Identifying Barriers for Implementing an Early Childhood Caries Risk Assessment Tool for Non-Dental Primary Care Providers

Darsh Sheth PA-S, Bachelor of Life Sciences
007887414
shethd@myumanitoba.ca

Supervisor: Dr. Robert Schroth, DMD, MSc, PhD

A capstone project submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirements for the degree of
MASTER OF PHYSICIAN ASSISTANT STUDIES

Master of Physician Assistant Studies
University of Manitoba
Winnipeg, MB

May 15, 2021

ABSTRACT

Purpose: The purpose of this project was to determine barriers to the implementation of a caries risk assessment tool for non-dental primary care providers. This project aimed to identify necessary requirements for practitioners to reduce the incidence of early childhood caries in the population.

Methods: 8 participants were recruited for this project, which consisted of physician assistants, nurse practitioners, and physicians practicing in Manitoba. There were 2 focus groups and 1 interview session conducted on the virtual video communication platform Zoom, and 1 focus group session held in-person following COVID-19 protocols and restrictions.

Results: Four themes were identified that related to barriers to implementation of a caries risk assessment tool: time, provider education, access to resources, and parental buy-in. Further breakdown of the themes included discussion on appointment slots, training, funding, and education respectively.

Conclusion: All participants considered the caries risk assessment tool to be a great resource but further research needs to be conducted with larger sample sizes and additional professions to gain an additional understanding of barriers to implementation.

TABLE OF CONTENTS

Introduction

Background

Early childhood caries (ECC) is a chronic disease affected by many factors, including diet, oral microbiome, and tooth integrity (1). Research into caries prevention has led to new approaches in dealing with ECC (2). However, the global burden of ECC has barely changed over the past 3 decades (2). This can be attributed to underlying social determinants of health including low socioeconomic status, parental education, maternal nutrition, and psychosocial issues (1). With ECC, families can potentially experience greater financial burden, leading to compromised quality of life for their children and complications such as infections (2). In certain cases, ECC requires invasive treatment such as dental surgery performed under general anaesthesia in hospital settings, which is the most common day surgery in young children at most Canadian pediatric hospitals (3). Unfortunately, this has caused limitations in access to hospital-based dental treatment since approximately 50% of children needing procedures have to wait longer than medically acceptable (3).

The Canadian Perspective

Dental caries is quite prevalent in the Canadian population, especially in the Indigenous population where children are reported to have poorer oral health and higher frequencies of dental pain (4). Indigenous children have a three to five times higher incidence of tooth decay compared to the national average in Canada (4). Additionally, they are less likely to access preventive dental health care services due to limited access to health resources and the availability of dental care in remote areas (4). In addition, newcomers to Canada, including refugees and immigrants, have faced challenges in accessing and maintaining their oral health due to language barriers and cultural differences, leading to a higher risk for dental caries (5). ECC continues to be a problem in Canada (1). This could be attributed to the failure of previous interventions addressing underlying issues such as biomedical, behavioral, and

social factors contributing to the development of caries (1). Although urban children are generally considered to be at low-risk for caries, there is data to suggest that ECC is prevalent in disadvantaged urban communities in Canada (1). Due to the extensive impact of ECC on children, a comprehensive assessment tool is needed to reduce associated treatment costs and impact on childhood growth (1).

Caries Risk Assessment

Caries risk assessment (CRA) can be regarded as a tool to assist with clinical decision-making and disease management to help identify patients with the greatest need for time and resources for the appropriate intervention and management of caries (6). CRA can be defined in detail as "the clinical process of establishing the probability of an individual patient to develop carious lesions over a certain period of time or the likelihood that there will be a change in size or activity of lesions already present" (6 p. 179). In essence, the goal of CRA is to develop a strategy that can address carious lesions at an early stage and to intervene before there is irreversible damage to teeth (7). Identifying ECC earlier can help reduce complications children encounter such as pain, failure to thrive, and overall diminishment of quality of life (8).

Problem Statement

Nevertheless, conventional CRA models have utilized "dental factors" or "past caries experience" as predictors, requiring visits to the dentist for a thorough dental examination (2). This has proved to be difficult as <2% of infants visit dentists in their first year of life compared to >82% visiting physicians (2). With an increase in global rates of ECC per capita (0.10 to 0.70) in children aged 1 to 4 years old, it would be beneficial to advocate for a medical CRA model for early identification of ECC in primary care settings (2). For context, research studies have shown that physician-delivered preventive oral health services have

been able to reduce 32% of the treatment cost of caries-related hospital visits in children up to 3 years of age (2).

There are different methods available to determine caries risk including salivary tests and clinical examinations (9). However, most children see a physician multiple times before their first birthday compared to dental visits (3). A survey of pediatricians completed in the United States illustrated that more than 90% believed dental assessments and preventive counselling should be incorporated into well-child care visits (3). With the development of Canada's first screening tool for non-oral health professionals to assess the risk of tooth decay in children under the age of six years, there is hope to identify ECC and educate about ECC prevention in settings outside the dental office (10).

The purpose of this research project is to determine any barriers that exist to the implementation of a CRA tool by non-dental primary care providers (PCPs). In addition, this project aims to identify the necessary training required for non-dental PCPs to utilize CRA in their daily clinical practice. Ultimately, by identifying these barriers and establishing methods to train non-dental PCPs in their respective clinical settings, there can be increased identification and earlier intervention for ECCs to improve outcomes without the need for invasive treatments.

Methods

This project was conducted using a qualitative approach. Non-dental PCPs practicing in Manitoba participated in 3 focus groups and 1 interview session. For this project, non-dental PCPs were defined as nurses, nurse practitioners (NPs), physician assistants (PAs), physicians (MD), and dieticians. This project received ethics approval from the University of Manitoba's Health Research Ethics Board (HREB). Interview questions (Appendix 1) were generated to be open-ended to obtain thoughts and perspectives on barriers in implementing a CRA tool in practice and required training for implementation (Appendix 2).

Invitation scripts (Appendix 3) to focus group sessions were sent to 21 non-dental PCPs in Manitoba, with 9 individuals replying with interest to participate. Due to limitations in scheduling, only 8 individuals were able to complete the focus group sessions as part of the project. Consent forms (Appendix 4) were sent to interested participants, as well as a survey link to collect demographic information (Appendix 5) including age, gender, years in practice, the primary location of practice, role at the site, and experience caring for Indigenous children. In total, 1 interview and 2 focus groups were conducted via the virtual video communication platform Zoom. In addition, 1 focus group session was completed in-person adhering to provincial COVID-19 protocols and restrictions. Consent was provided by all participants before the focus group session by submitting the online demographics survey and typing "accept" on the last question (Appendix 6).

