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Barriers to vaccination service delivery within general practice: Opportunity to make a sustainable difference in Aboriginal child health?

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Barriers to vaccination service delivery within general practice: opportunity to make a sustainable difference in Aboriginal child health?

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Abstract

Objective: To identify behavioural barriers of service provision within general practice that may be impacting the vaccination coverage rates of Aboriginal children in Perth, Western Australia (WA).

Methods: A purposive developed survey was distributed to 316 general practices across Perth and three key informant interviews were conducted using a mixed-methods approach.

Results: Of the surveyed participants (n=101), 67.4% were unaware of the low vaccination coverage in Aboriginal children; 64.8% had not received cultural sensitivity training in their workplace and 46.8% reported having inadequate time to follow up overdue child vaccinations. Opportunistic vaccination was not routinely performed by 30.8% of participants. Key themes identified in the interviews were awareness, inclusion and cultural safety.

Conclusion: Inadequate awareness of the current rates, in association with a lack of cultural safety training, follow-up and opportunistic practice, may be preventing greater vaccination uptake in Aboriginal children in Perth. Cultural safety is a critical component of the acceptability and accessibility of services; lack of awareness may restrict the development of strategies designed to equitably address low coverage.

Implications: The findings of this study provide an opportunity to raise awareness among clinicians in general practice and inform future strategies to equitably deliver targeted vaccination services to Aboriginal children.

Key words: immunisation, Aboriginal children, coverage rates, Perth, Western Australia, general practice, service delivery, barriers, vaccination

Vaccination delivers one of the most effective strategies of preventative public health.[1] Access to vaccines is not, however, universal. This paucity in administration renders certain child populations to be at heightened risk of vaccine-preventable disease (VPD). Many of these vulnerable populations experience comparatively greater health challenges, including higher rates of notifiable disease, and associated morbidity and mortality.[2-9] This increased risk may be compounded by the social determinants of health and the effects of globalisation.[9-11]

In Australia, the target for childhood vaccination coverage is 95%.[12] This figure reflects the nation's commitment to an accountability in disease prevention, not only within the country but also throughout the Western Pacific Region, where certain VPDs (for example, the rubeola virus) remain prevalent in some locations.[13] When viewed collectively, the current Australian childhood coverage rates are reported to be 90% or above.[14] However, these figures can mask coverage deficits seen in specific sub-populations and in certain geographical locations.

The national Aboriginal (inclusive of Torres Strait Islander people) childhood coverage rates are comparable to *all children* when measured at one, two and five years.[14] In comparison, the vaccination coverage rates of Aboriginal children living in the Perth metropolitan area at 12–≤15 months and 24–≤27 months are substantially lower than their non-Aboriginal counterparts and reflect some of the lowest rates in the nation.[12,14] This disparity renders this population vulnerable, at greater risk of being affected by disease outbreak, contracting a VPD, and hospitalisation. For those children with an immature or compromised immune system, acute, critical or chronic health outcomes may result.[15]

In WA, Aboriginal children are over-represented in terms of emergency department presentations.[16] A considerable proportion of these presentations occur as a result of acute respiratory infection (ARI); many of which are preventable by vaccination.[16] This feature not only impacts the Aboriginal community, state health departments and the wider population, but is of particular concern to individuals who cannot be vaccinated or alternately have multiple co-morbidities.[17]

General practice

General practice offers highly effective primary healthcare to the Australian population. Within this setting, providers play a key role in the provision of clinical services and evidence-based information designed to meet the healthcare needs of the community. Although jurisdictional

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models of service delivery exist, the influence of general practice in the uptake of childhood immunisation, both planned and opportunistic, cannot be underestimated.[18] In Australia, general practice delivers a high proportion of vaccination services to Aboriginal and non-Aboriginal adults and children.[19] Vaccination provision is, however, a complex and rapidly-changing field, requiring an extensive knowledge of the vaccines administered and a clear understanding of the populations they are targeting.[18,20]

This research was conducted from February to November 2018, in response to the sub-optimal vaccination coverage rates of Aboriginal children living in Perth. The aim of the study was to identify behavioural barriers among general practitioners (GPs) and practice nurses (PNs) working within general practice, which may be preventing greater levels of access and higher rates of coverage in the studied population.

Theoretical framework

The *Theory of Planned Behavior* (TPB) provided a structural framework for survey development.[21] The theory posits that the four proximal constructs: attitude; subjective norm; behavioural control; and intention heavily influence the likelihood of an outcome behaviour occurring.[21] The outcome behaviour in this study is effective vaccination services provided to Aboriginal children living in Perth. Determining the relative influence of these four constructs provides an insightful interpretation of the range of barriers limiting vaccination coverage and the behaviour in which they are situated. Within the studied setting, the resultant findings will serve to inform and enhance future clinical practice.[22]

Methods

Survey development and implementation

The study used a mixed methods approach to gain a greater understanding of the current immunisation services delivered to Aboriginal children attending general practice. The survey tool was developed following an analysis of the published literature and selection of an appropriate theory. During survey development, consultation was conducted with Aboriginal and non-Aboriginal health professionals across a variety of settings: general practice, child health and the WA Department of Health. Discussions with an interstate Aboriginal vaccination officer, a national Aboriginal immunisation research officer and a general practitioner based in the university setting were also undertaken.

