworth is a rural town located in the northwestern region of NSW, 420 kilometres north of Sydney. It has a diverse economy based on agriculture, education, and

services for the larger region. It is a popular tourist destination, well known for an annual country music festival. The 2016 Census recorded a population of 41,000 people, of which 11.3% identified as Aboriginal and/or Torres Strait Islander (ABS, 2016). Tamworth is home to the Gomeri people of the Gomeri Nation, who are the traditional custodians of the land, caring for Country and places of cultural significance.

Qualitative

We used qualitative methods to gain a deeper understanding of why First Nations children in Tamworth were behind schedule for their immunisations and what might be done to improve coverage. A participatory action research (PAR) approach was used, which has been acknowledged as a collaborative and culturally appropriate methodology to use with First Nations communities as it recognises both community members' expertise and researchers' technical skills (Miller et al., 2015). PAR seeks change through planning, acting, observing, and reflecting, which respects cultural ways of working and promotes culturally safe and meaningful engagement (Crane & O'Regan, 2010). Prior to commencing the study, three capacity building workshops were held where First Nations and other researchers shared knowledge, experience, and skills to build capacity to conduct qualitative research with cultural sensitivity. The workshops provided a space for two-way learning where mainstream researchers shared knowledge, experience, and skills in designing and conducting qualitative research, and First Nations researchers shared cultural knowledge and community ways of working together.

Potential participants with experience, knowledge, or insight into childhood immunisation for First Nations children in Tamworth were identified by members of the research team and invited to take part in the study. They included First Nations parents or carers of young children, and health service providers from Aboriginal Community Controlled Health Services (ACCHS), Aboriginal Maternal and Infant Health Services, Community Health Services, general practice, and population health. Health services were identified by First Nations public health team members NA, CM, PT, and AC, who have well-established links with Tamworth's health services. Parents and carers were identified by First Nations team members through their close connections with the community. Health service providers were approached by email and invited to take part in the study. Parents and carers were approached by First Nations staff members who personally invited them using email, SMS (short message service), or telephone. A snowballing technique was used where participants were encouraged to suggest other potential participants who may provide valuable insights.

Potential participants were invited to take part in either an individual interview or a small group discussion. First Nations researchers invited parents or carers and First Nations health service providers. Other team members invited the remaining government health service providers. A participant information statement was provided at the time of invitation with a consent form. Time was allowed for potential participants to decide if they would like to participate before following up. An AUD\$30 (AUD\$1 = USD\$0.70) gift card was offered to parents and carers as a token of appreciation for their time and for sharing cultural knowledge. Written, informed consent was obtained at the time of interview.

All discussions were held at times and places that were convenient to participants and were recorded with notes taken. First Nations researchers AC, NA, and CM conducted interviews and yarning sessions

with First Nations participants. Yarning refers to conversations involving the sharing of stories and the development of knowledge, prioritising First Nations ways of communicating that are culturally prescribed, cooperative, and respectful (Walker et al., 2014). Settings were informal and comfortable. One researcher led the discussions while a co-facilitator took notes, observing and asking additional probing or clarifying questions. Researcher ST led discussions with non-First Nations health service providers, with a First Nations researcher co-facilitating whenever possible. Due to distance and time constraints, one interview with a key government health service provider was held by telephone. All recordings were transcribed verbatim for analysis.

Transcripts were analysed manually (without use of software) by members of the research team. At least two researchers read each interview with at least one being a First Nations researcher. The transcripts were read by the researchers individually, with key words, phrases, ideas, and concepts highlighted. These were then shared with the other researcher and then with the larger team. With team discussion, the key words, phrases, ideas, and concepts were then grouped into similar categories. Categories were loosely mapped against the COM-B factors of capability, opportunity, and motivation. With ongoing reflection and back and forth discussion, themes were developed that captured the essence of the categories. Data analysis adopted a strength-based approach, avoiding a deficit discourse (Fogarty et al., 2018). This approach moves from problem-based interpretation to one of identifying solutions or opportunities that challenge negative thinking and ethnocentric assumptions. First Nations researchers applied an Aboriginal Lens to interpreting data that incorporated cultural values, lived experience, and Aboriginal ways of knowing, being, and doing (Bobba, 2019).

