

Optometry Outreach in Indigenous Communities in British Columbia,
Saskatchewan, and Manitoba

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Introduction: Inuit, Métis, and First Nations, the three main Indigenous groups within Canada, face disproportionate barriers to access for primary eye and vision care. Optometrists visit rural and remote Indigenous communities to provide outreach care to areas without a local optometrist; however, the approach is fragmented and not well represented. The purpose of this project is to assess the current state of outreach optometry within Indigenous communities by surveying optometrists who provide outreach care.

Methods: In collaboration with the provincial optometry regulatory bodies, eligible participants were identified as optometrists who travel outside of their primary clinics to provide care within non-urban Indigenous communities. A questionnaire was developed through iterative stakeholder review for phase I of the study. The online questionnaire captured the delivery of care across one year (2022). The process of planning logistics, distances travelled, patient care provided and associated expenses were queried. A Semi-structured interview guide was developed for phase II of the study. One-on-one interviews expanded on questionnaire themes, providing insight into individual experiences. Data was collated through descriptive statistics and thematic coding for case and cross-case analysis.

Results: The overall response rate was 50% (18/36) for the questionnaire and 30.5% (11/36) for the interview. Total questionnaire responses represent 96 outreach visits, 312.5 optometry clinic days, and 8,386 patient encounters across 64 communities in the three provinces. Optometrists coordinate with health center employees and school contacts to plan outreach visits, travelling primarily north to some of the most remote areas within each province. Overall Euclidean distances between participants primary clinic locations and communities visited ranged from 65 to 1405 kilometers (kms) (median: 438 kms). Costs per clinic day were highly variable (\$174.44 - \$3,800, mean: \$765 per clinic day). Challenges reported were related to logistics, economic burden, and organizational challenges. Complementary enablers were identified, and recommendations are provided.

Conclusions: This study is the first to provide visibility to the current state of outreach optometry care to Indigenous communities in British Columbia, Saskatchewan, and Manitoba. The process of planning outreach visits was variable for individual optometrists and between provinces. High variability in reported costs associated with outreach visits requires additional investigation. Multi-stakeholder collaboration to support optometry outreach programming would encourage outreach

participation and improve services towards reducing eye and vision health inequity experienced by non-urban Indigenous populations.

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A personal thank you to Douglas Chaytor. I would like to dedicate my thesis to you.

Land Acknowledgement and Researcher Positionality

The land that has influenced me throughout this project literally spans coast to coast. I respect and celebrate the diverse Indigenous groups, histories, and spiritual foundations across Turtle Island.

This project is inspired by and begins with the land that I love and call home in Newfoundland and Labrador (NL). I am motivated by these lands because of the relationships between location and access to health services, as informed by the lived experiences of myself and others who live across NL. The Isle of Newfoundland is located on the unceded and traditional territory of the Mi'kmaq, and Beothuk. The big land, Labrador, is located on the ancestral lands of the Inuit of Nunatukavut, Inuit of Nunatsiavut, and Innu of Nitassinan. This interest has led me from Newfoundland to Ontario, to temporarily live and learn in Waterloo. Waterloo is located along the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples, where I live along the Haldimand tract which is land that is granted to the Six Nations. While physically located in Waterloo, I study outreach optometry that takes place across British Columbia, Saskatchewan, and Manitoba, where I recognize the many diverse First Nations, Métis and Inuit groups that are the custodians of these lands.

My physical experience with this project began in St. John's, NL and essentially concludes in Vancouver, on the Unceded territories of the Musqueam, Squamish, and Tsleil-Waututh Nations, as I had the privilege to visit BC for the first time as part of this project.

I seek to act upon reconciliation through a dedication to personal reflection and humility, where I recognize my position and privilege. I have benefited from the colonial violence of my European ancestors who arrived in Newfoundland. My privileges have brought me to participate in research that is connected to Indigenous populations, without having a personal connection to any Indigenous group. It is my responsibility to use this privilege with the utmost care and caution, by reflecting upon the presentation of this project and considering possible un-intended consequences of this work as part of iterative project planning. I continue to learn about Indigenous histories, experiences, and culture through personal readings, by participating in on-campus learning opportunities offered by the University of Waterloo's Indigenous Office, and by seeking out the works of Indigenous artists and writers, particularly those from Newfoundland and Labrador while I am away from home.

Table of Contents

Author’s Declaration	ii
Abstract	iii
Acknowledgements	v
List of Figures	x
List of Tables.....	xi
Chapter 1 Background and Rationale	1
1.1 Optometry in Canada.....	1
1.1.1 Primary eye and vision care.....	1
1.1.2 Access to eye care	1
1.1.3 Optometry outreach.....	4
1.2 Project Context	4
1.2.1 Engagement strategy	5
1.2.2 Funding models	6
1.3 Thesis Aim	11
Chapter 2 Methodology	12
2.1 Methodology Justification.....	12
2.2 Ethics	12
2.3 Participants	13
2.4 Participant Recruitment.....	13
2.5 Questionnaire.....	14
2.5.1 Questionnaire development	14
2.5.2 Questionnaire protocol	16
2.5.3 Questionnaire data analysis	16

2.6 Semi-structured Interviews.....	18
2.6.1 Interview guide development	18
2.6.2 Interview protocol	19
2.6.3 Qualitative analysis	19
Chapter 3 Outreach Visit Logistics.....	21
3.1 Study Participants.....	21
3.2 Logistics of Optometry Outreach	22
3.2.1 Relationships between optometrists and communities	22
3.2.2 Transportation and distance travelled.....	23
3.2.3 Equipment availability.....	26
3.2.4 Dispensing glasses.....	28
3.2.5 Associated costs.....	29
3.2.6 Qualitative results.....	31
Chapter 4 Current State of Outreach Service Delivery	44
4.1 Current State Summary	44
4.2 Index of Remoteness Analysis	44
4.3 Frequency and Duration of Outreach Visits	46
4.4 Examinations, Dispensing, and Outcomes Reported.....	48
4.5 Provider Perceptions of the Current State of Outreach Optometry	50
4.5.1 Current supply of outreach services	50
4.5.2 Demand for services	53
Chapter 5 Provider Experience	54
5.1 Motivators	54
5.2 Relationships	55

5.3 Challenges and Enablers.....	59
5.3.1 Inherent Challenges	59
5.3.2 Actionable Challenges and Enablers	61
Chapter 6 Discussion, Recommendations and Conclusions	71
6.1 Discussion	71
6.1.1 Providing visibility to various outreach efforts	71
6.1.2 Access to equipment.....	72
6.1.3 Geographic spread of outreach services	73
6.1.4 Outreach services in 2022	74
6.1.5 Costs incurred during outreach visits	77
6.1.6 Improving service delivery	78
6.2 Recommendations	80
6.3 Implications and Future Directions	81
6.4 Strengths and Limitations.....	83
6.5 Conclusions	86
References	87
Appendix A Questionnaire Tool	104
Appendix B Semi-structured Interview Guide	112