Consultation with members of the Aboriginal community was a critical inclusion throughout the study to ensure that all content was relevant to the setting, population and situation and was culturally appropriate. The survey was piloted (n=10) for content and face validity with medical and science and nursing academics, a general practitioner, an epidemiologist within communicable disease control, a child health nurse, an Aboriginal child health clinical manager, clinical management staff in child and adolescent health, and a clinical research manager in child and adolescent health. Feedback received was used to refine the data collection instrument prior to final dissemination.

The survey consisted of demographic questions to determine the participants' current role, highest level of education achieved, length of time working in general practice and frequency of vaccinating Aboriginal children. This was followed by a series of statements within each of the four proximal constructs of the chosen theory (TPB).[21] Statements within each construct were used to examine whether identifiable barriers and associated behavioural traits existed. A five-point Likert scale was used to gauge the providers' levels of agreement to each statement (1=strongly agree to 5=strongly disagree). Data displayed in Tables 1–4 were analysed using the five-point scale and collapsed in presentation to represent agree, disagree and uncertain. In the interpretation of results, the reporting of *uncertain* by providers in statements involving specific behavioural tasks inferred that an action had not been performed.

Survey inclusion criteria and recruitment

The inclusion criteria for the survey consisted of a number of pre-determined characteristics. These were: the participants were either a GP or PN; and they were currently working in a general practice setting that was located in the Perth metropolitan area. Recruitment of the participants occurred through direct email request to each general practice (n=316); practice emails were obtained via the WA Department of Health consumer website and consisted of practices that had bulk-billing facilities.

Survey dissemination

A survey link to the Qualtrics online platform was initially emailed to 316 general practices in Perth during February 2018. Access remained open until May 2018. Information pertaining to the study, the intended benefits, potential risks and consent to participate were provided through the online survey and prior to survey commencement. A reminder was sent to all general practices three weeks after the initial dissemination to encourage participants who had commenced the survey but had not yet completed it to finalise their responses.

Survey data analysis

All survey data collected were exported into IBM SPSS Version 25 (IBM, New York, USA). Descriptive statistics were used to describe the demographics of the survey sample and the subsequent responses. To determine the differences in the distribution of responses by provider type (GP or PN), statistical analysis was applied using the nonparametric Mann-Whitney U test; a level of significance was set at $p<0.05$ using the asymptotic p-value.

The effect size for nonparametric analysis (r) was also calculated; 0.1 indicates a small effect, 0.3 a medium effect and 0.5 a large effect.[23] The formula used to calculate this figure was $r= z/\sqrt{N}$.[23]

Interview development and implementation

The aim of the qualitative component of the study was to investigate whether there was an awareness of the sub-optimal vaccination coverage in Aboriginal children living in Perth. It also sought to determine what strategies were being implemented to address this critical issue, if awareness was evident. The qualitative questions were initially piloted with one general practitioner who was also an academic in the university setting. This process informed the refinement of questions generated and the development of subsequent probes.

Interview process

The interview participants were purposively selected personnel recruited via direct email request. Following pilot testing, three face-to-face, semi-structured interviews were conducted with participants who had previously been involved in a WA-based immunisation working group. The sample consisted of a GP who had worked in Perth for more than 20 years, a senior manager

in population health, and a health officer working in an Aboriginal health organisation. Consent to conduct and audio-record each interview was also provided. Interviews ranged from 27 to 55 minutes in duration and occurred concurrently with survey distribution via convergent parallel mixed-methods.[24]

Interview data analysis

The interview recordings were transcribed by the lead author before undergoing thematic analysis to identify key themes and sub-themes across the findings.[25] The transcripts were shared with all members of the research team who coded a portion from each interview to reach consensus. The transcribed interviews were also emailed to each participant to confirm accuracy and representativeness of the transcripts through member checking.

Ethical considerations and governance

Ethical approval was provided by the Edith Cowan University Human Research Ethics Committee. Additional approval was sought and received from the WA Aboriginal Health Ethics Committee (WAAHEC) and the Sir Charles Gairdner and Osborne Park Health Care Group Human Research Ethics Committee; support for the study was provided by the Derbarl Yerrigan Health Service. Governance approval for staff in the WA Department of Health was also obtained.

Results

Survey

Of the 316 surveys sent to general practice, 101 providers consented to participate. A variable number of responses were recorded to each question; the total number for each statement is documented in Tables 1–4. It is not possible to determine the response rate, as all surveys were received in a non-identifiable format and the total number of persons (who met criteria) working within the participating practices is unknown. Practice nurses accounted for 70.2% of survey participants; 29.8% were GPs. On average, participants had worked in general practice for 11.9 years (SD=10.9) and were predominantly female (87.0%); 51.6% had achieved a bachelor's degree as their highest level of education and 19.4% a graduate diploma. The demographic characteristics of the study sample are detailed in Table 1.