The research methods were congruent with the Aboriginal and Torres Strait Islander Quality Appraisal Tool, designed to ensure values of First Nations people are reflected in research aims, methods, analysis, interpretation of results, and knowledge translation. This tool helps ensure research is beneficial to First Nations communities and that First Nations researchers provide leadership and governance over the process (Harfield et al., 2020).

Ethics approval for the study was obtained from the Hunter New England Human Research Ethics Committee (HNEHREC 18/06/20/5.03) and the Aboriginal Health and Medical Research Council (AH&MRC 1449/18).

Results

Quantitative analysis identified Tamworth East and Tamworth West as SA2 areas with a high number and rate of First Nations children who were not fully immunised. Despite high numbers and rates in other children, First Nations children were more likely to be overdue. Data was consistent from 2015 to 2019, with high numbers and rates of First Nations children who were overdue: 179 (23%) in 2019, 240 (30%) in 2018, 202 (26%) in 2017, 186 (24%) in 2016, and 212 (27%) in 2015. Reasons for the high numbers and rates were unknown (Table 1).

Table 1. Number and Rate of Children Aged 0 to 4 Years Not Fully Immunised in Tamworth, 2015 to 2019

SA2 Tamworth	Non-Aboriginal children			Aboriginal children			Indigenous status unknown	Total under immunised
	Not fully immunised <i>n</i>	Not fully immunised for age %	Population 0–4 years ^a <i>N</i>	Not fully immunised <i>n</i>	Not fully immunised for age %	Population 0–4 years ^a <i>N</i>	<i>n</i>	<i>n</i>
2019								
East	136	14	975	48	17	279	9	193
North	145	18	788	38	24	160	10	193
West	50	19	265	72	35	208	1	123
Region	102	13	781	21	15	142	0	123
Tamworth total	433	15	2,809	179	23	789	20	632
2018								
East	164	17	975	60	22	279	8	232
North	155	20	788	51	32	160	2	208
West	61	23	265	94	45	208	1	156
Region	129	17	781	35	25	142	1	165
Tamworth total	509	18	2,809	240	30	789	12	761

Table 1. Number and Rate of Children Aged 0 to 4 Years Not Fully Immunised in Tamworth, 2015 to 2019 (continued)

SA2 Tamworth	Non-Aboriginal children			Aboriginal children			Indigenous status unknown	Total under immunised
	Not fully immunised <i>n</i>	Not fully immunised for age %	Population 0–4 years ^a <i>N</i>	Not fully immunised <i>n</i>	Not fully immunised for age %	Population 0–4 years ^a <i>N</i>	<i>n</i>	<i>n</i>
2017								
East	161	17	975	62	22	279	8	231
North	116	15	788	45	28	160	2	163
West	38	14	265	62	30	208	1	101
Region	135	17	781	33	23	142	1	169
Tamworth total	450	16	2,809	202	26	789	12	664
2016								
East	101	10	975	52	19	279	6	159
North	88	11	788	35	22	160	3	126
West	28	11	265	71	34	208	2	101
Region	103	13	781	28	20	142	3	134
Tamworth total	320	11	2,809	186	24	789	14	520

Table 1. Number and Rate of Children Aged 0 to 4 Years Not Fully Immunised in Tamworth, 2015 to 2019 (continued)

SA2 Tamworth	Non-Aboriginal children			Aboriginal children			Indigenous status unknown	Total under immunised
	Not fully immunised <i>n</i>	Not fully immunised for age %	Population 0–4 years ^a <i>N</i>	Not fully immunised <i>n</i>	Not fully immunised for age %	Population 0–4 years ^a <i>N</i>	<i>n</i>	<i>n</i>
2015								
East	163	17	975	65	23	279	10	238
North	125	16	788	32	20	160	3	160
West	58	22	265	82	39	208	2	142
Region	131	17	781	33	23	142	4	168
Tamworth total	477	17	2,809	212	27	789	19	708

Note. Source: Australian Immunisation Register (AIR) data.

^a2016 ABS Census data.