In total, 2 physicians, 3 PAs, and 3 NPs participated in this project (Figure 1). Each focus group was broken down as follows: The in-person focus group had 2 physicians and 1 PA, the first virtual focus group had 1 PA and 1 NP, the second virtual focus group had 2 NPs and the interview was conducted with 1 PA. Each focus group or interview session took approximately 45 minutes to 1 hour and was audio recorded. Responses were transcribed at a later date and the audio recording was subsequently deleted after transcription was complete. All 8 participants consented to their responses being used in this project at the end of the focus group session. Additionally, each

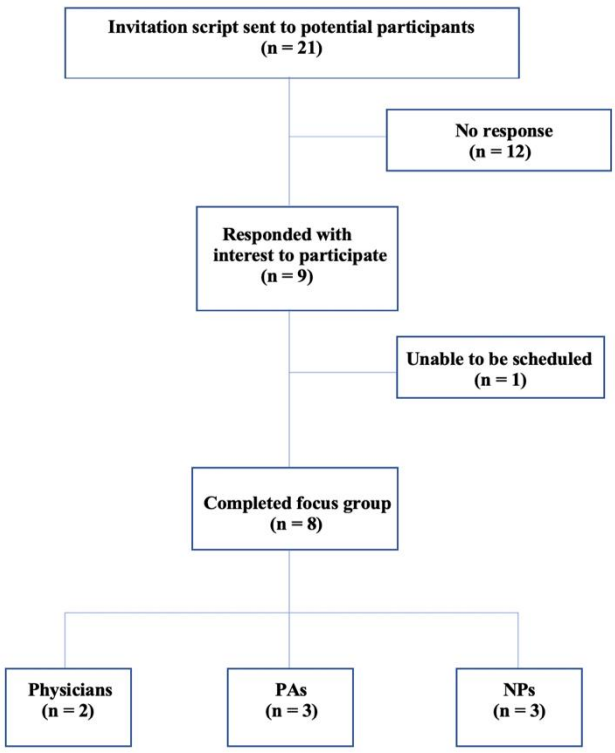


Figure 1: Outline of project recruitment

participant was sent a $25 honorarium in the form of a gift card for participating in the focus group or interview session.

Results

All 8 participants (Table 1) recruited in the project practice in Manitoba, with 4 working in Winnipeg, 2 in the Interlake, 1 in Northern Manitoba, and 1 splitting time between Winnipeg and Northern Manitoba. Most participants were female (n = 5), with the participant age range being 30-67 years. All participants (n = 8) had at least 4 years of clinical experience, with 3 participants having ≥ 15 years of experience. Most participants (n = 5) identified as having plenty of experience caring for Indigenous children, with only 1 participant stating minimal experience. As part of their patient population, 4 participants identified having ≥ 40% patients being Indigenous, 3 participants stating 20-29%, and 1 participant stating 0-9%. In terms of pediatric population interaction, 4 participants identified 10-19% of their patient population being pediatric, 2 participants stated 20-29%, and 1 participant each stated 0-9% and 30-39%.

Table 1: Demographic information of participants

	Age	Gender	Years in Practice	Location of Work	Role at Site	Experience with Indigenous Children	Approx. Patient pop. Indigenous	Approx. Pediatric Population interaction
Participant 1	34	F	4-6	Winnipeg	PA	Plenty	40%+	10-19%
Participant 2	46	F	15+	Winnipeg	Physician (MD)	Plenty	20-29%	10-19%
Participant 3	37	F	7-10	Winnipeg	Physician (MD)	Average	20-29%	20-29%
Participant 4	50	F	15+	Winnipeg/ Northern MB	NP	Plenty	20-29%	10-19%
Participant 5	67	M	15+	Northern MB	PA	Plenty	40%+	0-9%
Participant 6	37	M	4-6	Winnipeg	PA	Minimal	0-9%	10-19%
Participant 7	30	F	7-10	Interlake	NP	Average	40%+	30-39%
Participant 8	32	M	4-6	Interlake	NP	Plenty	40%+	20-29%

After completion of the focus group and interview sessions, the transcribed data were analyzed and four themes were identified for barriers to implementation: time, provider

education, access to resources, and parental buy-in. This was further subdivided into categories based on participant responses, which is outlined below (Table 2). Based on the transcribed data, common impactful words spoken by participants were grouped based on their profession and entered into a Venn diagram (Figure 2).

Table 2: Barriers to implementation identified by participants

Theme	Descriptor
Time	Appointment slots Value
Provider Education	Training Comfortability Information to educate others
Access to Resources	Funding Storage
Parental Buy-in	Education Value