List of Figures

Figure 1.1: Trends of NIHB vision care benefit expenditures in Manitoba and Saskatchewan.....	8
Figure 2.1: Thesis methodology schematic.	12
Figure 3.1: Relationship duration between communities and optometrists.....	22
Figure 3.2: Primary community contacts reported as a proportion of total responses.	23
Figure 3.3: Primary transportation methods by optometrists providing outreach care as a proportion of total responses per province	24
Figure 3.4: Aggregate visualization of distance and direction travelled by optometrists providing outreach care in British Columbia, Saskatchewan, and Manitoba.	25
Figure 3.5: Frequency distribution of Euclidean distance estimates between participants' primary clinic location and communities reported per province.....	26
Figure 3.6: Optical management for outreach optometry as a proportion of total responses per province.....	29
Figure 3.7: Self-reported costs associated with optometry outreach visits as a proportion of total costs reported per province.....	31
Figure 3.8: Thematic summary of the logistics of outreach optometry.....	32
Figure 4.1: Index of Remoteness (IR) of communities visited for outreach optometry care in 2022. .	46
Figure 4.2: Number of outreach clinic days per month (2022)	47
Figure 4.3: Frequency of repeat community visits (2022)	48
Figure 5.1: Descriptive summary of challenges and enablers of providing outreach optometry within Indigenous communities.....	62
Figure 5.2: Proportional reporting of actionable challenges associated with providing outreach optometry care to Indigenous Communities in British Columbia, Saskatchewan, and Manitoba.	63

List of Tables

Table 2.1: Questionnaire content.....	16
Table 3.1: Euclidean distance estimations between participants’ primary clinic locations and communities visited.....	25
Table 3.2: Equipment availability reported for optometry outreach visits.....	27
Table 3.3: Summary statistics of self-reported costs associated with travelling to provide outreach optometry care.....	30
Table 3.4: Pre-planning outreach optometry clinics within Indigenous communities.....	36
Table 3.5: Setting up external optometry clinics within Indigenous Communities.....	39
Table 3.6: Administrative tasks following optometry outreach visits in Indigenous communities.....	42
Table 4.1: Summary of outreach eyecare reported (2022).	44
Table 4.2: Index of Remoteness for communities reported (2022) compared to provincial ranking (2021).	45
Table 4.3: Duration of outreach visits reported (2022).	48
Table 4.4: Examinations and dispensing reported for outreach optometry visits (2022).	49
Table 4.5: Top 5 eye and vision conditions encountered during outreach visits per province.....	50
Table 5.1: Inherent challenges of providing outreach eye and vision care within Indigenous communities.....	60

Chapter 1

Background and Rationale

1.1 Optometry in Canada

1.1.1 Primary eye and vision care

Optometrists are the primary eye care professionals in Canada^{1,2} that provide comprehensive eye and vision care. Optometry care includes the early detection and prevention of vision impairments, management of refractive errors, and diagnoses and treatment of eye disease.¹ Research supports regular eye examinations as an effective preventative health care service.^{3,4} Vision threatening ocular diseases, such as diabetic retinopathy, glaucoma, and age-related macular degeneration, may be asymptomatic before the onset of irreversible vision loss.⁵

Preventing and slowing the progression of visual impairment is a national and global priority.^{4,6} Preventative health care has been declared as a federal priority to guide health care policies in Canada.⁷ The declaration from the Public Health Agency of Canada recognizes that all stakeholders in healthcare have a role to play to achieve holistic health and wellness in Canada, which includes the eye and vision care provided by optometrists in Canada.

Investments in upstream, preventative care improves public health outcomes, reducing the demand and utilization of tertiary care.⁸ It is reported in 2019 that costs associated with vision loss and blindness totalled \$32.9 billion dollars.⁹ Analysis of costs per patient with vision loss ranges from \$9,577 per person with mild vision loss to \$14,736 per person with severe vision loss.⁴ The utilization of eye care varies across the provinces,^{10,11} partially explained by inconsistent public coverage for optometry services within each jurisdiction.^{12,13} The Canadian Association of Optometrists, along with various other non governmental stakeholders, advocate for appropriate coverage and reimbursement of eye care services, making the case for the economic impact on the wider health system in Canada.⁹

1.1.2 Access to eye care

Rural, remote, and Indigenous populations across Canada experience disproportionate barriers to access primary eye and vision care provided by optometrists.^{14,15} Canada is a settler-colonialist country established on Indigenous land. Inuit, Métis, and First Nations are the three main Indigenous

groups across Canada. The term “Indigenous” will be used when referring collectively to the three groups, as per constitutional denomination.¹⁶ The rural population in Canada is 6.6 million,¹⁷ representing approximately 18% of the total population. Over half of the population living in government identified Indigenous communities live within the most rural and remote areas along the index of remoteness classifications.¹⁷ There are different definitions to delineate between rural, remote, and northern,¹⁸ where the regions of focus within this project are broad across the three definitions to represent outreach optometry within any non-metropolitan Indigenous community.

The distribution of the optometry workforce is widespread but generally favours the higher population density cities within the country. A geographic availability study¹⁹ reports that primary clinic locations (2017 data) are clustered within and surrounding urban areas across Canada,¹⁹ where 79% of optometry clinics are located in census defined urban areas. The remaining 21% of clinics are in rural areas, with 8.9% located in the most remote and isolated areas. Throughout this project, remoteness is classified through the degree of metropolitan influence, ranging between high metropolitan influence zones (semi-urban) to weak metropolitan influenced zones (remote/isolated).^{20,21} The breakdown of rural primary optometry clinic locations in Canada is as follows: 11.2% of clinics are in strong metropolitan influenced zones (MIZ), 1.7% in moderate MIZ, and 7.2% in weak MIZ (2017 data).¹⁹ This data does not account for the distribution of optometry care outside of conventional bricks and mortar optometry clinics.

There is limited data on the utilization of eye and vision care by Indigenous populations. Research by the Canadian National Institute for the Blind reported that one-third of the Indigenous population in Canada had not met the national guideline frequency for a comprehensive eye examination between 2014-2015 despite availability of eye and vision coverage for 80% of the Indigenous population in Canada.^{1,22} The academic literature on access to eye care is also limited. A review by Asare et al., (2019) concludes that there are no studies published on utilization of eye care for the least populated or resource limited areas of the country between 2005 and 2017.²³ This literature gap continues beyond 2017. There is a trend in the national-level utilization literature to use the Canadian Longitudinal Study on Aging (CLSA) as a data source for the self-reported use of eye care in adult populations.^{10,11,24,25} This literature provides a valuable overview in the absence of a coordinated effort across all eye and vision care stakeholders, though there is a significant limitation in the generalizability of this data, namely that the CLSA does not survey Indigenous reserves in Canada. Additionally, the surveys’ supplementary sampling efforts occur in close proximity (25-50

kilometres) to urban areas,^{10,25} thus excluding representation of populations with potential unmet eye and vision care needs.