In total, 53 participants were invited to take part in the interviews and yarning sessions and 50 agreed, including 12 parents and 38 health service providers. Three parents were not able to attend due to work commitments, a sick child, and for reasons not given. Three individual interviews and 10 small yarning sessions were conducted between July 2019 and May 2020. Four themes emerged:

Cultural safety in immunisation services provides a welcoming and supportive place for First Nations families and health staff.

- a. Existing immunisation services could be better accessed if physical and cost barriers were removed.
- b. Positive stories and accurate information about immunisation can promote confidence for parents who are unsure.
- c. Routinely available immunisation data can be used to help increase coverage rates for First Nations children.

Each theme is discussed below.

Cultural Safety in Immunisation Services Provides a Welcoming and Supportive Place for First Nations Families and Health Staff

Many participants talked about the importance of services that are culturally safe and welcoming. Most often these were the ACCHSs, but some participants also mentioned their general practitioner or other services. Parents and health service providers said that families are more likely to use services where they feel comfortable; there are friendly, familiar faces; and there is an atmosphere of trust and respect where they will not be judged. Parents appreciated a welcome reception from staff and receiving good care from providers.

What I like about being through the AMS [Aboriginal Medical Services] is I know the people there, so I can get through and explain my story and be more comfortable about it. I feel more comfortable, I think, going to the Aboriginal services and being Aboriginal. (Parent, Group 2)

I first went to the AMS once it opened because it was you know “blackfullas support blackfullas”—you’ve got to keep those services open by, you know, using them. (Parent, Group 2)¹

I’m big on trust. I want to know that my child’s important, so they’re not just somebody else coming in and getting jabbed. That’s the sort of service I like. (Parent, Group 3)

If you create a clinic for mums to bring their kids in, they’ve got to have people there that they know. Family members that they know and people that they know from the street, so they sit there, have a yarn, get real comfortable and feel safe because there’s people there doing the same thing, they are looking to get the same outcomes. (Health service provider group)

¹ Blackfella or blackfulla is an informal term sometimes used by Australian Aboriginal people to refer to themselves as Black people.

These culturally safe services used more flexible models that supported families and helped with arranging transport or making appointments. They understood First Nation families may have other priorities, related to family and community, and that children's immunisation may have fallen behind as a result. They also understood that most families wanted to catch up on their children's immunisations. They were more "family centred," encouraging extended family members to come into the consultation room, not only one parent and the child.

We don't make it feel like a hospital setting. They come to the front desk and I'll get up and make them a coffee, give them a biscuit and I'll have a yarn to them ... and then the nurse will have a yarn with them and make them feel comfortable. Same with the doctors. It's their centre as well. Everyone just feels at home here. (Health service provider group)

If there's sorry business [a period of cultural practices following the death of a community member] or other things happening in the family, that's a priority ... immunisation will be put off because they know it can be done next week or the week after. It's about family being the priority and community being the priority. (Health service provider group)

The way we do clinics is White medicine clinics, so it's a room like this with a door, a desk and an office, and you sit down on those chairs, and you behave yourself, answer my questions and fill in forms. Again, it's not family focused. It's not Aboriginal culturally appropriate, whereas different types of care are more inclusive, engaging, and more accepting. (Health service provider group)

Some service providers observed a lack of cultural safety at some government health services where there were no Aboriginal Health Workers who could support the nurses to provide a positive experience for families. They felt the role of the Aboriginal Health Workers was undervalued and that racism and a lack of cultural awareness meant families may avoid those services. Participants spoke about the importance of having more First Nations people in the health workforce and that this was connected to feeling welcome and safe in health services. Some spoke about the importance of having more First Nations nurses who can immunise children, especially in First Nations specific programs, and that this was a way of building trust and safety within services. Some service providers commented on vacant Aboriginal Health Worker positions and the impact that might have on services for First Nations people.