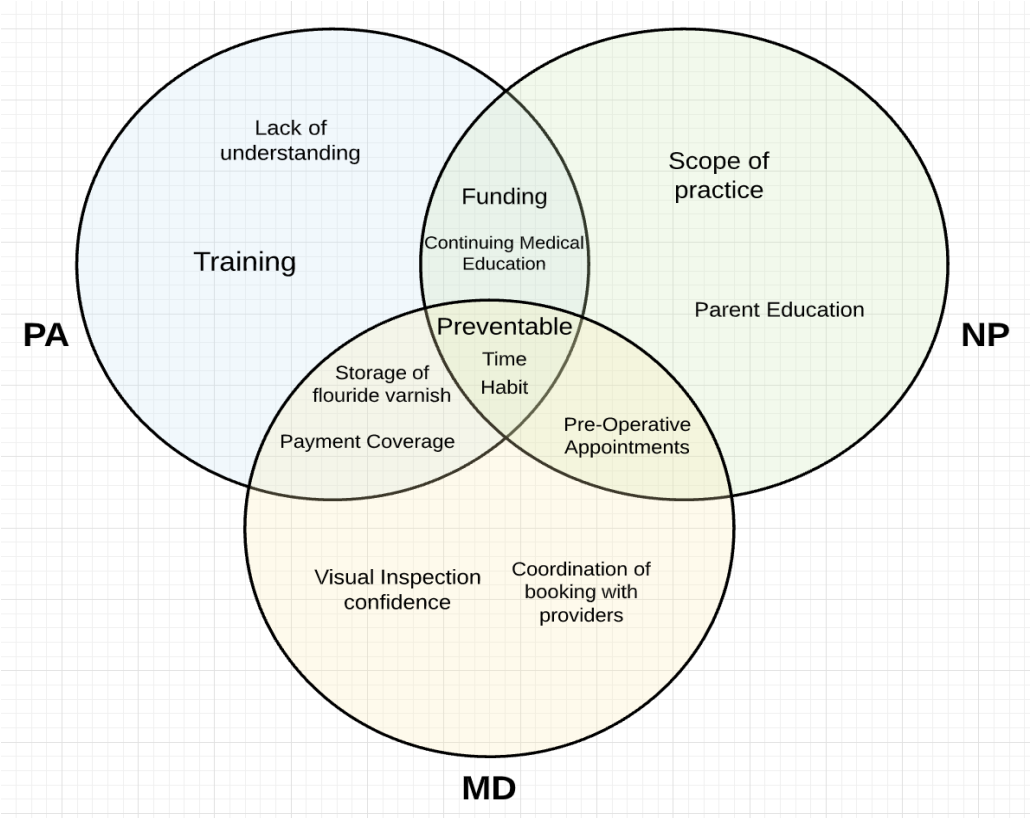


Figure 2: Common impactful words spoken by participants grouped by profession

1. Time

a. Appointment slots

Seven (3 NPs, 2 PAs, 2 physicians) of the eight participants (87.5%) noted that time was a barrier to implementation of a CRA tool. One of the NPs noted that ECC is:

> "…a very overlooked issue in primary care, especially in at-risk communities…".

With the CRA tool encompassing fluoride varnish, there was a concern of needing additional time to fully utilize the CRA tool in practice. For example, one PA noted that for fluoride varnish:

> "I don't know how to do that or what's required for that. I see that taking more time…".

In addition, one physician spoke about coordination of booking with other providers as these appointments could require additional resources (if required) to apply fluoride varnish such as having a nurse or physician colleague help hold the child while applying fluoride varnish. Furthermore, there could be an issue with physician billing codes, as two NPs spoke about their physician colleagues potentially having trouble billing for services related to the CRA tool. Specifically, one NP noted that:

> "Another challenge we talked about before is time and fee for service billing codes and for a busy physician, that is a bit of a hard sell that you're going to spend that extra time when you're already incredibly busy so you know it would be reasonable to compensate people for that time they're spending with a dedicated billing code".

b. Value

There was discussion amongst participants about the value of dental assessments in primary care settings. Particularly, two NPs spoke about their scope of practice being a limiting factor in terms of implementing a CRA tool in their practice. One NP stated that:

> "I think it's crazy to not do this as part of our scope of practice. I think a lot of underresourced or underserviced communities, we get stuck within our scopes and we keep our scopes a bit narrow but we need to be innovative and need the entire team in on projects like this".

Another NP spoke about prioritizing issues and the value of having dental assessments in the short window they have with children:

> "…a tooth and malocclusion, you can say something but it isn't high on our priority list especially when they come in for ear infections, chest infections then we are not really thinking of that".

However, one PA noted that although time may be a limiting factor, there is value in filling out a CRA tool to benefit patients:

> "I would make the time to fill out this tool and there is always time to provide better care and improve for the patient and this is essential".

2. Provider Education

a. Training

Three (2 PAs, 1 NP) of the eight participants (37.5%) noted that continuing professional development (CPD) or continuing medical education (CME) may be beneficial in providing additional training to non-dental PCPs. In terms of confidence level, one PA noted that there is low confidence in performing a CRA due to:

> "…a lack of understanding or training on our perspective in terms of PAs and doctors to really know more about how to approach it other than just saying does your child see a dentist".

Six (3 NPs, 2 physicians, 1 PA) participants (75%) noted that pictures provided in the CRA tool are helpful but 2 NPs particularly mentioned that a booklet with instructions would be helpful too. Specifically, one of the NPs stated that:

> "I think a lot of professionals if you just gave them with the CRA tool, a how-to-use booklet I think for most people that would be sufficient".

b. Comfortability

Six (2 NPs, 2 PAs, 2 physicians) of the eight participants (75%) noted that either remembering or getting into a habit would pose a barrier in the initial stages of using a CRA tool. The main reason cited was no experience with using a CRA tool before in practice and providers needing a reminder to use the CRA tool during their appointments with children. One PA noted that:

> "From a bang for our buck perspective, it's not been something I've been trained to do so it hasn't been blended into practice".

Also, one NP noted that:

> "I think getting into the habit would be a barrier since it takes time to build a new habit in your practice and you know with a busy schedule, if you don't see these patients for a while, it's pretty easy to fall out of the habit of that".

Moreover, seven (3 NPs, 2 PAs, 2 physicians) of the eight participants (87.5%) noted that integrating the CRA tool with the Rourke record would increase accessibility and make the tool readily available for providers. The majority (87.5%) of participants use electronic medical records, with Accuro being the most common platform. One NP mentioned that:

> "Right now, we use electronic medical records (Accuro) and I think if you've populated it into our forms where it is electronically fillable, it would be very easy".

At the same time, another NP mentioned that there may be issues around provider education such as understanding what fluoride varnish is and how to address concerns to parents about the nature of the CRA tool:

> "…we're not dentists and we don't have a lot of understanding of toxicity profile, safety profile of fluoride".

c. Information to educate others

Five (2 NPs, 2 physicians, and 1 PA) of the eight participants (62.5%) noted that the referral process to dentists would pose a challenge. Participants discussed concerns centred around knowing dentists that would accept their patients for follow-up and coverage issues for payment. One NP noted that:

> "We've got no formal way to easily refer children to a dentist, no one referral process".

In addition, one of the physicians stated:

> "…I don't know the community dentist, I don't know who is good with children, who has forgiveness for no shows, which dentists are close by so I would struggle to send people too".

Another physician spoke about coverage issues outlining confusion surrounding affordable options for their patients:

> "I get confused about coverage issues, like SMILE plus but I don't know how it works".

Additionally, one of the PAs added:

> "I think just knowing for our population who is covered is a huge issue since a lot of patients can't pay for that".

3. Access to Resources

a. Funding

Half of the participants (3 NPs, 1 PA) noted that funding would be an issue in terms of acquiring fluoride varnish and any other tools needed to utilize a CRA tool in practice. One NP had concerns regarding employers prioritizing oral health in primary care settings:

> "…you know how funders are, they want to see economic value of it".