Patients may have to travel to urban centers to access care, where medical relocation may be the only option for patients with frequent and complex medical needs.^{26,27} Accessing care can create a significant economic and wellness burden for the patients who may need it the most.²⁸ Currently, the main barriers of access to primary eye care in Canada are from inadequate workforce supply, lack of public awareness, availability of eye care services, regularity of services, affordability, physical accessibility¹³ and sociodemographic characteristics of patients, such as age, socio-economic position, and level of education.¹⁹

In order to improve access to care, a curated solution to address the knowledge and service delivery gaps specific for Indigenous primary eye care is essential.^{6,14,29,30} Canada is one of many high-income countries that has yet to publish a comprehensive report on the vision health outcomes of Indigenous populations.²⁹ Fragmented reports conclude a higher incidence of ocular disease and vision impairment, specifically myopia, astigmatism and diabetic retinopathy.³¹⁻³⁷ It is also important to consider that medical researchers tend to focus on negative health outcomes for Indigenous people.¹⁴ Therefore, efforts to write a comprehensive report must acknowledge the importance of holistic community-based inquiry to provide meaningful and relevant evidence about eye and vision outcomes for Indigenous populations in Canada.

The national representatives of the profession of optometry in Canada acknowledge a vision health disparity and have made commitments for meaningful action. The Federation of Optometric Regulatory Authorities of Canada (FORAC/FAROC) has signed a declaration of commitment towards the Truth and Reconciliation Commissions' Calls to Action in Health,³⁸ to promote cultural safety.³⁹ The Canadian Association of Optometrists' (CAO/ACO) strategic directions for 2023-2026 includes a priority to "Enhance access to vision care services for Indigenous and underserved communities." The importance of improving eye and vision health outcomes for all populations in Canada in general is reflected in bipartisan support for Federal Bill-C-284-441 for a national strategy for eye and vision care.

Tele-optometry may be a promising tool to complement in-person eye and vision care to increase year-round access.⁴⁰⁻⁴² Tele-optometry is defined by the FORAC as: "*The provision of vision and eye health services that are delivered within the scope of practice of optometry using electronic health*

*information, medical and communication technologies, and where the provider and patient are separated by remote distance.”*⁴³ Tele-optometry may be synchronous (i.e. real-time) or asynchronous (i.e. store-and-forward), or a hybrid combination of synchronous and asynchronous.⁴⁴ Literature on comprehensive primary care tele-optometry is limited.⁴⁰ As tele-optometry continues to expand, an evidence-based approach to the development and implementation will help to ensure optimal benefit and efficacy of the technology. Developing the evidence-based guidelines and policy to support safe and equitable implementation of tele-optometry is a priority for the profession.⁴⁵ Health service assessment will be an important line of inquiry to ensure the safe, patient centered,⁴⁶ culturally sensitive⁴⁷, and sustainable use of tele-optometry within rural, remote, and Indigenous communities.^{29,48-50}

1.1.3 Optometry outreach

For communities that do not have a nearby optometry clinic, optometrists periodically travel outside of their primary clinic location for outreach care to help meet the need for eye and vision care.³⁰ The approach to coordinate outreach care is fragmented¹⁴ as individual optometrists provide this care in isolation from one another and develop individual relationships with the communities that they visit. As a result of this siloed approach, optometrists may have different processes and experiences for how they plan and provide outreach visits.

To take meaningful action towards improving year-round access to eye and vision care for rural, remote, northern, and Indigenous communities in Canada, the first step is to begin characterizing optometry outreach efforts. Process factors, personal factors, and environmental factors influence the delivery of community outreach services.⁵¹ Within this project, process factors include the logistics of planning outreach visits, personal factors include the experiences of participating optometrists, and environmental factors relate to the context, influenced by supporting programs, professional support, and community context. These factors are not well represented within the current literature, therefore deliberate assessment of the current state of outreach care will address a literature gap⁵² of the current state of outreach care in optometry.

1.2 Project Context

The initiative to characterize outreach care provided to Indigenous communities (or nearby rural communities) has been supported through partnership between the University of Waterloo School of

Optometry and Vision Science (UWOVS) together with three provincial professional associations: the British Columbia Doctors of Optometry (BCDO), the Saskatchewan Association of Optometrists (SAO), and the Manitoba Association of Optometrists (MAO). Of note is that the SAO and MAO are responsible for self-regulation of the profession like the role of the Colleges within other provinces. Understanding the facilitators, process, and barriers of providing rural optometry service will provide the profession with valuable insight to support improvements in service delivery and access to care. The results presented within this thesis will be of interest to the professional colleges and associations of optometry, optometrists who are interested in providing outreach care, and payors that reimburse for eye and vision care services.

1.2.1 Engagement strategy

Relationships between UWOVS and the provincial colleges and associations have been leveraged to support this project and to facilitate strategic conversations about the long-term commitment to improve rural, remote, and Indigenous eye and vision health equity. Solutions to improve access rely on engagement and co-development with participating stakeholders. A Model through the framework of community based participatory research (CBPR) is applied.^{53,54} Relevant stakeholders included: academic partners (UWOVS, the only English language optometry school in Canada), professional associations and colleges, optometrists, community partners (e.g. tribal council members, health center representatives), and patient partners (e.g. Elders, patients, care-givers). The conceptual logic model of CBPR^{53,54} presents 4 iterative steps: 1) understanding the context, 2) understanding group dynamics to develop equitable partnerships, 3) appropriately developing and implementing interventions/research to then 4) to measure outcomes and repeat the cycle.^{53,54} The project presented is the first evaluation to support the contextual understanding of outreach care to support inquiry of health inequities in eye and vision care for Indigenous and rural communities.

Engagement with optometrists is essential to provide context to outreach optometry care. In parallel to this project, participating partners continue to identify community health priorities and foster capacity and readiness^{53,54} for the next steps towards meaningful and appropriate interventions for primary eye and vision care within rural and Indigenous communities. Regular meetings between UWOVS and the provincial associations has supported the line of inquiry and relationship building necessary for an appropriate approach towards co-developed projects with Indigenous communities who have already identified that eyecare is a priority.

Despite the focus on optometry service delivery and provider experience for this project, the cultural context of this study is equally important. Thorough consideration has been reflected in the design of this project including guidance from the TCPS2 Chapter 9 (2022),⁵⁵ and the First Nations Information Governance Centers (FNIGC) OCAP Principles ©.⁵⁶ Future work will be refined iteratively as guidance is shared by community about their preferences and priorities. Neither TCPS2 nor FNIGC are a one size fits all checklist for an appropriate research strategy.

The FNIGC provides guidance for the use of Indigenous data under OCAP ©, which is an acronym for Ownership, Control, Access, and Possession as the pillars to uphold First Nations data sovereignty to protect against the misuse of First Nations data by non-First Nations organizations and researchers. For this project, identifiable Indigenous information collected would be the names of communities that receive outreach care. However, data obtained is of low risk for harm or unintended consequences. Data is further protected by reporting in aggregate for each province to protect community privacy. Optometrist participant identity is anonymized to reduce the risk of secondary identification of communities visited for outreach optometry care. It is not within the scope of this study to consult with the 68 communities identified across the three provinces. Aggregating the data supports the purpose of evaluating the context of outreach service delivery, without the intention to research or represent the experience of any Indigenous community or person.