We know historically with a lot of Aboriginal people; they have a deep mistrust of any government organisation. They've got that choice to say, "No. I don't want to see any of these services." (Health service provider group)

I think if there were a place with a bit more of an Aboriginal presence it would be better than the crazy busy environment in some settings. (Health service provider group)

We don't have an Aboriginal worker with us in the clinics. Maybe if you're interviewing clients, maybe that's something that might make them feel more comfortable if we had an Aboriginal worker do that. That might be an option. (Health service provider group)

Another part of that is down the future with Aboriginal Health Practitioners who can immunise. That's a clinician who's connected with community, whether it's a nurse or a practitioner, and can see a list of 10 kids who are overdue, go around and get them immunised. Not just that but

helping connect mums with other services and help problem solve a bunch of other things.
(Health service provider group)

Existing Immunisation Services Could be Better Accessed if Physical and Cost Barriers Were Removed

In addition to concerns about cultural safety, participants discussed physical and cost barriers to accessing immunisation. Physical barriers included lack of public or private transportation, inconvenient locations, closed books, limited clinic times, and excessive time spent in the waiting room.

Transport is a big thing, they always say. (Health service provider group)

I now go to [ACCHS]. They're fantastic. Very welcoming, just approachable people. ... The only thing I notice with [them] I mean I personally do drive but I know that a few of my friends and stuff like that if they have children, if they don't live there there's no transport. (Parent, Group 1)

When we first started here ... transport wasn't a big issue, as we're getting bigger, yes, now transport is an issue. (Health service provider group)

You've got two places [ACCHSs] to pick from. It takes a good 4 weeks to get an appointment. (Health service provider group)

Who's got a spare 2 hours to sit there and wait with a screaming kid as well? It's hungry. Doesn't want to sit still. You've got to get to work. (Parent, Group 1)

Several participants commented that appointment-based clinics were unhelpful, especially for busy working parents and parents with many children. Concerns were raised about plans to change the only drop-in clinic to an appointment-based one.

The clinic was an evening clinic to allow working people to come later. They're going to change that to a morning clinic and make it booked appointments. I find that's another barrier. (Health service provider group)

In addition to physical barriers, cost barriers to accessing services were also raised. Apart from ACCHSs, where consultations are provided free of charge, free general practitioner clinics were said to be limited in Tamworth, with a standard appointment costing up to AUD\$81. Some parents could not afford the out-of-pocket costs, even with two parents working.

Even for working families, that's a fair chunk of my budget with five children. If I wanted to get all five taken in, and to be seen at a doctor, I'm sorry, we'd be probably eating toast and noodles for the next fortnight. (Parent, Group 1)

Participants identified ways that service access could be improved including removing cost barriers, providing transport, having more convenient locations and hours, and offering immunisation as part of outreach including home visiting. One general practitioner practice discussed including immunisation under an Aboriginal health check to remove costs.

I think a lot of people, and our Aboriginal community, are accessing the Aboriginal Health Service because it's a free service. (Health service provider group)

We find that if you can go to the house and you can immunise the children in the house, you've got a captive audience. Even if there's other things happening in their life, usually or even 100% of the time they will say, "Yes. Let's get the child immunised." They want the child immunised. They just can't always get there. (Health service provider group)

If there was an immunisation day and whether that's once a month, it's walk-in immunisation day. So, if you're available then, it minimises the time. It could work. (Parent, Group 2)

Positive Stories and Trusted Information About Immunisation Can Promote Confidence for Parents who are Unsure

Parents were generally very supportive of immunisation, and some reported experiencing vaccine preventable disease firsthand or hearing about benefits of childhood vaccination. They recognised the value of immunisation as protective of their child's health and that of the community.

We do know with Aboriginal families they want their children immunised. That's one thing I definitely know. They just can't always get there. (Health service provider interview)

I think the biggest majority, as we know, especially in this Tamworth area ... want their kids vaccinated. That's not the issue. (Health service provider interview)

Some participants felt that support for childhood immunisation in the community was influenced by negative messages on TV and social media about bad reactions or side effects. Negative messaging was thought to influence young mothers who are isolated, not well supported or who grew up in a family where immunisation was not important. Those parents who lacked information about benefits of vaccinating were also vulnerable to negative messages in the media.