Another NP noted support among organizational staff but acquiring funds to implement CRA tools in practice posed challenges:

> "The funding is a big problem because while there is a buy-in, which pot is the funding come from for this?".

Building on the conversation, this same NP mentioned:

> "…it just reflects the way we're trained and oral health isn't always prioritized".

Ultimately, the messaging was around the difficulty of sourcing funds for oral health practice in non-dental primary care settings making applying CRA in practice a challenge.

b. Storage

Two (1 PA and 1 physician) of the eight participants (25%) noted that storage of fluoride varnish would pose a challenge. The discussion was about any special requirements to store the fluoride varnish and whether they can be placed in examination rooms or in a central location for all providers to utilize. One of the PAs mentioned:

> "Just information what it is, how it needs to be stored, how it can be applied…do I need to keep the kid around to have it set, dry?".

This issue does connect to prior discussion on provider comfortability and having enough information to appropriately conduct and educate others about the CRA tool. Furthermore, the same PA talked about fluoride varnish interrupting the daily flow in the clinic if it needed special storage:

> "…can we store small batches, vials, bottles of it in each individual room or somewhere central similar thinking with the tools so I can see it being an interruption in the flow of one's day".

4. Parental Buy-in

a. Education

In terms of educating parents about the CRA tool, all participants (100%) stated that they believed caries are preventable. This was followed by a discussion about sugary beverages, which five (2 PAs, 2 physicians, 1 NP) participants (62.5%) talked about when answering what comes to mind and what they know about childhood tooth decay. Seven (3 NPs, 2 physicians, 2 PAs) participants (87.5%) mentioned bottle-feeding being a contributor to caries development. The overarching idea was a lack of education surrounding the consequences of parental actions being a barrier to implementing a CRA tool. One of the NPs stated:

> "…how can we market the education in such a way that these are attractive practices for parents to make".

Further to this, the same NP noted:

> "…I think it's become an accepted culture in high-risk communities that people will just have extensive childhood tooth decay and it's going to be a natural process for the family and children in the family".

The messaging and education surrounding the CRA tool were cited as a key barrier to achieve parental confidence in utilizing the CRA tool in practice.

b. Value

There were six (3 NPs, 2 PAs, 1 physician) participants (75%) that spoke about the value to the parents being a barrier to utilizing a CRA tool in practice. Specifically, discussion surrounded the parents' ability to understand and see the value of oral health services provided by primary care providers outside of a dental office. One NP mentioned:

> "It's just a matter of presenting in such a way that would get parents to buy in that kind of thing".

In terms of showing parents the value, one NP spoke about illustrating the benefits of a CRA tool through reduction of surgery and pre-operative appointments:

> "If their kids don't have to go for surgery, that's a big bonus reducing costs spent on something else and don't have to risk their lives going for surgery…".

Additionally, one of the PAs talked about parents questioning the value of a CRA in a primary care office and what it could ultimately achieve:

> "…but if it's deeper or there is more involvement or I need to look at back sides of teeth, there would be questions of shouldn't I just go see the dentist so that can be a barrier from the parent's perspective".

Discussion

Importance of findings

This research project set out to determine barriers that exist to the implementation of a CRA tool by non-dental PCPs. After analyzing the data from the multiple focus group sessions and sole interview, four themes emerged from participant responses including time, provider education, access to resources, and parental buy-in. Although the results of this project demonstrated numerous barriers to the implementation of a CRA tool, similar findings are noted in the literature. A study by Prakash et al. (11) illustrated that "46% of Canadian pediatricians and 62% of Canadian family physicians lack knowledge in recognizing the early signs of tooth caries" (p. S97). This was a similar notion identified by participants in this project who felt the lack of training and confidence impeded their ability to accurately identify caries. Furthermore, a study conducted by Alshunaiber et al. (11) in Saudi Arabia explained that pediatricians and family physicians reported lack of clinical time as their highest reported barrier. Most participants in that study indicated that they were open to receiving more dental education and training, which aligned with the findings of the study among Canadian pediatricians and family physicians (11).

The CRA tool provides greater access to dental care, especially for parents who are unaware of the importance of their child's first dental visit (11). As a result, it is important to introduce oral health at an early stage of training for non-dental PCPs (11). One PA participant in this project mentioned that PA education should consider including dental training in the 2nd year of the program as it would greatly benefit students in terms of exposure to oral health issues. The study conducted by Alshunaiber et al. (11) mentioned that maintenance of children's oral health should be included in medical training while enhancing the referral system between the medical and dental community. This can lead to better patient satisfaction and outcomes since there would be a pathway for non-dental PCPs to refer to known dentists to ensure continuity of care.

In addition, successful implementation of a CRA tool could lead to a reduction in costs for the healthcare system. In a study by Meyer et al. (12) analyzing the impact of physician-provided oral health services in the United States, results showed that physicians who began providing preventive oral health services such as screening, referral, and fluoride varnish to young children led to improved oral health access, increased preventive dental utilization, and decreased caries-related treatment among Medicaid-enrolled children. Moreover, two or more physician-provided oral health service visits led to lower dental general anesthesia costs by $114, equivalent to dental treatment on 1 tooth (12). In this project, many participants mentioned that children visit clinics for pre-operative form completion. As a result, having adequate preventative tools and early identification of caries could help reduce the need for invasive surgeries and treatment costs.

Consequently, overcoming barriers to implementation can lead to better health outcomes for patients. Fluoride varnish can be an effective intervention, demonstrating a 43% reduction (on average) in decayed, missing, and filled tooth surfaces for teeth treated with fluoride varnish (13). A study completed by Da Silva et al. (13) analyzed the use of fluoride varnish in

primary care settings in Ontario. Their results demonstrated physician's and nurse's willingness to provide preventive dental care but optimal training methods were lacking (13). In addition, self-reported barriers included insufficient time during well-child visits, difficulty in applying fluoride varnish, and funding issues (13). These findings were similar to participant responses in this project where there was concern about appointment time slots, funding issues to acquire fluoride varnish, and comfortability with using fluoride varnish. A study by Braun et al. (14) reported that children who received 4 or more fluoride varnish applications (FVAs) at well-child visits by 3 years of age had lower ECC prevalence than children who received fewer FVAs. Furthermore, their study cited barriers to delivery of oral health protection by medical providers included lack of time and lack of referral dentists (14). These findings were similarly stated in the participants of this project, lending evidence that these barriers need to be addressed in order to implement a CRA tool in practice.