1.2.2 Funding models

Each participating province has its own vision care benefit scheme through the publicly funded health system administered by the respective provincial Ministry of Health. In Canada, private insurance is the primary payor for most of the population, while provincial insurance and other national programs are secondary payors or payors of last resort. This section provides context to Indigenous eye and vision care coverage within each province.

1.2.2.1 Eye care benefits

1.2.2.1.1 Ministry of Health Eye and Vision Care Benefits

All three provinces have provincial coverage for routine comprehensive eye examinations for all children (*defined as ≤18 years of age in BC and MB, <18 years of age in SK*).⁵⁷ In British Columbia⁵⁸ and Saskatchewan,⁵⁹ children are covered for annual examinations. In Manitoba,⁶⁰ children are covered for biannual examinations. Not all provinces have routine comprehensive eye examination

coverage for adults (*defined as ≥ 65 years of age in BC, and ≥ 64 in Manitoba*).⁵⁷ In British Columbia, adults are covered annually. In Manitoba, adults are covered biannually. In Saskatchewan, only adults who are eligible for supplementary health benefits (ex. Family Health Benefit, Seniors Income Plan, Disability Benefit) are covered annually. All provinces have supplementary benefits for medically necessary care and special populations within the 18-65 age bracket. There is no standard provincial coverage for corrective eyewear in any of the provinces. Supplementary benefit programs provide glasses coverage to special populations eligible under programs such as income or employment support.⁵⁷

1.2.2.1.2 Indigenous Services Canada Non-Insured Health Benefits Program

Indigenous Services Canada (ISC) Non-Insured Health Benefits (NIHB) program⁶¹ is a federal program that provides funding for health care expenses for eligible First Nations and Inuit patients that are not covered under provincial, territorial, or private health insurance. In March of 2021, there were 898,839 First Nations and Inuit people eligible for NIHB funding in Canada:²² 160,954 in Manitoba, 158,785 in Saskatchewan and 17,019 in British Columbia. Of note, the lower number for BC is due to funding transfer to the First Nations Health Authority (*See section 1.2.2.1.4*). Clients eligible through NIHB represent 80.32% of the First Nations and Inuit population represented in the 2021 census of population.⁶²

The NIHB vision benefit covers routine comprehensive eye examinations annually for clients with conditions that affect the eyes and clients under eighteen and greater than sixty-five. Examinations are covered every two years for clients between eighteen and sixty-five. The schedule of benefits outlines eligible services and is standard for clients across Canada. The reimbursement schedule is different for each province, with differing reimbursement for examinations and glasses. Corrective eyewear is covered annually for clients under eighteen and biannually for clients greater than eighteen.¹⁹

The timing of the Covid-19 pandemic had a significant impact on the delivery and utilization of all medical care.²² Vision care expenditure reports from NIHB suggest that there is a pent-up demand for eye care services, resulting from the Covid-19 pandemic. In 2020-21, the vision care benefit represented 2.7% (\$39.9 million) of NIHB program expenditures,²² which was a 13.2% decrease from the 2019-2020 fiscal year (Table 3.1, NIHB Annual Report).²² Interestingly, the vision care benefit had the second highest decrease in expenditures after dental care expenditures at a 16.5% decrease (\$46.6 million, Table 3.1 NIHB Annual Report).²² Data are publicly available for Saskatchewan and

Manitoba vision care expenditures across a 5-year period, where Figure 1.1 shows an increasing trend of vision care expenditure since 2016, with a drop in 2020-2021 for both provinces.

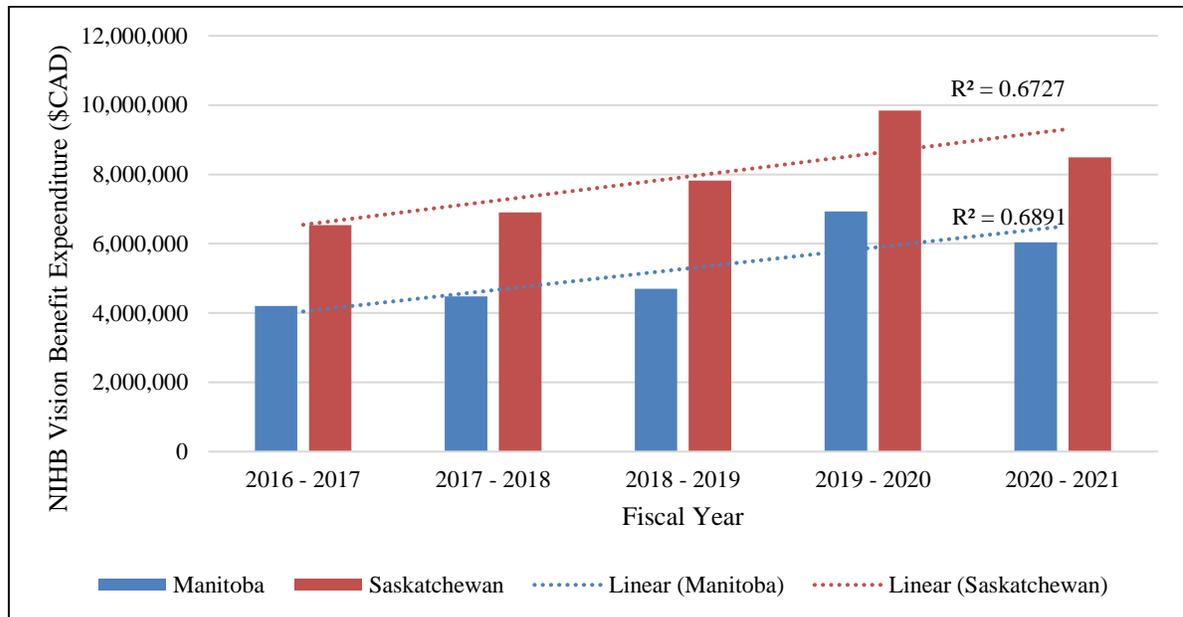


Figure 1.1: Trends of NIHB vision care benefit expenditures in Manitoba and Saskatchewan.

Data excerpted from NIHB Annual Report (2020-2021, page 72, Table 8.2: NIHB vision care expenditures by region. FST adapted by Business Support, Audit, and Negotiations Division).²²

1.2.2.1.3 Non-Status Eye and Vision Care

First Nations and Inuit who are not registered with status, or Métis populations not covered under NIHB, must not be excluded from the discussions to improve access to eye and vision care.

Alternative funding exists, though it is not the focus for this project. For example, Jordan’s Principle is a secondary child-first federal program that reimburses medical necessities (such as glasses) for Indigenous children who are not registered to be eligible through NIHB, or when conflicts between payors arise.⁶³

1.2.2.1.4 First Nations Health Authorities

Health services organization and delivery may be governed or supported by different First Nations Health Authorities in each province, supported by 1989 Health Transfer Policy agreements.^{64,65} The focus for this chapter is on the British Columbia First Nations Health Authority as there they are the primary vision benefit payor for First Nations in BC in lieu of NIHB.