You always see in the media of the anti-vaxxers, "They're doing this to your kid. They don't need that." Again death, autism, paralysed. As a mother it's a natural instinct of "I'm not going to infect my kid with something that they don't need and it's going to make them sick." (Parent, Group 1)

Sometimes you get lost and caught up in Facebook, the information that may not be necessarily true around immunisation. You only ever hear the negative stories. I understand the importance of immunisation, especially for young Aboriginal kids who are so vulnerable as it is. (Parent, Group 2)

But there's a lot of mums, especially first-time mums ... who haven't had positive role models, who don't have the education. There's just that lack of knowledge or positive role models or influences that help you make those decisions [about immunisation]. (Parent, Group 2)

We're hearing stuff on Sunrise and on Today [two morning news programs on commercial television], and it's always this debate about how immunisation is linked with childhood

behavioural issues and autism. We got these White people on the news every morning talking about it. It must be true. (Health service provider interview)

It was not always easy to get trusted information about vaccine preventable diseases and vaccinations in ways that were understood by the community. Some parents consented without understanding why vaccinations are needed and how safe they are. Poor communication between providers and parents was reported as commonplace, with mainstream health service providers mistakenly assuming parents were not interested in childhood immunisation.

You see time and time again when the mother or whoever comes in and brings the child in for their immunisation, the health provider, whether it be a doctor, nurse, or whatever, sometimes can explain things to the parents about the immunisations, and because they don't understand, they think that the parents aren't interested ... but in actual fact, they are interested. It's just they don't understand what's being said to them. (Health service provider group)

Or they're too ashamed to ask what it is and why it is, because they think ... they should know this, but they don't, so they're not going to ask. "Just give my kid a needle so I can go home." (Health service provider group)

You [want to] know what to expect and why you're having the needle. ... You're going to need that support or that education prior. (Parent, Group 3)

You'd ask family members for advice because you don't know. (Parent, Group 3)

Many participants agreed that families need to receive more factual information about immunisation and that positive stories about immunisation need to be shared more widely. Information should be delivered in culturally appropriate ways. That means written information should be short, clear, and in plain language. Visual displays were suggested as being more effective than only written words. Information could be shared during individual or group meetings and at cultural events.

Weighing up the risks versus the benefits. I think putting it in simple language as well. So, people understand and that way it educates them. ... You're doing it because we don't want your child to end up with X, Y, and Z. (Health service provider group)

Especially the stuff that comes from the Ministry. Their pamphlets are very much filled with words, aren't they? If you had that more visual thing with pictures on it compared to a Ministry pamphlet, you know which one yourself that you want to take. (Health service provider group)

Like, I know I've said to people, "Do you want your kid crying for 3 minutes or do you want them in hospital for 3 weeks?" So, it's that metaphor that blackfellas like and relate to. ... Give them some familiar analogies, break it down like that. (Health service provider group)

You've also got your community-based groups where you can actually sit down and invite people in to talk on that sort of stuff. Get them in an environment where they feel comfortable. (Health service provider group)

A working group composed of First Nations people and health providers was proposed as a trusted source of information, and a group that should be consulted in designing and disseminating culturally appropriate health information. Having a consistent message on immunisation across government, health services, and the community was further discussed as building trust with families.

I think a working group, which then has a health doctor on there. Then, you've got your Aboriginal Health Workers and practitioners, and all of them in there, so that the clients will see the Aboriginal people are on board. ... They'll see Bob on there. "I look up to Bob, I'll listen to that message," type of thing. (Health service provider group)

I think it should be filtered down from all tiers so then it's got a stronger approach. It's the same united message ... from our individual service providers here on the ground, like our community health, linking in with our AMs, and then having that united approach and coming together, and all sharing the same messages, I think that will look better. (Health service provider group)

Routinely Available Immunisation Data Can Be Used to Help Increase Coverage Rates for First Nations Children

Many health service providers reported errors and delays when using practice software and entering AIR data including incorrect entry of the provider or vaccine dose number. These errors could remain undetected until parents received a government notice that their child was overdue, with cuts to parent support payments as a result.