Table 1: Demographic characteristics of participant sample in survey.

Characteristic	Total response[a]	Variable	n	%
Responded to survey	n=102	Consented	101	99
		Did not consent	1	1
Current work role	n=94	Practice nurse	66	70.2
		General practitioner	28	29.8
Highest level of education	n=93	Bachelor degree	48	51.6
		Graduate certificate	8	8.6
		Graduate diploma	18	19.4
		Master's degree	7	7.5
		Doctoral degree (PhD)	2	2.2
		Other	10	10.9
Gender	n=92	Female	80	87
		Male	12	13
Frequency of vaccinating Aboriginal children	n=92	Every day	5	5.4
		Weekly	9	9.8
		Monthly	15	16.3
		Once per six months	32	34.8
		Yearly	13	14.1
		Not at all	18	19.6
Years worked in general practice	n=91	<1 year	8	8.8
		1 to < 5 years	30	32.9
		5 to < 10 years	17	18.7
		≥10 years	36	39.6

Note:
a: n denotes the total number of participants that responded to each statement (combined GP and PN)

Table 2: Provider response to attitude construct in survey.

Statement	Total response[a]	Variable	n (%)	*p*-value[b] (2-tail)	Effect size[c]
Vaccinations are a vital component of disease prevention in the community.	n=90	Agree	90 (100)	0.899	-0.013
		Disagree	0 (0)		
		Uncertain	0 (0)		
By administering all scheduled vaccinations on-time some serious illnesses can be prevented	n=90	Agree	89 (100)	0.509	-0.07
		Disagree	0 (0)		
		Uncertain	0 (0)		
Vaccinations are a safe way of protecting the health of Aboriginal children	n=90	Agree	90 (100)	0.618	-0.053
		Disagree	0 (0)		
		Uncertain	0 (0)		
Some vaccines on the childhood National Immunisation Program (NIP) schedule are not very effective	n=89	Agree	7 (7.9)	0.749	-0.15
		Disagree	70 (78.6)		
		Uncertain	12 (13.5)		
A delay in receiving scheduled childhood vaccination is not a health risk as long as children eventually receive them	n=89	Agree	13 (14.6)	0.166	-0.034
		Disagree	72 (80.9)		
		Uncertain	4 (4.5)		
Administering all age-appropriate scheduled childhood vaccinations on the same day is more likely to result in a greater number of side-effects than if they were given on separate occasions	n=89	Agree	10 (11.2)	0.363	-0.110
		Disagree	70 (78.7)		
		Uncertain	9 (10.1)		
I feel that some Aboriginal parents are hesitant about having their child vaccinated	n=82	Agree	10 (12.2)	0.024	-0.24
		Disagree	50 (61.0)		
		Uncertain	22 (26.8)		
I feel we are given clear direction as to how we could improve the coverage rates of Aboriginal children living in Perth	n=87	Agree	32 (36.8)	0.243	-0.125
		Disagree	26 (29.9)		
		Uncertain	29 (33.3)		

Notes:
a: n denotes the total number of participants that responded to each statement (GP and PN)
b: asymptotic p-value <0.05 denotes statistical significance in statement response reporting between provider type (GP versus PN) using the Mann-Whitney U test
c: effect size (r): 0.1= small effect, 0.3 = medium effect and 0.5 =large effect

Awareness and culture

The study identified that 67.4% of participants were either unsure of the vaccination coverage rates of Aboriginal children living in Perth or believed they were high. There were no statistical differences in provider type (GP or PN) reporting in this finding (z=-0.264, *p*=0.791). With respect to cultural safety training in this setting, 64.8% reported that they had not received any; there were no statistical differences in the reporting of this response between provider types (z=-0.235, *p*=0.814).

Attitude construct

Almost 20% of participants were either uncertain or agreed that a delay in receiving a childhood vaccination was not a health risk as long as the child eventually received their vaccinations; 21.3% agreed with or were uncertain of the statement that some vaccines in the childhood National Immunisation Program (NIP) were not very effective. Approximately 21% of participants were either uncertain or agreed that delivering all scheduled childhood vaccinations to an Aboriginal child on the same day resulted in a greater number of side effects than if they were administered on separate occasions; 29.9% did not feel they were given clear direction as to how to improve the coverage rates in Aboriginal children. The majority of participants (61%) reported that they did not find Aboriginal parents/guardians to be hesitant of vaccines; GPs were significantly less likely than PNs to report finding Aboriginal parents to be vaccine hesitant (z=-2.252, *p*=0.024, r=-0.24). Table 2 outlines additional statements and the associated responses to this construct.

Table 3: Provider response to subjective norm construct n survey.