The development of the First Nations Health Authority (FNHA) in 2013 re-assigned the federal responsibility of health services to First Nations leadership, including coverage for 133,430 First Nation clients from NIHB to FNHA.^{22,66} A 2019 transfer of benefits includes a transfer of the vision care benefit from the federally funded NIHB vision care benefit to benefits coordinated through Pacific Blue Cross⁶⁷ for a greater amount of control over the management of benefits, resulting in an overall increase in utilization of benefits and reduced administrative costs.⁶⁶ These efforts to reform health and provide “wrap-around care” (i.e. integrated and coordinated services⁶⁶) for First Nations clients in BC are supported through organizational agreements and cooperation between the FNHA, individual communities, health care stakeholders and the provincial ministry of health.

FNHA provides funding for eye examinations for eligible residents under eighteen every year, and every second year for residents greater than eighteen. FNHA covers corrective eye wear (glasses or contact lenses) once per year for residents under eighteen, and every two years for residents greater than eighteen.⁶⁷ Vision care expenditures through FNHA are not publicly available.

1.2.2.2 Optometry Mobilization Funding

Working towards integrated person-centered care, outreach health care is recognized and praised as a tool to improve access to care, especially for rural, remote, isolated and equity seeking populations.^{52,68} The definition of “outreach” in health is broad and poorly defined in the literature. There is a lack of research to assess the myriad of health-related outreach programs and services.^{69,70} This project follows the World Health Organization definition with outreach services defined as the mobilization (physical or virtual) of health care providers to deliver care within regions outside of where the health care provider primarily lives and works.⁵² This definition is specified to distinguish this work from other community outreach efforts that represent the role of social work within health care utilization and promotion.⁷¹ Typically, outreach services are specific to interventions on health inequity caused by a specific pathology (e.g. diabetic retinopathy), while fewer outreach programs represented in the literature focus on primary, comprehensive, and preventative services and programs in advance of disease development.^{52,69}

Medical outreach services have the potential to decrease costs for the health system; decrease patient travel burdens; improve patient-provider relationships; increase patient confidence in the health system; and improve utilization and outcomes.^{52,72} Mobilization of physicians is supported in Canada through several regional, provincial, and federal programs that incentivize the mobilization of

physicians to travel to remote and isolated communities to provide care. For example, a 2022 article by Donaghy et al., details a rural outreach program to improve access to orthopaedic care for rural patients in Newfoundland and Labrador, funded through the provincial ministry of health.⁷³ In some instances, funding provided to physicians may be extended to other health professionals, such as optometrists, though this is not always coordinated.

NIHB and the FNHA provide reimbursement for medical transportation costs for health professionals to provide services to remote and isolated First Nations and Inuit communities, which includes funding for optometrists to provide outreach visits to eligible communities.²² Eligibility, reimbursement, frequency of funding, and expenditures specific to health care providers including optometry are not publicly available and likely vary by regional office and/or province. Individual communities may fund optometry mobilization as per agreements between the community and provider, information that is not publicly available.

Mobilization funding in British Columbia

British Columbia is unique for having a coordinated program to support the provision of comprehensive primary vision care provided by visiting-optometrists. With funding from the BC Ministry of Health, The BCDO initiated a Rural Access Program (RAP) in 2019 to improve access to eye care for underserved rural and Indigenous communities across the province. The program was modelled after the British Columbia Northern and Isolation Travel Assistance Outreach Program (NITAOP) for travelling physicians^{74,75}, to reimburse costs incurred by optometrists who travel outside of their offices to provide care within rural and First Nations communities that are greater than 75 kilometres away from a bricks and mortar optometry clinic. The program is not exclusive to Indigenous communities, thereby covering visits to First Nations populations who live off-reserve but still within a rural area. The rural access program reimburses eligible expenses for accommodation, food, transportation, and time spent travelling to community. The BCDO RAP has sparked a conversation for the support and delivery of optometry care in rural and Indigenous communities across the country.

The BCDO are using their funding to prepare for the use of tele-optometry as virtual outreach, in complement to in person visits. Currently, three tele-optometry enabled lanes are used for in-person outreach care as all equipment is compatible for both uses. As trusted patient-provider relationships

are established and continue to build, tele-optometry can serve as a tool to bridge gaps in year-round access.

1.3 Thesis Aim

Objective

The overall objective of this thesis is to benchmark the current state of outreach optometry care provided to non-metropolitan Indigenous communities in British Columbia, Saskatchewan, and Manitoba. The current state of outreach practice is modelled through characterizing the trends of outreach clinic logistics, number of outreach clinics provided across one year (2022), and by collating optometrist's experiences providing outreach care.

Research questions

1. What is the process to provide optometry outreach care within Indigenous communities?
2. What is the current state of optometry outreach service delivery to Indigenous communities?
3. What are the challenges and enablers reported by optometrists who provide outreach care to Indigenous communities?

Chapter 2

Methodology

2.1 Methodology Justification

Mixed methods research is a strategy to assess systems within health care service delivery.⁷⁶⁻⁷⁸ This study followed a measurement scaling⁷⁹ approach. Quantitative questionnaires were coupled with qualitative interviews to collect data on provider experiences and understand the quantitative information within the social context that it exists.⁷⁹ Thesis methodology is summarized within Figure 2.1.

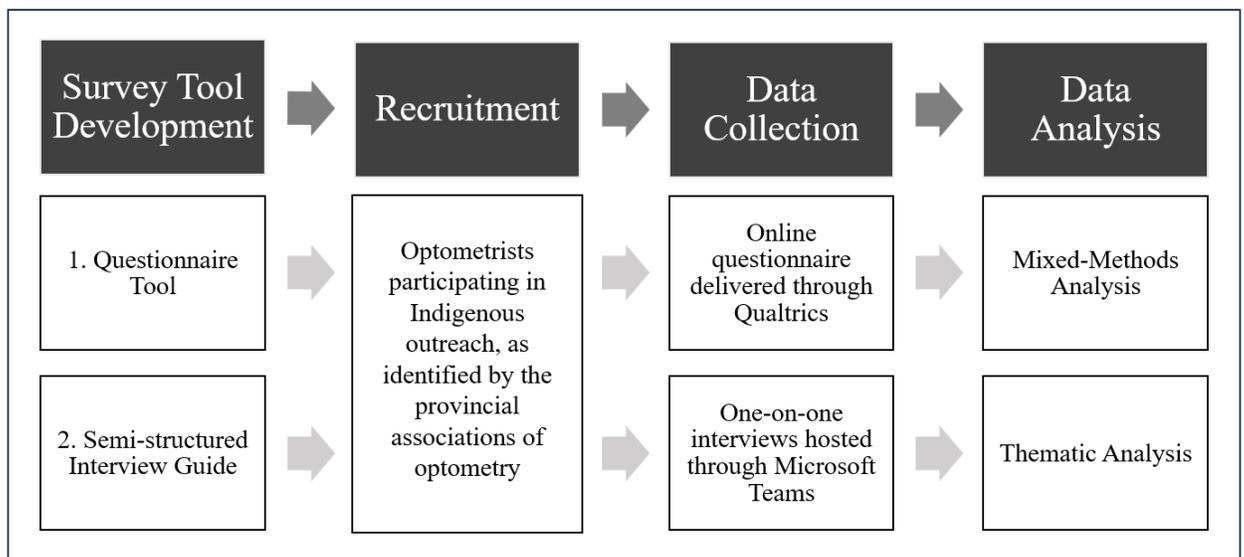


Figure 2.1: Thesis methodology schematic.