It is another time-consuming job. It takes a while but we find it very important because if that data doesn't go in, your client's payments are stopped. (Health service provider group)

I actually got cut off because if your immunisations aren't done, you can't actually get childcare subsidy ... and it was cut off for 6 weeks before I even noticed. I rang up the doctors and I said, "You know he did get his immunisations;" and they're like, "Oh I'm so sorry." Left me \$800 short so that's quite significant. ... Next time, I stayed there until they put it into the computer system. (Parent, Group 2)

Some health service providers thought that immunisation data could be better shared to inform them of low coverage with some being surprised to hear that First Nations children were falling behind. A few expressed a desire to know which children were falling behind and whether they were registered with their service, so that they could follow-up with them.

Some noted that good data is available and needs to be shared with all immunisation service providers to inform them of local trends. Immunisation data analysis was said to be time-consuming for public health staff who had many other public health priorities in the large geographic area of HNELHD.

It really surprises me. ... We've always been told 95% for Tamworth, we've been the top of Australia for I don't know how long. Have we become complacent? We're not really sure where it's falling down. (Health service provider group)

We actually have no idea, at present, of who's behind. If they don't re-present, we don't have any capacity to follow them up. I'm sure someone would still be getting those reports at public health or some follow-up must be done on someone's level. To me, that's a big issue. (Health service provider group)

We've got really good systems to get the data out to people, but it's just a scale problem. That's a big problem. (Health service provider group)

Some services used practice software to generate reminders, and many parents commented this was really helpful, especially if reminders were sent more than one day in advance; many parents stated that without reminders, they would forget. Parents also liked reminders that allowed them to book appointments at the same time. Health service providers liked printed monthly lists that they could use to follow-up by phone or letter but admitted if they were busy with urgent health needs, then reminders were not always a priority.

Maybe a fortnightly reminder, then a day before reminder. I do like the day before reminder. But in some situations, it catches you off-guard and you're like, "Oh I'm not going to make it."
(Parent, Group 2)

Some service providers recalled how data available from AIR was previously used to plan and evaluate immunisation services. Meetings at an executive level in HNELHD used to take place with ACCHSs where data was shared, highlighting areas that were doing well and advocating for groups who may have needed additional support. Some changes to service delivery were made without the use of data or consultation, but rather based on individual observations, assumptions, or other ad hoc methods. Service evaluation was seen as something that only happened if budget cuts were planned.

We used to go regularly and present our immunisation data and they'd all talk about it and go, "That's good, keep going," or "You need to talk to these people," or "You've forgotten about these people over there." That doesn't happen anymore. (Health service provider group)

They're not evaluated until someone wants to save some money and they come under critical evaluation. Health outcomes are not part of the picture. (Health service provider group)

Discussion

Tamworth has two ACCHSs providing culturally appropriate care to families, including childhood immunisation. We found that community members used both services. A framework synthesis exploring access to primary health care for First Nations people in Australia found evidence that access to care can be improved when services are owned and managed by First Nations communities and are tailored to meet local needs. Such services are more likely to be free of racism and more culturally appropriate (Davy et al., 2016) because they are based on an understanding of community values and beliefs related to respect, equality, access, social justice, and collaboration. Important characteristics of access include employing culturally knowledgeable staff, preferably First Nations people, who understand and respect cultural and community values. Other characteristics included using a broader model of care that included transport, use of outreach services, drop-in clinics, and extended hours. Davy et al. (2016) also described the importance of a physical environment that was welcoming, where people felt comfortable

and at ease. These factors related to access to primary health care were raised by participants in our study. Health policies and practices that are culturally appropriate require funding that is both adequate and ongoing (Davy et al., 2016). It is important that ACCHSs in Tamworth are well-resourced and accessible to encourage their use. There is scope for more specific community participation in planning immunisation services to ensure they meet the needs of local families, including assistance with transport and flexible service models.