Statement	Total response[a]	Variable	n (%)	*p*-value[b] (2-tail)	Effect size[c]
There is pressure from the general public to increase the vaccination coverage rates among Aboriginal children	n=85	Agree	24 (28.2)	0.110	-0.173
		Disagree	29 (34.1)		
		Uncertain	32 (37.6)		
My manager views the achievement of high immunisation rates in Aboriginal children as a priority*	n=60	Agree	38 (63.4)	N/A	N/A
		Disagree	8 (13.3)		
		Uncertain	14 (23.3)		
My colleagues view the achievement of high vaccination rates among Aboriginal children as a priority in their practice*	n=25	Agree	17 (68.0)	N/A	N/A
		Disagree	3 (12.0)		
		Uncertain	5 (20.0)		
My colleagues strongly believe in the importance of delivering vaccinations to Aboriginal children on-time	n=79	Agree	70 (88.6)	0.752	-0.036
		Disagree	1 (1.3)		
		Uncertain	8 (10.1)		
My colleagues' practice of regularly discussing vaccinations with Aboriginal parents has influenced me to do the same	n=82	Agree	32 (39.0)	0.098	-0.129
		Disagree	23 (28.0)		
		Uncertain	27 (33.0)		
There is strong pressure from the Aboriginal community to improve the way immunisation services are delivered to Aboriginal children living in Perth	n=82	Agree	17 (20.7)	0.497	-0.075
		Disagree	9 (11.0)		
		Uncertain	56 (68.3)		
I worry that if I mention vaccinations to Aboriginal parents at every visit they will view this negatively and won't return to our clinic	n=80	Agree	7 (8.8)	0.135	-0.167
		Disagree	58 (72.5)		
		Uncertain	15 (18.7)		
I feel pressure from Aboriginal parents to not vaccinate their child if the child presents with an illness	n=81	Agree	7 (8.6)	0.909	-0.013
		Disagree	56 (69.2)		
		Uncertain	18 (22.2)		
Key influences to your clinical practice**	n=110	Doctor: workplace	35 (31.8)	N/A	N/A
		Colleagues	28 (25.5)		
		Regulatory Body	25 (22.7)		
		Manager	9 (8.2)		
		Other	13 (11.8)		
At my workplace, there are strong expectations to ensure that Aboriginal children are vaccinated on-time	n=82	Agree	61 (74.4)	0.317	-0.110
		Disagree	8 (9.7)		
		Uncertain	13 (15.9)		

Notes:

a: n denotes the total number of participants that responded to each statement (GP and PN unless stated)

b: asymptotic p-value <0.05 denotes statistical significance in statement response reporting between provider type (GP versus PN) using Mann-Whitney U test

c: effect size (r) 0.1=small effect, 0.3=medium effect and 0.5=large effect

** indicates that the question was directed to practice nurses only*

***denotes that multiple responses were allowed*

Subjective norm construct

When asked specifically whether there were strong expectations in their workplace to vaccinate Aboriginal children on time, 25.6% were either uncertain or disagreed. Almost 37% of PNs surveyed were either uncertain or did not agree that their manager viewed the achievement of high vaccination rates in Aboriginal children to be a priority in their workplace. In terms of influence on clinical practice, the majority of responses received indicated that GPs within the practice (31.8%) were a key source, followed by work colleagues (either GP or PN [25.5%]) and their professional regulatory body (22.7%). Table 3 outlines additional statements and the associated responses to this construct.

Perceived behavioural control construct

Almost one-half of participants (46.8%) reported that they often did not have time in their workday to follow up with children who were overdue for their scheduled vaccinations. Of the total sample, 31.6% reported that accessing the Australian Immunisation Register (AIR) prior to vaccinating a child was too time consuming; PNs were significantly more likely than GPs to agree with this statement (z=-2.610, *p*=0.009, r=-0.294). Approximately one-third of providers (32.1%) indicated that they were able to independently work out a catch-up schedule if an overdue child presented to their workplace; PNs were significantly more likely than GPs to report being able to perform this task (z=-2.930, *p*=0.003, r=-0.332). A total of 77.2% of participants felt that their clinical practice would be enhanced by having regular data coverage updates of Aboriginal children living within their geographical workplace location and 51.9% reported that having a greater selection of culturally appropriate vaccination material to distribute to parents or guardians would provide additional support to their practice (Table 4). Table 4 outlines additional statements and the associated responses to this construct.

Intention construct

In terms of identifying Aboriginality in persons that attend their practice, 88.6% of the participants felt comfortable doing so. A total of 30.8% of participants reported that they did not offer opportunistic vaccinations

to siblings of Aboriginal children; there were no statistical differences noted across profession type (z=-0.076, *p*=0.94). Fifty-nine per cent of participants indicated that they did not always access the AIR to determine the vaccination status of Aboriginal siblings; PNs were significantly more likely than GPs to report that they did check vaccination status via the AIR (z=-2.513, *p*=0.012, r=-0.285). One-third of participants reported that they did not find it easy getting in contact with parents of Aboriginal children to discuss vaccinations and 50.6% reported that they did not contact parents/guardians of Aboriginal children prior to their vaccination due date as a form of pre-call. In terms of immunisation protocol delivery, 82.9% of participants indicated that they used the same protocols in Aboriginal and non-Aboriginal children; PNs were significantly more likely than GPs to report using the same protocols (z=-2.873, *p*=0.004, r=-0.306). Table 5 outlines additional statements and the associated responses to this construct.