Limitations

Although this project provided key insight into barriers faced by non-dental PCPs in implementing a CRA tool, many limitations need to be addressed. First of all, the small sample size of participants recruited to participate in focus groups greatly limited the findings of the project. At the start of the project, the goal was to recruit and schedule at least 15 participants however, the impact of the COVID-19 pandemic greatly limited scheduling and responses for participation. Initially, there was hope of multiple clinics within Winnipeg being eager to participate, although the changing circumstances of the COVID-19 pandemic resulted in staff redeployment and scheduling difficulties that restricted participation. For example, there were redeployments of primary care nurses to alternative isolation accommodations (AIA) that prevented nurses from participating, even in the evenings. In addition, given the clinical nature of the PA program, scheduling around the business hours of providers was challenging with a full block of clinical rotations with call shifts.

Furthermore, given the pandemic restrictions, it was necessary to hold the majority of focus groups virtually over Zoom. With in-person focus groups, there can be more interaction and discussion about questions amongst participants, while limiting distractions that can be present over Zoom. There was one in-person focus group that did generate more discussion and ideas amongst providers, which was less evident over Zoom. Given the circumstances, data was still sufficiently collected and the hope would be to have more in-person focus group sessions in the future.

Additionally, another limitation was the various focus group sizes. It may be beneficial to standardize focus group sizes to a certain number to maintain a similar level of discussion amongst participants in a focus group setting. For example, the larger focus group of 3 participants had more discussion amongst themselves around questions as opposed to the single interview participant that only had their opinion to discuss without hearing and building on other participant's perspectives.

Finally, as the participants were recruited from Manitoba only, the data does not represent the opinions of non-dental PCPs across Canada. Given that the CRA tool is developed for use in Canada, it is important to listen and involve Canadians from coast to coast. There may be additional findings for barriers amongst Atlantic Canadians compared to Central Ontario depending on the population they deal with and having a vast array of participants from across the nation can help build a more robust picture of barriers to implementation.

Future Direction

Given the findings of this project, it is beneficial to build and gather more data to identify barriers to the implementation of the CRA tool. For future studies, it may be useful to include dieticians, primary care nurses, and social workers as part of the data sample to gain a broader perspective from different practitioners. Moreover, increasing the sample size to incorporate larger focus groups can generate more discussion and ideas that may be missed in

smaller focus groups. A project incorporating practitioners across Canada could help identify regional barriers to implementation, as well as looking at the urban and rural issues.

Conclusion

Participants in this project were able to provide insight into potential barriers for implementation of a CRA tool, specifically highlighting themes such as time, provider education, access to education, and parental buy-in. Although there was a small sample size limited to non-dental PCPs in Manitoba, this project can be a stepping stone to future research into implementing a CRA tool for non-dental PCPs to prevent the progression of caries in children. Given that all participants acknowledged that the tool is a great resource, there is potential for consistent use in practice. With more awareness, this tool can help in the fight to reduce the incidence of ECCs and ultimately improve the oral health of Canadian children.

Acknowledgements

I would like to thank my capstone mentor Dr. Robert Schroth and the entire Healthy Smile Happy Child team for their help and motivation throughout the project. Additional thanks to all participants who took the time to do a focus group session to help complete this capstone research project.

References

1. Pierce A, Singh S, Lee JH, Grant C, Cruz de Jesus V, Schroth RJ. The Burden of Early Childhood Caries in Canadian Children and Associated Risk Factors. Frontiers in Public Health [Internet]. 2019 Nov 12 [cited 2021 Apr 14];7(328):1–16. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6861386/

2. Kalhan TA, Lam CU, Karunakaran B, Chay PL, Chng CK, Nair R, et al. Caries Risk Prediction Models in a Medical Health Care Setting. Journal of Dental Research [Internet]. 2020 July 1 [cited 2021 Apr 20];99(7):787–96. Available from: https://journals.sagepub.com/doi/10.1177/0022034520913476?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed

3. Nicolae A, Levin L, Wong PD, Dave MG, Taras J, Mistry C, et al. Identification of early childhood caries in primary care settings. Paediatrics & Child Health [Internet]. 2017 Nov 22 [cited 2021 Apr 20];23(2):111–5. Available from: https://pubmed.ncbi.nlm.nih.gov/29686495/

4. Elsalhy M, Gill M, Isaac DM, Littlechild R, Baydala L, Amin M. Integrating preventive dental care into general Paediatric practice for Indigenous communities: paediatric residents' perceptions. International Journal of Circumpolar Health [Internet]. 2019 Jan 29 [cited 2021 Apr 21];78(1):1–7. Available from: https://pubmed.ncbi.nlm.nih.gov/30696378/

5. Azrak ME, Huang A, Hai-Santiago K, Bertone M, Demare D, Schroth RJ. The Oral Health of Preschool Children of Refugee and Immigrant Families in Manitoba. Journal of the Canadian Dental Association [Internet]. 2017 Sep 20 [cited 2021 Apr 21];83(h9):1–10. Available from: https://pubmed.ncbi.nlm.nih.gov/29106352/

6. Jørgensen MR, Twetman S. A systematic review of risk assessment tools for early childhood caries: is there evidence? European Archives of Paediatric Dentistry [Internet]. 2019 Sep 26 [cited 2021 Apr 21];21(2):179–84. Available from: https://pubmed.ncbi.nlm.nih.gov/31559535/

7. Schroth RJ, Rothney J, Sturym M, Dabiri D, Dabiri D, Dong CC, et al. A systematic review to inform the development of a Canadian caries risk assessment tool for use by primary healthcare providers. International Journal of Paediatric Dentistry [Internet]. 2021 Jan 26 [cited 2021 Apr 21];00:1–25. Available from: https://pubmed.ncbi.nlm.nih.gov/33497015/

8. Yusif S. Incorporating Oral Health Care in Pediatric Primary Care Practice. Evidence-Based Practice Project Reports [Internet]. 2019 May 14 [cited 2021 Apr 21];129:1–149. Available from: https://scholar.valpo.edu/ebpr/129/

9. Kuru E, Eden E. Success of Two Caries Risk Assessment Tools in Children: A Pilot Study With a 3-Year Follow-Up. International Quarterly of Community Health Education [Internet]. 2019 Nov 28 [cited 2021 Apr 21];40(4):317–20. Available from: https://pubmed.ncbi.nlm.nih.gov/31779528/

10. Kruchak, M. UM researcher develops tool to assess children's tooth decay. UM News Today [Internet]. 2020 Apr 20 [cited 2021 Apr 21]. Available from: https://news.umanitoba.ca/um-researcher-develops-tool-to-assess-childrens-tooth-decay/#:~:text=UM researcher develops tool to assess children's tooth decay,-April 20, 2020&text=A Rady Faculty of Health,Tool was created by Dr.