Not all families in our study used ACCHS and having a choice of provider was important. Strengthening the First Nations primary health care workforce is one way of improving cultural safety in government health services. The *National Aboriginal and Torres Strait Islander Health Workforce Strategic Framework 2016–2023* identifies priorities including improving recruitment and retention, improving skills and capacity, and ensuring a culturally safe workplace (Aboriginal and Torres Strait Islander Health Workforce Working Group, 2016). One study identified opportunities to develop the First Nations primary health care workforce, particularly in regional areas, including professional development, mentorship, potential for promotion, fostering a harmonious workplace with strong teamwork, supportive colleagues with a shared purpose, strong leadership with effective supervision and support, and competitive remuneration. The study found it was important to tailor workforce strategies to meet local needs (Jongen et al., 2019). Bond et al. (2019) critiqued the discourse surrounding the First Nations workforce and noted that AHWs frequently have to defend the legitimacy of their role and the value of their community knowledge, which is essential in providing culturally safe healthcare. This justification is not required of other health professionals, whose knowledge and legitimacy are not questioned (Bond et al., 2019). In light of this, general practice and community health services in Tamworth could be improved by having more First Nations primary health care workers, which would help to ensure more services are culturally safe and appropriate and increase the availability of First Nations nurses who can immunise children.

The role of AIHWs emerged as an important one in encouraging timely vaccination in First Nations communities (Cashman et al., 2016; Tashani et al., 2017). The AIHWs use telephone “pre-calls” (before immunisations are due), SMS reminders, follow-ups for overdue children, and promote immunisation in their communities (Hendry et al., 2018). Their impact has been impressive; however, pockets of low coverage persist not only in Tamworth but in other First Nation communities in NSW (unpublished data). The AIHW program was evaluated in 2015 and 2017. Key strengths included having a First Nations person, who was valued and well-received in the community and who developed a close collaborative relationship with community groups, providing immunisation services. Ongoing challenges included a lack of culturally appropriate services to which parents could be referred, cost and transport barriers, and errors in AIR data. The evaluations identified scope for further development including tailoring the role to meet local needs, developing Aboriginal immunisation taskforces within public health units, and more effective use of AIR data by generating and sharing timely reports of due and overdue children (Menzies et al., 2015; Tashani et al., 2017). Our study found that despite the benefits of the program, it is unrealistic to expect one AIHW to overcome the many structural barriers families face in Tamworth. The role itself does not include providing immunisation or transport to services. Closing the Gap in immunisation is not one person’s responsibility but one that belongs to all partners.

Participants suggested ways in which physical and cost barriers could be addressed, such as ensuring immunisation services have available appointments and are free of charge, transportation support, and more flexible options including outreach and home visiting (Davy et al., 2016). Some barriers may be associated with social determinants of health, including unemployment and low levels of education (Davy et al., 2016; Thomas et al., 2018). While ACCHSs are well placed to address these access barriers, they need to be supported with policy and secure funding to ensure sustainability. Tamworth's ACCHSs may find ways to reduce waiting times, assist with transport, and to offer outreach or home-visiting services for those most in need. General practice can work towards easier access to appointments that are free of charge, and community clinics can increase flexibility with hours and locations.

Participants reported sensationalised anti-vax stories on social media and some negative experiences with immunisation, leading to some hesitancy about immunisation. Hesitancy has not been reported in previous studies with First Nations communities, and little is found on the impact of social media on immunisation decision-making. This emerged as an area where further study is needed, particularly for first-time single mothers who may lack family support and encouragement to vaccinate their child, and who may be influenced by negative messages in the media. Some participants recommended providing information that is culturally appropriate, which means clear, factual messages to groups or individuals, using visual or story-based formats. These views resonate with earlier studies with First Nations communities in NSW (Massey et al., 2009, 2011).

First Nations culture is rich in storytelling, artwork, and analogies, and these can provide an effective way to disseminate health messages, especially when tailored to the local community, rather than relying on written words in pamphlets or fact sheets (Peake et al., 2019). Storytelling has been found to serve as an effective traditional way to convey customs and values and to share knowledge and experiences. This can assist in finding common ground, learning about health concepts, and making decisions. Visual representation of a story (the use of art, words, pictures, photographs, and film) can provide innovative and culturally appropriate ways of learning. Yarning groups are another way for community voices to be heard, helping to ensure that health messages are provided in a culturally sensitive way. When community leaders are included in the process, cultural values are respected. Importantly, these ways of learning link culture to health messages in respectful and meaningful ways, empowering communities to improve health outcomes (Peake et al., 2019; Tough, 2007).