Table 4: Provider response to perceived behavioral control construct in survey.

Statement	Total Response[a]	Variable	n (%)	*p*-value[b] (2-tail)	Effect size[c]
I feel confident with my knowledge of childhood vaccinations that are given to Aboriginal children	n=78	Agree	72 (92.3)	0.065	-0.209
		Disagree	2 (2.6)		
		Uncertain	4 (5.1)		
I often find that I don't have the time in my work day to follow up on children who are overdue for their vaccinations	n=79	Agree	37 (46.8)	0.931	-0.097
		Disagree	41 (51.9)		
		Uncertain	1 (1.3)		
Accessing the AIR prior to prescribing or vaccinating a child, to confirm which vaccinations a child is due for is too time consuming	n=79	Agree	25 (31.6)	0.009	-0.294
		Disagree	44 (55.7)		
		Uncertain	10 (12.7)		
I find it generally easy to be able to get in contact with parents of Aboriginal children to discuss their child's Immunisations	n=78	Yes	11 (14.1)	0.071	-0.205
		No	26 (33.3)		
		Uncertain	41 (52.6)		
To support my role, it would help to have access to a greater selection of promotional material on childhood vaccinations specifically designed for Aboriginal children and parents	n=79	Agree	41 (51.9)	0.731	-0.039
		Disagree	18 (22.8)		
		Uncertain	20 (25.3)		
I feel comfortable raising the subject of Aboriginality with parents that access my workplace for their child's vaccinations	n=79	Agree	69 (87.3)	0.696	-0.044
		Disagree	1 (1.3)		
		Uncertain	9 (11.4)		
The technical resources at my workplace prevent me from providing a more efficient service	n=79	Agree	10 (12.7)	0.135	-0.168
		Disagree	67 (84.8)		
		Uncertain	2 (2.5)		
I am able to independently work out a catch-up schedule for an Aboriginal child who is overdue for their vaccinations and presents to my workplace to receive them	n=78	Agree	25 (32.1)	0.003	-0.332
		Disagree	44 (56.4)		
		Uncertain	9 (11.5)		
It would help my clinical practice if I was given regular data updates on the rates of fully vaccinated Aboriginal children in the geographical area that I work in	n=79	Yes	61 (77.2)	0.375	-0.10
		No	18 (22.8)		
Regarding the previous question concerning data updates, please state the frequency you would like to receive this data, if possible*	n=60	Fortnightly	3 (5)	N/A	N/A
		Monthly	22 (36.7)		
		Quarterly	23 (38.3)		
		Six mthly	6 (10)		
		Yearly	6 (10)		

Notes:

a: n denotes the total number of participants that responded to each statement (GP and PN unless stated)

b: asymptotic p-value <0.05 denotes statistical significance in statement response reporting between provider type (GP versus PN) using Mann-Whitney U test

c: effect size (r) 0.1= small effect, 0.3 = medium effect and 0.5 =large effect

**indicates that only respondents that answered yes to the previous question were able to answer*

Qualitative results

Three key themes were identified during the analysis stage of the interviews (n=3). These were: awareness, cultural sensitivity, and inclusion/engagement.

Theme: Awareness

An acute awareness of the rates has the potential to greatly influence provider response, intent and sustainability of services provided. A lack of awareness of the vaccination rates in Aboriginal children within the provider setting was identified as a major theme. Two of the three participants believed that Aboriginal children in Perth experienced high levels of vaccination coverage:

> *We don't see it as a gap because it's been picked up, we believe adequately and if you look at our immunisation rates comparatively including Aboriginal, it's not a gap.* – Senior Manager, population health

> *… it was surprising. I didn't think that the Aboriginal cohort wasn't as well vaccinated … there are … health inequalities across the Aboriginal cohort, but I wasn't aware that vaccination was one of them.* – General Practitioner

The discussion on low vaccination rates for Aboriginal children led to a reflection on the effectiveness of the current model of care used in general practice, which is non-promotional and predominantly relies on the patient presenting to a given practice to access medical services:

> *We have used those models for 20 years and we've got low vaccination rates … so, if they really want to change [the coverage rates], then they need to change the whole model for delivery in this segment … this sector of the marketplace. … So, it's about encouraging the patient to cross the threshold rather than preparing the threshold …* – General Practitioner

For one participant, who manages a large number of clinical health professionals in population health, vaccination coverage was not regarded as priority area.

> *It's not a priority focus area. It's an issue, but not a priority … two different things.* – Senior Manager, population health

There also appeared to be varied views concerning who was responsible for maintaining high childhood vaccination coverage. One participant working within a population health setting allocated this responsibility solely with general practice with limited crossover between health settings: "The (general practice) area has the allocated responsibility".