11. Alshunaiber R, Alzaid H, Meaigel S, Aldeeri A, Adlan A. Early childhood caries and infant's oral health; pediatricians' and family physicians' practice, knowledge and attitude in Riyadh city, Saudi Arabia. The Saudi Dental Journal [Internet]. 2019 Feb 1 [cited 2021 Apr 22];31:S96–S105. Available from: https://pubmed.ncbi.nlm.nih.gov/31061610/

12. Meyer BD, Wang R, Steiner MJ, Preisser JS. The Effect of Physician Oral Health Services on Dental Use and Expenditures under General Anesthesia. JDR Clinical & Translational Research [Internet]. 2019 Aug 21 [cited 2021 Apr 22];5(2):146–55. Available from: https://journals.sagepub.com/doi/10.1177/2380084419870128

13. Da Silva K, Daniel I, Singhal S, Feller A, Quinonez C. The Use of Fluoride Varnish in Primary Care in Ontario: A Qualitative Study. Journal of the Canadian Dental Association [Internet]. 2020 Jul 7 [cited 2021 May 14];86(k6):1–6. Available from: https://jcda.ca/k6

14. Braun PA, Widmer-Racich KJ, Sevick CJ, Starzyk EJ, Mauritson K, Hambidge S. Effectiveness on Early Childhood Caries of an Oral Health Promotion Program for Medical Providers. American Journal of Public Health [Internet]. 2017 Jun 29 [cited 2021 Apr 22];107(S1):S97–S103. Available from: https://ajph.aphapublications.org/doi/10.2105/AJPH.2017.303817

Appendices

Appendix 1: Focus Group Interview Questions

1. What are your thoughts on early childhood tooth decay?
    - What comes to mind? What do you know about it?
    - Do you think caries are preventable?

2. How do you feel about non-dental primary care providers (physicians, nurses, dieticians, etc.) performing caries risk assessment (CRA) for preschoolers?

3. What challenges or barriers do you foresee with implementing CRA and undertaking CRA for preschoolers in your practice?

4. Looking at the CRA tool developed for use in Canada for preschool children, how would you foresee integrating it into your medical record?

5. What could be some benefits of integrating CRA for preschoolers into your practice? For you, for your patients, for the clinic?

6. Have you already implemented any form of CRA for preschoolers into your practice?
   If yes, please describe your experience
   If no, what would help you successfully implement CRA into your practice?

7. What type of training would you like or think you might need to successfully implement CRA?
    - What would be the best way to conduct the training?

8. The CRA tool may prompt you to apply fluoride varnish. What challenges or barriers do you foresee in applying fluoride varnish?

9. What challenges/barriers do you foresee in successfully integrating fluoride varnish application into your practice?

10. What challenges do you anticipate encountering when connecting/referring children to dental providers or giving preventive advice?

11. Please share any other thoughts or comments on using the tool itself.

Appendix 2: CRA Tool

Canadian Caries Risk Assessment Tool (< 6 years)

Child's Name:

Child's Date of Birth:

Date of Assessment:

Factors	Yes	No
Teeth cleaned with brush (or cloth if infant) at least twice daily by parent or caregiver	☐ (0)	☐ (1)
Daily exposure to fluoride (e.g. fluoridated toothpaste, fluoridated water)	☐ (0)	☐ (1)
Feeding practices (one or more – please check all that apply): ☐ Bottle-feeding > 12 months of age; ☐ use of bottle or sippy cup between meals with liquid other than water (e.g. pop, fruit juices, milk, chocolate milk) ☐ Bedtime/naptime bottle or sippy cup use ☐ No oral hygiene routine established after solid foods have been introduced while still breastfeeding or bottle-feeding after 12 months ☐ Sugary snacks and drinks between meals (e.g. cookies, candy, sugary cereal, chips, pop, fruit juices, chocolate milk)	☐ (1)	☐ (0)
Family is low income (e.g. "has difficulty making ends meet at the end of the month")	☐ (1)	☐ (0)
Visible plaque and/or food debris on teeth	☐ (1)	☐ (0)
Visible caries (including white spot lesions) and/or past evidence of dental treatment for caries (e.g. fillings, stainless steel crowns, extracted teeth)	☐ (3)	☐ (0)
Total Score (please add up points from each row)		

Overall caries risk status: ☐ **High Risk (score ≥ 3)** ☐ **Low Risk (score < 3)**

***RECOMMENDATIONS* (Please check all that have been reviewed with parent/caregiver)**

HIGH RISK:

If **overall caries risk status is high**, recommend the following *in addition* to the below:

☐ Refer to dental office for treatment if there is caries present.

☐ Apply fluoride varnish *today.*

FOR ALL CHILDREN:

☐ Refer to dental office (if child has not yet been to a dental office in the last year).

Caregiver Information – Recommend:

☐ That adult brushes child's teeth (< 8 years old) at least twice daily for 2 minutes with:
- Water or non-fluoridated toothpaste only for 0-3 years of age if total score = 0
- Smear (grain of rice size) of fluoridated toothpaste for 0-3 years of age (if total score > 0)
- Green pea size of fluoridated toothpaste for 3-6 years of age

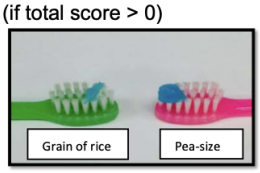
☐ Lowering sugar consumption or limiting sugary drinks/snacks

☐ Avoiding overnight bottle and sippy cup use with liquids other than water

☐ Initiate weaning off bottle by 12 months of age

☐ Initiate switching to an open cup/lidless sippy cup by 12 months of age

☐ Other: _____



ADDITIONAL COMMENTS:

Dental referral made to: _____ ☐ **Not required (child has already been to dental office)**

Provider signature: _____

University of Manitoba · Canadian Paediatric Society / Société canadienne de pédiatrie · CAPD / ACDP · CAPHD / ACSDP · Canadian Association of Public Health Dentistry / Association canadienne de la santé dentaire publique · Public Health Agency of Canada / Agence de la santé publique du Canada

December 20, 2019

Canadian Caries Risk Assessment Tool (< 6 years)
Signs of Plaque and Caries Lesions

Visible Plaque and/or Food Debris	
Early Caries (White Spot Lesions)	
Advanced Caries	  

Images courtesy of Dr. Robert Schroth

University of Manitoba | Canadian Paediatric Society / Société canadienne de pédiatrie | CAPD ACDP | CAPHD ACSDP | Canadian Association of Public Health Dentistry / Association canadienne de la santé dentaire publique

December 20, 2019

Public Health Agency of Canada | Agence de la santé publique du Canada

Appendix 3: Interview Script

Invitation Script CRA – Healthcare Providers

Hello _____

My name is Darsh Sheth and I am a 2nd year Physician Assistant Student working with Healthy Smile Happy Child as part of my University Capstone Project. We are a Manitoba initiative that promotes early childhood oral health and does research on how to prevent early childhood tooth decay.