Our study reported that use of technical jargon by doctors is not understood by some families. This finding is not unique to our study. Minnican and O'Toole (2020) also found that community members reported health providers used complicated or patronising tones. Non-First Nations health service providers must learn to listen, speak without jargon, clarify misunderstandings, and acknowledge and accommodate the expertise of community members as ways to improve cross-cultural understanding (Minnican & O'Toole, 2020).

Many service providers were surprised to learn that a relatively large number of First Nations children in Tamworth were not fully immunised for their age. This lack of awareness was found in previous TIP studies in NSW (Bolszewicz et al., 2020; Thomas et al., 2018). In Australia, good quality immunisation data is available from the AIR and from medical software used in ACCHSs and general practice. In high-income countries, the WHO recognises the need for reliable, timely data as an integral part of immunisation programs, identifying overdue children for follow-up, monitoring coverage, and

evaluating service performance (Crowcroft & Levy-Bruhl, 2017). This data can help reduce inequity by identifying areas of low coverage and enabling tailored strategies to be developed. It can also help inform health policy and guide public health decision-making by providing an indirect measure of population immunity levels (European Centre for Disease Prevention and Control, 2018).

Data can also be used to generate reminders or recalls, which are known to help increase immunisation uptake and are appreciated by parents (Brewer et al., 2017; Vann et al., 2018). All immunisation providers can request reports from AIR to identify children who are due or overdue, correct errors, and send reminder messages. Australian *Standards for General Practice* recommend using clinical software rather than existing registers to manage reminders as part of preventative care required for accreditation (The Royal Australian College of General Practitioners, 2017). Historically, AIR data had been analysed and shared widely in Tamworth and across the health district for the follow-ups of overdue children and to guide service delivery. There is potential to reinstate some of those practices, prioritising areas of low coverage, and increasing the use of both AIR and medical software data to plan, monitor, and evaluate immunisation services in Tamworth.

The TIP process proved useful in identifying an area of low childhood immunisation coverage in Tamworth. For the first time, we incorporated First Nations' ways of knowing and doing into TIP's methodology. Community engagement, PAR, and a process led by First Nations researchers helped create a trusting environment where information was shared and findings were genuine. Our study results were interpreted in a way that was culturally relevant to First Nations community members, service providers, and researchers, building on strengths and identifying opportunities for improvement. Using the COM-B model of behaviour change, our study found that capability factors (parent's knowledge, communication from health service providers) and motivation factors (parental attitudes and confidence in vaccination) are contributing to low immunisation coverage in Tamworth. We also found that opportunity factors (cultural appropriateness of services, physical access and use of data) were important. The third phase of TIP will develop an evidence-based, tailored strategy to increase the number and rate of First Nations children who are fully immunised for their age. First Nations methods, participation, and governance will play a central role.

There are some limitations in the reliability of AIR data that can be attributed to delays in entering data, records not being updated, as well as children moving, and their address not being updated in Medicare. This means some children who appear to be overdue may actually be up to date. Analysis of the data found a high number and rate of non-First Nations children were also overdue for vaccinations. It was outside the scope of our study to investigate contributing factors for that group of children; however, these data have been shared widely with all immunisation providers and public health staff. Our qualitative data collection and analysis was spread over 12 months, which may be considered a long time. Our diverse team had many workplace and community priorities, which meant some data collection and analysis were delayed. The emergence of COVID-19 and its impact on families and communities meant some researchers were less available for data analysis. Our study results are relevant to the local community of Tamworth and may not be generalisable to other settings; however, we believe the concepts are likely to be applicable in other Australian First Nations communities.

Conclusion

The study has highlighted a number of factors contributing to lower coverage, including service access barriers, negative messages, and suboptimal use of coverage data. While some factors are beyond the control of individuals and local health services, knowledge of these factors and their impact on families can help ensure services are flexible and culturally safe. Strengthening the First Nations workforce, using language that families understand, linking culture to immunisation health messages in a way that empowers families, and improving use of data to plan and evaluate immunisation services are also strategies within reach of both public and private health services in Tamworth. Using First Nations research methods was essential in providing deep understanding of the reasons why some children may be falling behind in their immunisations and what might be done to improve coverage rates. These methods should be considered in all research with First Nations communities.

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