Theme: Cultural safety

All interview participants were extremely conscious and respectful of the importance of cultural safety and its potential to enhance the accessibility and acceptability of services. This was clearly illustrated by views held by the senior manager in population health and a GP:

> *Cultural safety is absolutely mandatory, and we have a very strong process in Aboriginal strategy that surrounds cultural security and*

respect … it's about changing attitude and culture and respectful relationships … It's about respect, it's about listening … it's about understanding the trauma and the effect of trauma. … it's not just about doing the training and ticking the box, it's far broader than that. – Senior Manager, population health

Vaccinate … in a safe environment that is non-confrontational … and non-judgemental. – General Practitioner

There also seemed to be a focus on equality rather than equity in service provision, with two participants stating they used the same vaccination protocols for Aboriginal and non-Aboriginal children:

There is no different model in my clinic. We try and be respectful to everyone that comes in and we treat them all the same. – General Practitioner

When discussing equity, one participant working in Aboriginal health added in this perpective with respect to protocol and resource allocation:

… it's a tricky one though because I think that a lot of GPs don't want to be (seen as) racist and have almost the opposite effect. – Health Officer, Aboriginal health organisation

Theme: Inclusion

Another key theme identified was *inclusion*. The involvement of the Aboriginal population in the process of supporting vaccination rates was identified as a clear sub-theme. This included engagement with members of the Aboriginal community and the use of Aboriginal Health Workers (AHW) or clinicians in mainstream settings to address low coverage and overdue vaccinations and to provide health promotion and education on the merits of vaccination to parents or guardians.

I think the reality is that anytime we have really needed to intervene with the health of Aboriginal people, it's been most successful, most effective when we have got AHWs to do it. – General Practitioner

What you want is Aboriginal people in mainstream services across the board. … Having Aboriginal led mainstream programs ….. is far more important and improves access. – Senior Manager, population health

If the general practices did have an AHW in the areas of high Aboriginal population, it just makes it that little bit more culturally appropriate. – Health Officer, Aboriginal health organisation

Table 5: Provider response to intention construct in survey.

Statement	Total response[a]	Variable	n (%)	*p*-value[b] (2-tail)	Effect size[c]
If the parents of an Aboriginal child do not present for their child's immunisation appointment I contact them that day to re- schedule	n=78	Agree Disagree/ uncertain	43 (55.1) 35 (44.9)	0.917	-0.012
I find it generally easy to be able to get in contact with parents of Aboriginal children to discuss their child's immunisations	n=78	Yes No Uncertain	11 (14.1) 26 (33.3) 41 (52.6)	0.071	-0.205
In my workplace, we are encouraged to try new strategies to increase the proportion of fully vaccinated Aboriginal children in our geographical work place*	n=54	Agree Disagree/ Uncertain	16 (29.6) 38 (70.4)	N/A	N/A
In my workplace, we often try new strategies to increase the proportion of fully vaccinated Aboriginal children in our geographical work area*	n=24	Agree Disagree Uncertain	1 (4.2) 18 (75) 5 (20.8)	N/A	N/A
I opportunistically offer vaccinations to siblings of Aboriginal children that I see at my workplace	n=78	Agree Disagree/ Uncertain	54 (69.2) 24 (30.8)	0.940	-0.009
At my workplace we contact the parents' of Aboriginal children prior to their vaccination due date to alert them of their child's upcoming vaccinations	n=77	Agree Disagree/ Uncertain	38 (49.4) 39 (50.6)	0.959	-0.006
Making a follow up appointment for an Aboriginal child to receive their next vaccination on the day that I prescribe or administer a vaccination is something I always do	n=76	Agree Disagree/ Uncertain	40 (52.6) 36 (47.4)	0.005	-0.323
I feel comfortable raising the subject of Aboriginality with parents that access my workplace for their child's immunisation	n=79	Agree Disagree Uncertain	70 (88.6) 1 (1.3) 8 (10.1)	0.696	-0.044
In my workplace I use the same protocols to maximise the proportion of fully vaccinated Aboriginal children as I do with non-Aboriginal children	n=88	Agree Disagree Uncertain	73 (82.9) 10 (11.4) 5 (5.7)	0.004	-0.306
I always check the vaccination status of the siblings of Aboriginal children that attend my workplace via the AIR	n=78	Agree Disagree Uncertain	32 (41.0) 14 (18.0) 32 (41.0)	0.012	-0.285

Notes:

a: n denotes the total number of participants that responded to each statement (GP and PN unless stated otherwise)

b: asymptotic p-value <0.05 denotes statistical significance in statement response reporting between provider type (GP versus PN) using Mann-Whitney U test

c: effect size (r): 0.1= small effect, 0.3 = medium effect and 0.5 =large effect

** indicates that the question was directed to practice nurse only*

Discussion

This research set out to explore whether behavioural traits were possibly preventing greater vaccination coverage in the studied population. Although a higher number of PNs in comparison to GPs responded to the survey, it is well established that PNs within this setting administer a high proportion of vaccinations; as such, they are well placed to positively influence uptake and provision.[18,26,27]

All survey respondents indicated a belief that vaccination was a vital component of disease prevention. The majority of these participants also reported feeling satisfied with their knowledge of the childhood NIP and the additional vaccines offered to Aboriginal children. However, despite these findings, a number of key factors may be hampering sustainable coverage improvements. Critically, the majority of participants who completed the survey were not aware of the low coverage rates of Aboriginal children living in this location; this was also reflected in the interview data with two of the three participants interviewed having this belief. Awareness is key to the development and resourcing of targeted programs designed to redress disparity.