We are doing research to gather primary healthcare providers' feedback on the Public Health Agency of Canada's (PHAC) new Canadian Pediatric Caries Risk Assessment (CRA) tool.

This tool was commissioned by PHAC in 2017 in order to provide primary healthcare providers, in non-dental settings, a tool to assess pre-school children's risk of developing tooth decay and to provide a pathway of referral for dental care.

The tool was finalized in December, 2019. It is included in the email package sent to you with this script.

This research is important for many reasons including:

- A medical CRA tool can be used by primary care providers (PCPs) to identify caries in earlier years of life
- Identification of caries earlier on can help reduce complications for patients such as failure to thrive and pain
- Research into CRA tools is limited in Canada and building a tool for PCPs can help provide easier access to dental care for children and improve quality of life

We would like to invite you to be a part of a focus group with other primary healthcare providers.

If you are interested, you and those in your group will be asked a series of questions about application of the new tool and incorporating it into your practice.

The information you share in the focus group will not be linked to you. The focus group will take about **1 hour to finish**. The key findings from focus groups are going to help to determine how to most effectively integrate CRA into primary healthcare settings.

Out of respect for others in the focus group, everything you hear in this session is **to be held in confidence and not to be repeated outside of the group.**

There will be a $25 honorarium in the form of a gift card provided for all participants.

Focus groups may be held virtually. If you are interested in participating, please reply back to this email and a survey link will be sent for you to fill out.

Thank you for your time.

Appendix 4: Consent Form

University of Manitoba
Dr. Gerald Niznick College of Dentistry

Department of
Preventive Dental Science,
College of Dentistry
P131Pathology Building
790 Bannatyne Avenue
Winnipeg, Manitoba
Canada R3E 0W2

RESEARCH PARTICIPANT INFORMATION AND CONSENT FORM FOR FOCUS GROUPS (CRA)

Title of Study: Working together to implement novel, culturally informed early childhood oral health interventions for young First Nations and Metis children in Manitoba

Principal Investigator:

Dr. Robert J Schroth
Professor
Department of Preventive Dental Science, College of Dentistry
Faculty of Health Sciences
University of Manitoba

507 – 715 McDermot Avenue
Winnipeg MB R3B 1E2
(204) 975-7764
robert.schroth@umanitoba.ca

Co-Investigators:
Ms. Rhonda Campbell — First Nations Health & Social Services Secretariat of Manitoba
Ms. Frances Chartrand — Manitoba Metis Federation
Ms. Kathy Yerex — University of Manitoba

We are asking you to take part in a research study that will include baseline and follow-up activities. Please take your time to read over this consent form. You can ask the study staff any questions you have. You can talk about it with your family or friends before you make your choice. This consent form may use words that you do not understand. Please ask the study staff to explain any words or information that you do not clearly understand.

Purpose of Study

We are doing this study to promote early childhood oral health and prevent early childhood tooth decay in First Nations and Metis communities in Manitoba. This research wants to strengthen the Healthy Smile Happy Child program in communities by listening, learning and supporting traditional teachings about oral health. The aims of this study are to: i) integrate traditional oral health teaching to improve the effectiveness of the HSHC initiative in new partnering First Nations and Metis communities in Manitoba; and ii) implement caries risk assessment (CRA) in early childhood by non-dental primary care providers as a means to improve access to oral health care. The overarching project goal is to address the oral health disparity of ECC experienced by First Nations and Metis children in Manitoba.

Your feedback will be valuable for Healthy Smile Happy Child research. It will help us to engage the community and to look for ways to promote oral health and well-being of young children. It will also help to determine whether Healthy Smile Happy Child is helpful in the community to direct growth of the program.

Focus Group/Interview Procedures

You will be part of a focus group with primary healthcare providers and stakeholders or will take part in a one-on-one interview. You will be asked a series of questions about your knowledge and implementation of CRA. The information you share will not be linked to you so that we keep you anonymous. The focus group/interview will take about 1 hour to 1 and ½ hours to finish. The key findings are going to help increase awareness of CRA tools and its use by non-dental healthcare professionals, identify barriers to the implementation of such a tool, and identify training needs. If participating in a focus group, out of respect for others, everything you hear in this session is to be held in confidence and not to be repeated outside of the group.

At the end of the study, aggregate results will be shared through tailored community reports/letters sent to each participant.

Risks and Discomforts

There are no real risks in taking part in this study. There may be some interview questions that make you feel uncomfortable. There is a chance that what you share in the focus group will be repeated outside of the group.

Benefits

There may not be a direct benefit to you from participating in this study. However, we hope the information learned from this study will benefit you and others in the future. We also hope that these focus groups/interviews will tell us more about the role primary healthcare providers play in young children's oral health. The information you share will help guide the implementation of a CRA tool in non-dental settings and will help foster early childhood tooth decay prevention in your community. We also hope that in the future, the implementation of CRA by non-dental primary healthcare providers will serve as a pathway of referral for children who do not yet have a dental home.

For taking part in this study, you will receive $25.

Costs
There is no cost to you for taking part in this study.

Confidentiality
We keep information about you confidential. Although we will do everything to keep information about you private, we cannot promise this. Personal information we collect about you might be revealed, if required by law. We will protect your identity by following the Personal Health Informative Act (PHIA) of Manitoba. The University of Manitoba Research Ethics Board might look over our study records for quality assurance reasons.

You will not be revealed in any reports, papers, presentations, or community gatherings where findings of this study are talked about.

Information collected in this research study including full or partial quotes of what you say may be published or presented in public gatherings. Your name and other identifying information will not be used or revealed. If you participate in any focus groups or meetings, participants will be reminded that anything said within that forum is to remain confidential.