2.2 Ethics

The study was reviewed and received approval from the University of Waterloo Research Ethics Board (ORE: #44390). Information letters detailed the purpose of the study and information about how the data would be used. Informed consent for questionnaire participation was obtained before the questionnaire was accessed. Informed consent for interview participation was obtained before interviews were scheduled. Both consent forms included details on how to withdraw from the study at any time before the anticipated completion date. The consent form for the semi-structured interview

included options to consent for audio recording, transcription, quote inclusion and for review of selected quotes.

2.3 Participants

The target population of this study was the optometrists who travel outside of their primary clinics to provide primary eye and vision care to First Nations either on-reserves or through nearby rural communities. Engagement with the professional associations and colleges of optometrists supported the study by identifying the target population within each province. The target populations varied slightly between the provinces because of the different data collection processes maintained by the individual organizations.

The British Columbia Doctors of Optometrists (BCDO) identified relevant participants as members who utilized BCDO Rural Access Funding. The funding provides reimbursement of expenses associated with providing community outreach optometry to rural and First Nations communities that are greater than 75 kilometres away from a bricks and mortar optometry clinic. Of the 942 optometrists in British Columbia,⁸⁰ fourteen optometrists were identified as providing outreach optometry. It is possible that this is lower than the true number of eligible optometrists in BC, as the rural access funding program was newly established, in Spring 2021.

The Saskatchewan Association of Optometrists (SAO) and Manitoba Association of Optometrists (MAO) serve as the regulatory body for these provinces. Both associations identified relevant participants through annual mandatory surveys. Outreach optometry was reported by fifteen of the 190 optometrists in Saskatchewan,⁸⁰ and seven of 192 optometrists in Manitoba.⁸⁰ It is likely that these numbers are a true representation because of the 100% response rate from college mandated data collection.

2.4 Participant Recruitment

Due to the exploratory nature of the study, non-probability sampling⁸¹ was used to obtain voluntary responses from the small, but engaged, target population. Recruitment for both questionnaires and interviews were sent out via email from the research team, facilitated by a neutral member from the provincial associations to the entire target population of eligible optometrists in BC (n=14, was originally n=12 at time of questionnaire recruitment), SK (n=15), and MB (n=7). Email recruitment included a recruitment script and the study information letter. The survey invites were sent out first.

Within the first 1.5 months of questionnaire recruitment, it became apparent that an overall response rate of approximately 40% for each province would be an attainable goal. There was no pre-planned goal for minimum acceptable questionnaire response due to the exploratory nature of the environmental scan. After ~40% survey response rate was achieved from each province (n=5/12 in BC at the time of questionnaire collection, n=6/15 in SK, and n=4/7 in MB), interview invites were sent out in the same manner as the questionnaire invites to the original target populations from the province, regardless of whether the individual had completed the questionnaire. In addition, individual email invitations were sent to eligible optometrists who had already completed the questionnaire.

To ensure adequate sampling for qualitative semi-structured interviews, a recruitment goal of minimum three optometrists per province was justified by the qualitative sample size assessment theory of “Information Power.”⁸² According to the theory, fewer participants are needed for studies that are narrow and specific, according to a continuum across 5 domains of the research design.⁸² In this study, the aims⁸² are narrow and specific – to characterize the stepwise process of optometrists who provide outreach care. Limited numbers of optometrist participate in outreach care and the knowledge of the participants⁸² is highly specific to this activity. The quality of interview dialogue⁸² is expected to be high because of the willingness to participate from the experienced target population. It is anticipated that there is a likelihood of early data saturation as participants within each province share experiences and may have learned from each other to develop their processes for providing outreach care. Information power would suggest a medium sample size for studies that are exploratory and include case and cross-case analysis, defined within this project as a minimum of 9 total interview participants.⁸²

2.5 Questionnaire

2.5.1 Questionnaire development

The questionnaire was developed internally. Initial question set and themes were compiled by Dr. John Lam (JL), Dr. Stanley Woo (SW), and Adrianna Warren (AW). Both JL and SW have expertise in optometry and providing optometry care, where JL has expertise in rural outreach optometry. AW has completed a course-based graduate diploma in community health and humanities with a focus on rural, remote, and northern health services.

The question set was refined through iterative development with feedback from eligible optometrists, to capture the critical elements of providing outreach care from start to finish. The first version of the question set was shared and piloted with the original group of intended participants, rural optometrists in BC, during an in-person meeting held in May 2022. Stakeholders from Saskatchewan and Manitoba were not engaged at this point in the study design. AW explained the purpose of the survey and presented the major themes for discussion. Participants were provided with paper and electronic copies of the survey to provide feedback on the content, language, length, and layout. Group members were given two weeks to review the survey and provide a first round of feedback over e-mail. Some group member provided verbal feedback following the introduction. The survey was modified to incorporate this feedback and sent back for a second round of review over another 2-week period.

The feedback provided by the stakeholder group included the addition of questions to report the distance travelled to each community, if equipment is shared with community, addition of questions about dispensing glasses. Feedback included edits to the language for clarity and content validity of questions. Additional feedback was provided in relation to the cultural context of Indigenous outreach care in British Columbia. For example, the question “How often do your patients see you” was edited to acknowledge the experience that many community members spend time on and off-reserve throughout the year and therefore may receive care in urban areas.

Following stakeholder feedback, the survey was shared with Dr. Elizabeth Irving (EI) for review. The final version was shared with the University of Waterloo Survey research center for a consultation on question clarity and organization. The final survey had 25 primary questions for participants to complete for each community that they report visiting, capturing information on the logistics of providing care, retrospective visit summaries, and the costs associated with providing care. Table 1 presents the question categories within the questionnaire. A copy of the complete survey is included in Appendix A.

The final question set was coded into Qualtrics (<https://www.qualtrics.com/>), an online survey platform hosted by the University of Waterloo. There is a mix of open-ended questions, multiple choice questions, matrix input questions, numeric questions, and a final open ended paragraph question. The questionnaire is being released for the first time within this study. Responses collected and data quality will inform additional improvements to the questionnaire content and delivery.

Table 2.1: Questionnaire content.