Engagement with patients is a critical component of general practive service provision. It was identified that almost two-thirds of providers had not completed any cultural safety training while working in this setting. This feature may compromise the acceptability and assessabilty of services. Moreover, it could lead to a disengagement of services, reduce the ability to opportunistically vaccinate and may potentially affect other areas of health, further to vaccination. The published literature suggests that vaccination timeliness may be a feature of Aboriginal child health.[28-30] A delay in receiving the required vaccines at the recommended age may compromise a child's health (acute and

chronic) if a VPD is contracted.[30] This feature reinforces the importance of opportunistic vaccination and consistent engagement.

In terms of follow-up of Aboriginal children overdue for their vaccinations, almost half of participants reported that they often did not have time in their work day to perform this task. Follow-up on overdue children may be more successfully achieved if performed by specific teams situated either within or external to the general practice setting, with an allocated responsibility of active surveillance. Our study also determined that 29.9% of survey participants did not feel they received clear instruction as to how to improve the coverage rates of Aboriginal children; greater intersectoral collaboration may strengthen capacity within this setting.[11]

The AIR is an important resource used to determine accurate vaccination status of children and adults, record vaccine encounters and generate reports designed to inform practice.[31] The study identified that the register was perceived by almost one-third of providers as being time consuming and potentially not being used effectively to support practice. There also appeared to be some uncertainty with the applications of the AIR, with one GP reporting that they were only able to enter data into the register and not extract anything out of it.

A common theme in the qualitative approach was the inclusion of Aboriginal health clinicians in mainstream settings to facilitate an uptake in services and generate demand. The creation of specific roles designed to target low coverage combined with a strong and supportive system could potentiate robust leadership in this area. Lastly, in terms of scheduling, re-call and reminders, a number of findings may impact the current rates. More than 50% of participants reported that they did not alert parents of upcoming vaccinations, while 47.3% reported they did not make a follow-up appointment for the next vaccination when the parents or care-givers were in the practice. Greater engagement and the use of health information technology may be useful options in this setting; alternatively, the development of a WA-specific immunisation application containing alerts, vaccine information and patient-specific vaccination scheduling and reminders should also be considered.

Strengths and limitations

The high number of combined responses received from GPs and PNs in the survey strenghtened the validity of the findings and accounted for a considerable proportion of the overall results.

The small sample of qualitative participants may be consided a limitation of this study. The findings in this approach, however, supported and added a depth of interpretation to the survey results.[32]

Conclusion

Historically, there has been a paucity of research conducted on the impact of vaccination services provided to Aboriginal children within the general practice setting in Perth. This study is of importance as it contributes to the limited body of research conducted in this location. It is well understood that general practice operates within a highly pressured environment. However, key findings identified a general lack of awareness of the coverage rates and to some extent, some hesitancy surrounding the safety and effectivenss of vaccines, which could be influencing the disparity of coverage. Ongoing dedicated staff training to prioritise vaccination in this setting should strengthen capacity. A lack of cultural safety awareness in general practice may also be impacting the accessibility and acceptability of the current services provided. Specific education in this area could potentiate a change in perspective and facilitate a more supportive environment for Aboriginal families.