The focus group will be **audio-**recorded. All recordings and consent forms will be kept in a locked filing cabinet, within a locked office, until the information is type-written. Once the project has been completed the audio-recordings will be destroyed. Electronic documents will be purged following 7 years of storage (2032).

Out of respect for the others in the group, everything you hear in the session should not be repeated outside of the group.

Voluntary Participation/Withdrawal from the Study
Your decision to take part in this study is voluntary. You may say no to taking part, or you may leave the study at any time. However, if you decide to stop taking part in the study, we encourage you to talk to us first. Your decision not to take part or leave the study will not affect you or your family. Your decision not to take part in the study will not affect your child's current or future dental care. If the study staff feel that it is in your best interest to remove you from the study, they can do so without your consent.

Questions
You are free to ask any questions that you may have about your rights as a research participant. If any questions come up during or after the study or if you have research–related problem, contact the following:

Ms. Daniella DeMaré at (204) 789-3500 or Dr. Robert Schroth at (204) 975-7764.

For questions about your rights as a research participant, you may contact the University of Manitoba, Bannatyne Campus Research Ethics Board Office at (204) 789-3389.

Do not sign this consent form unless you have had a chance to ask questions and have received satisfactory answers to all of your questions.

How our study is handling COVID-19 and Research Participation

FOCUS GROUPS

At the University of Manitoba, our primary responsibility related to research is to protect the safety of our research participants.

Coronavirus (COVID-19) is an illness caused by a virus that can spread from person to person, with symptoms that can range from mild (or no symptoms) to severe illness.

How is COVID-19 spread? COVID-19 can be contracted from respiratory droplets when an infected person coughs, sneezes, or talks. People may also get it by touching a surface or object that has been contaminated, and then my touching your mouth, nose, or eyes.

How to protect yourself and others from COVID-19? The best way to protect yourself is to avoid being exposed to the virus. Avoid close contact with others. Wear a mask that covers your nose and mouth in public settings. Clean and disinfect frequently touched surfaces. Wash your hands often with soap and water for at least 20 seconds or use an alcohol-based hand sanitizer that contains at least 60% alcohol.

- We are taking all safety precautions to reduce the risk of spread of COVID-19 and expect you to follow public health directives as well.
- If you feel that you are from a group vulnerable to contracting COVID-19 (e.g., senior, immuno-compromised), please discuss your participation with the research team before consenting. You are under no obligation to participate and there will be no consequences if you change your mind about participating in this research.
- Focus groups/interviews may be held virtually through University of Manitoba-approved Zoom or through Telehealth for more remote communities with limited access to the Internet.
    - Should focus groups be held virtually, to avoid loss of confidentiality, participants will be ask to not put their names on the screen, but give themselves numbers. Therefore, the information shared in the focus group will be kept anonymous to avoid loss of confidentiality. Participants will only be audio recorded during these virtual focus groups.
- For in-person focus groups/interviews, the following safety protocols will be followed, as per Occupational Health and Safety:
    - Staff will be asked to self-screen before coming into work
    - Participants will be asked to self-screen at home prior to arriving to the location and will be screened again at the location using the Shared Health questionnaire
        - Participants coming to CHRIM will be screened via phone prior to their study visit using a CHRIM-approved questionnaire to determine whether it is safe to come into our facilities.
    - Staff and participants will take appropriate precautions (e.g. face covering / cloth mask) while inside.
    - Hand sanitizer will be available to use at the study location.
    - Physical distancing will be maintained, at all times when possible. Face masks will be required if physical distancing is not possible. Masks will be provided for those who do not have one.

- We will be collecting personal contact information that we must retain in order to follow up with you and/or conduct contact tracing if you may have been exposed to COVID-19 in coming to the research site.
- Contact information will be kept separate from data collected through our research study to allow for de-identification of the research data (if applicable, as detailed in the protocol).
- Participants will maintain their right to withdraw from the study at any time, including research data (if applicable). We will continue to maintain participants' contact information and will only give it to Occupational Health if required for contact tracing.
- We cannot guarantee anonymity as the personal contact information identifies people as participants in this study.

Statement of Consent

I have read this consent form. I have had the chance to discuss this research study with Dr. Robert Schroth/or his study staff. I have had my questions answered by them in language I understand. I understand the risks and benefits. I know that I will get a copy of this consent form after I sign it. I know that my participation in this study is voluntary and that I can decide to leave the study at any time. I freely agree to take part in this study.

I understand that information about my personal identity will be kept confidential, but that confidentiality is not guaranteed. I allow the University of Manitoba's Research Ethics Board to look at my records that relate to this study for quality assurance reasons.

I agree that my interview may be audio-recorded. I agree that direct quotes from my interview may be used without identifying me. I understand that everything mentioned during the session should not be repeated outside of the focus group.

By signing this consent form, I have not given up any of the legal rights that I have as a participant in a research study.

Participant signature: _____ **Date_____**
(day/month/year)

Participant printed name: _____

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has knowingly given their consent

Printed Name:_____Date _____
(day/month/year)

Signature:_____ Role in the Study: _____

Appendix 5: Demographics Survey

Demographics

* 1. What is your age?

* 2. What is your gender?

- ◯ Male
- ◯ Female
- ◯ Other (please specify)

* 3. How many years have you been in practice?

- ◯ 0-3
- ◯ 4-6
- ◯ 7-10
- ◯ 11-14
- ◯ 15+

* 4. Please state your primary location of work.

* 5. What is your role at the site?

- ◯ Nurse
- ◯ Nurse Practitioner
- ◯ Physician
- ◯ Physician Assistant (PA)
- ◯ Other (please specify)

* 6. How much experience do you have caring for Indigenous children?

- ◯ Plenty
- ◯ Average
- ◯ Minimal
- ◯ None

* 7. What proportion of your patient population is Indigenous?

- ◯ 0-9%
- ◯ 10-19%
- ◯ 20-29%
- ◯ 30-39%
- ◯ 40%+

Appendix 6: Consent to Participate

* 8. How much of your patient population that you care for falls into pediatrics?

- ◯ 0-9%
- ◯ 10-19%
- ◯ 20-29%
- ◯ 30-39%
- ◯ 40-49%
- ◯ 50%+

* 9. By typing "accept" below and submitting this survey, I consent to participate in this project. Please be aware that the session will be recorded over zoom or in-person and deleted permanently after being transcribed.

Done