Category	Sub-categories
1. Logistics	i. Community relationships ii. Distance Travelled iii. Equipment iv. Clinic location v. Administration
2. Current State of Service Delivery	i. Geographic distribution ii. Timing iii. Outcomes iv. Optical services
3. Economics	i. Reported costs ii. Exam reimbursement

2.5.2 Questionnaire protocol

Data collection began in January 2023. The survey remained open for BC and SK optometrists through February, March, and April. Data collection for MB optometrists was completed between April and May. Reminders for participation were sent at regular intervals with support from the provincial associations.

2.5.3 Questionnaire data analysis

2.5.3.1 Data Processing

Survey data were downloaded from Qualtrics and manually inputted into excel files, separate of the identifying information. Survey length made automated download into CSV files from the online survey platform not possible, thus inputting a manual step that is a potential source of error. Data

were separated by theme within separate sheets. Results from each province were kept separate to facilitate sharing with the professional associations, as per data transfer agreements.

Cost data was analyzed to compare fly-in and drive-in visits and to identify the average cost per clinic day from the total costs reported. Cost data was reported for a single visit. Communities with cost data reported that were missing the corresponding number of clinic days were excluded from the analysis. It was assumed that the costs reported for a single visit represented the average cost per visit for a given community. For communities with multiple visits, the total costs associated with outreach care across one year were obtained by multiplying the total number of visits by the costs reported for one visit.

Additional analysis occurred for the question “Please list the top 5 eye conditions diagnosed at your clinic amongst your patients in [community name] and the approximate percentage. Examples include refractive error, diabetic retinopathy, cataract, glaucoma, and binocular vision dysfunction.” The question was open text, resulting in a range of responses. Open-ended text responses were aggregated into general categories. For example, amblyopia and strabismus were categorized into binocular vision conditions, where only one rank value was retained to reduce over-representation of conditions that were grouped into one. For example, if a participant had reported two different types of refractive error as the top highest and second highest diagnoses encountered, only one rank value for refractive error was included within the analysis. Total ranks assigned for each condition grouping were summed to provide an overall rank for the top eye and vision conditions encountered for each province.

Data collected from Statistics Canada was used to inform secondary analysis of questionnaire data. Index of Remoteness (IR) data for census sub-divisions was downloaded from Statistics Canada.^{20,21} The IR Data were referenced for all the communities reported in the current access survey, to provide context to the classification of remoteness for the locations reported. Fifty percent of the total classified census subdivisions fall within the values of 0.2-0.45, and 3.7% of census subdivisions are ranked above 0.7, representing the highest ranks of remoteness in Canada.²⁰ Therefore, community rankings were related to benchmark values of 0.45 and 0.7 to broadly represent rural and remote communities, respectively.²⁰

Questionnaire data were analyzed through descriptive statistics for each question using Microsoft Excel. Geospatial analysis was performed using an online mapping tool, Zeemaps

(<https://www.zeemaps.com/>). Balancing richness of information and privacy is challenging when dealing with geospatial data in research.⁸³ For the purpose of the project, geospatial data was anonymized and aggregated for participant and community privacy. Exact locations of outreach clinics within each community were not obtained. Considering this data limitation, distance approximations were made using a Euclidean distance tool within the mapping software. Euclidean distances were chosen because route distances were not available for communities that did not have road access (e.g. fly-in only). The results provide an approximation of the mathematical distance in kilometres (kms) between the participant's primary clinic and a non-specific location within each community. As a result, distances reported are likely lower than actual distances travelled. Geospatial data were anonymized by aggregating specific points to a single location to visualize the distance and direction that participants travel in relation to the cardinal directions. Visualization was created using Adobe Illustrator (<https://www.adobe.com/>).

Significance testing was performed for cross case analysis using RStudio V.2022.02.3+492 (<https://www.rstudio.com/categories/rstudio-ide/>). Normality of data was assessed using Shapiro wilks test. Non-parametric test choice was Kruskal-Wallis ANOVA with Dunn's post-hoc correction with Bonferroni adjustment at the 95% significance level. Scheirer-Ray-Hare testing was used as an extension of the Kruskal-Wallis for multi-factorial analysis. For normal data, parametric test choice was Student's T-Test. JASP graphical user interface V.0.16.4.0 (<https://jasp-stats.org/>) was used to create one histogram and box plot visualization.

2.6 Semi-structured Interviews

2.6.1 Interview guide development

The consolidated criteria for reporting qualitative research (COREQ) 32-item checklist for qualitative focus group and interview research⁷⁸ was used as a framework for the planning of the follow-up study design. A brief literature review was conducted to provide context to interview research with rural outreach providers in different medical fields to consider the appropriate theoretical basis for analysis.⁸⁴⁻⁸⁶ The theoretical approach for the interviews were rooted in deductive thematic analysis framework using line by line comparative coding for case comparisons of patterns within the data.^{76,82,87}

One-on-one interviews were selected to capture a greater level of detail than what was captured in the survey and may be discussed in a group environment.⁷⁶ Semi-structured interviews were selected such that participants had the flexibility to talk about what was most important to them in relation to the question prompts. A semi-structured interview guide was created based on the question set and organization of the online questionnaire. The survey questions were reviewed by SW and EI. The survey guide was piloted through a mock interview with thesis committee member, Dr. Andre Stanberry (AS) to ensure question flow, timing, and scope of questions.

The final interview guide (Appendix B) had 9 primary questions with sub-prompts to facilitate discussion of individual provider experiences. An online demographic survey was included to capture information on participants age, years in practice, self report of living in a rural community, and number of communities visited.

2.6.2 Interview protocol

Once consent was provided, participants were then automatically redirected to the Microsoft Teams booking page to schedule a convenient interview slot. Interviews were scheduled between April 09 – May 31st, 2023, through Microsoft Teams, except for one interview that was completed over the phone. Interviews were completed alone, with only the researcher and participant present to hear the conversation. Interviews began with a reminder about the purpose of the study and process of the semi structured interviews. The interviews were recorded and transcribed using the tool within Microsoft teams. The phone interview was recorded using an audio recorder and transcribed using Microsoft Word. Interview guides were formatted and printed to support notetaking during the interview. Notetaking kept the flow of conversation on track, jotting down information that would be revisited for probing before completion of the interview.

2.6.3 Qualitative analysis

Interview transcripts were reviewed immediately following the interview to remove any personal identifiers, transcription of obviously off-topic discussion, filler language and incorrect transcription. Audio recordings were referenced for all edits due to poor transcription quality.

De-identified transcripts were coded manually by two coders, AW and MW through line-by-line coding. AW completed the interviews. MW is an optometry student research assistant. Using highlight tools in Microsoft word, initial coding followed the three major questionnaire themes of

logistics, patient care, and economics. Subthemes were identified individually to allow a greater range of subthemes to come from the data.