References

1. Gram L, Soremekun S, ten Asbroek A, Manu A, O'Leary M, Hill Z, et al. Socio-economic determinants and inequities in coverage and timeliness of early childhood immunisation in rural Ghana. *Trop Med Int Health*. 2014;19(7):802-11.
2. Attwood L, Rodrigues S, Winsor J, Warren S, Biviano L, Gunasekera H. Improving delivery of health care to Aboriginal and Torres Strait Islander children. *J Paediatr Child Health*. 2015;51(5):534-40.
3. Bitsori M, Galanakis E. Vaccine-preventable infection morbidity of patients with chronic kidney disease and cocoon vaccination strategies. *Expert Rev Vaccines*. 2015;14(10):1385-95.
4. Brown TIM, Moon G. Geography and global health. *Geogr J*. 2012;178(1):13-17.
5. Dwyer J, Boulton A, Lavoie JG, Tenbensel T, Cumming J. Indigenous peoples' health care: New approaches to contracting and accountability at the public administration frontier. *Public Manage Rev*. 2014;16(8):1091-112.
6. Katz SL. A vaccine-preventable infectious disease kills half a million children annually. *J Infect Dis*. 2005;192(10):1679-80.
7. Lam E, Brennan M, Maina A, Diaz M. Displaced populations due to humanitarian emergencies and its impact on global eradication and elimination of vaccine-preventable diseases. *Confl Health*. 2016;10:27 eCollection 2016.
8. Levin R, Herbert M. The experience of urban Aboriginals with health care services in Canada. *Soc Work Health Care*. 2004;39(1-2):165-79.
9. Naidu L, Chiu C, Habig A, Lowbridge C, Jayasinghe S, Wang H, et al. Vaccine preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people, Australia 2006-2010. *Commun Dis Intell Q Rep*. 2013;37(Suppl):1-95.
10. Andrus JK, Cochi SL, Cooper LZ, Klein JD. Combining global elimination of measles and rubella with strengthening of health systems in developing countries. *Health Aff*. 2016;35(2):327-33.
11. Baum F. *The New Public Health*. 4th ed. South Melbourne (AUST): Oxford University Press; 2016.
12. Australian Department of Health. *National Immunisation Program*. Canberra (AUST): Government of Australia; 2018.
13. Hennessey K, Schluter WW, Wang X, Boualam L, Jee Y, Mendoza-Aldana J, et al. Are we there yet? Assessing achievement of vaccine-preventable disease goals in WHO's Western Pacific Region. *Vaccine*. 2014;32(34):4259-66.
14. Australian Institute of Health and Welfare. *Healthy Communities: Immunisation Rates for Children in 2015-2016*. Canberra (AUST): AIHW; 2017.
15. Abbott P, Menzies R, Davison J, Moore L, Wang H. Improving immunisation timeliness in Aboriginal children through personalised calendars. *BMC Public Health*. 2013;13:598.
16. Barnes R, Blyth CC, de Klerk N, Lee WH, Borland ML, Richmond P, et al. Geographical disparities in emergency department presentations for acute respiratory infections and risk factors for presenting: A population-based cohort study of Western Australian children. *BMJ Open*. 2019;9(2):e025360.
17. Li-Kim-Moy J, Yin JK, Patel C, Beard FH, Chiu C, Macartney KK, et al. Australian vaccine preventable disease epidemiological review series: Influenza 2006 to 2015. *Commun Dis Intell Q Rep*. 2016;40(4):e482-e95.
18. Halcomb E, Hickman L. Attitudes and immunisation practices of Australian general practice nurses. *Contemp Nurse*. 2016;52(4):440-6.
19. Harris M, Webster V, Jalaludin B, Jackson Pulver LR, Comino EJ. Immunisation coverage among a birth cohort of Aboriginal infants in an urban community. *J Paediatr Child Health*. 2014;50(4):306-13.
20. Thomas S, Cashman P, Islam F, Baker L, Clark K, Leask J, et al. Tailoring immunisation service delivery in a disadvantaged community in Australia; views of health providers and parents. *Vaccine*. 2018;36(19):2596-603.
21. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process*. 1991;50(2):179.
22. Pielak KL, McIntyre CC, Tu AW, Remple VP, Halperin B, Buxton JA. Identifying attitudes, beliefs and reported practices of nurses and doctors as immunization providers. *J Adv Nurs*. 2010;66(7):1602.
23. Fritz CO, Morris PE, Richler JJ. Effect size estimates: Current use, calculations, and interpretation. *J Exp Psychol*. 2012;141(1):2.
24. Creswell J. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks (CA): SAGE Publications; 2014.
25. Clarke V, Braun V. Thematic analysis. *J Posit Psychol*. 2017;12(3):297-8.
26. Taylor L, Turner N, Poutasi C. What are the keys to high immunisation rates in general practice? *Nurs N Z*. 2017;23(6):25-7.
27. Desmond N, Grant CC, Goodyear-Smith F, Turner N, Petousis-Harris H. Nurses make a difference in immunisation service delivery. *Aust J Adv Nurs*. 2011;28(4):28-35.
28. O'Grady KA, Krause V, Andrews R. Immunisation coverage in Australian Indigenous children: Time to move the goal posts. *Vaccine*. 2009;27(2):307-12.
29. Moore L, Menzies R, Davison J, Wang H, Abbott P. Improving immunisation timeliness in Aboriginal children through personalised calendars. *BMC Public Health*. 2013;13:598.
30. Menzies R, Andrews R. Immunisation issues for Indigenous Australian children. *J Paediatr Child Health*. 2014;50(10):e21-e5.
31. Law C, McGuire R, Ferson MJ, Reid S, Gately C, Stephenson J, et al. Children overdue for immunisation: A question of coverage or reporting? An audit of the Australian Immunisation Register. *Aust N Z J Public Health*. 2019;43(3):214-20.
32. Egleston BL, Miller SM, Meropol NJ. The impact of misclassification due to survey response fatigue on estimation and identifiability of treatment effects. *Stat Med*. 2011;30(30):3560.