Coding was compared between AW and MW to discuss discrepancies until consensus on subthemes were reached between the two coders. A final coding of transcripts was inputted into NVIVO (Version 14, [NVivo - Lumivero](#)) to support analysis of relationships within the qualitative data for data exploration to support case and cross case analysis. A final round of coding separated out the qualitative data that are specific to the process of providing care, to be presented in complement to the questionnaire data (*Results Chapter 3+4*). Themes of experience, challenges and enablers were coded separately for a qualitative investigation on provider experience providing outreach care (*Results Chapter 5*). Themes from the data are presented through a narrative account, utilizing quotes from participants.

Themes and sub-themes presented within the first draft of results were discussed between AW and supervisor SW. Both members of the research team have a broad understanding of outreach care. Naming conventions for themes and sub-themes were improved to better represent the data reflected within each thematic category. Names were improved to be more concise or descriptive to reduce potential for misinterpretation. For participants indicating quote review upon consent, quotes that were selected for potential use in either section were sent back and approved to ensure that context and integrity was maintained.⁸⁵

Chapter 3

Outreach Visit Logistics

3.1 Study Participants

A total of 15 questionnaire responses were received from eligible optometrists: 5 from British Columbia, 6 from Saskatchewan, and 4 from Manitoba. It was identified that participants who work through the same clinic submitted a single response for 2/5 completed questionnaires from British Columbia. The resulting questionnaire response rate is 57% (8/14) from British Columbia, 43% (6/15) from Saskatchewan, and 57% (4/7) from Manitoba.

The Questionnaire was repeated for each community that a participant reported visiting. Within the 15 responses, the question set was complete 64 times, representing 96 visits and 312.5 clinic days for 64 different Indigenous communities in 2022. For one optometry team from British Columbia, an exception was granted to receive survey responses through an excel file to facilitate ease of reporting results for multiple communities. As a result, responses were missed for some questions that did not appear within the question set unless certain criteria in previous questions were reported. The response rates for specific questions (*n*) are reported per community represented. There are indicated exceptions where the response rate was reported per participant.

A total of 11 semi-structured interviews were completed: Of the 11 interview participants, 9 (80%) had also completed the questionnaire. The resulting interview completion rate is 35.7% (5/14) from British Columbia, 26.6% (4/15) from Saskatchewan, and 28.5% (2/7) from Manitoba.

Participant demographics

Ten of eleven interview participants completed a demographic survey. Participants ages ranged from 31 to 45.5 years (median = 45.5), 70% of participants identify as male and 30% identify as female. Years in practice as an optometrist ranged from 6 to 36 years (median = 21 years), and years providing outreach care ranged from 1 to 35 years (median = 7.5 years). Number of communities visited for each participant ranged from 3-10 (median = 7), with one respondent reporting 10+. Most interview participants had reported living in a rural area (60%), compared to those that had not (40%).

Due to the variance in the participants experiences providing outreach care and the flexible nature of semi-structured interviews, there was a high degree of variance in the qualitative data captured. Participants were reminded that they may spend time talking about what is most important to them. This

must be kept in mind when interpreting any qualitative interview results presented within any chapter of this thesis.

3.2 Logistics of Optometry Outreach

Results informing the logistics of providing outreach optometry come from mixed-methods questionnaire data and a subset of qualitative interview data. Questionnaire results are presented first, followed by interview results.

3.2.1 Relationships between optometrists and communities

The duration of relationships between participating optometrists and communities reported range from newly established connections to long-standing relationships. Overall, participants reported relationship durations reported ranged from 1 month to 31 years (median 3.875 years, n=36). Newer relationships (0-3 years in duration) were reported for 36% of all communities. Mid-duration relationships (4-9 years) were reported for 50%, and longstanding relationships were reported for 14% of communities represented.

There are general trends for relationship durations reported within each province. British Columbia participants primarily reported mid-duration relationships. Longstanding relationships (>10 years) represented 25% of reports from Saskatchewan and Manitoba participants. Figure 3.1 shows the number of communities reported in each relationship duration category for each province.

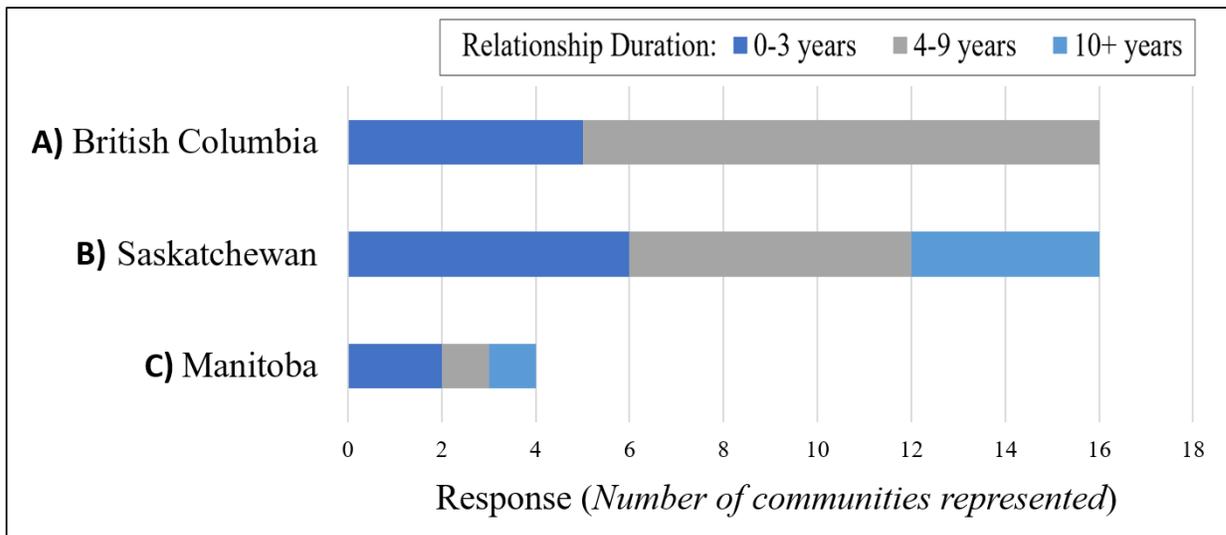


Figure 3.1: Relationship duration between communities and optometrists. Relationships between visiting optometrists and communities receiving outreach care in BC (n=16/44), SK (n=16/16), and MB (n=4/4).

Optometrists coordinate with community contacts to plan outreach visits. Overall data shows that health directors and nursing station staff were reported as the most frequent community contact by participants from all provinces (Figure 3.2). There are differences in primary contacts reported per province. Participants from British Columbia reported coordinating with health center staff exclusively (100% combined). In addition to health center staff, participants from Saskatchewan frequently (36%) reported school contacts as the primary community connection. School visits were not reported by participants from British Columbia or Manitoba. Saskatchewan participants also reported connections with tribal council members (4%) and community Elders (4%) to plan their visits. Participants from Manitoba reported primarily coordinating with health center staff (80% combined). Unique to Manitoba, is coordination with an independent optician who is established within a rural community. The optical does not have a resident optometrist and serves as a visit site for optometrists to provide exams to patients from the nearby surrounding Reserves and rural communities.

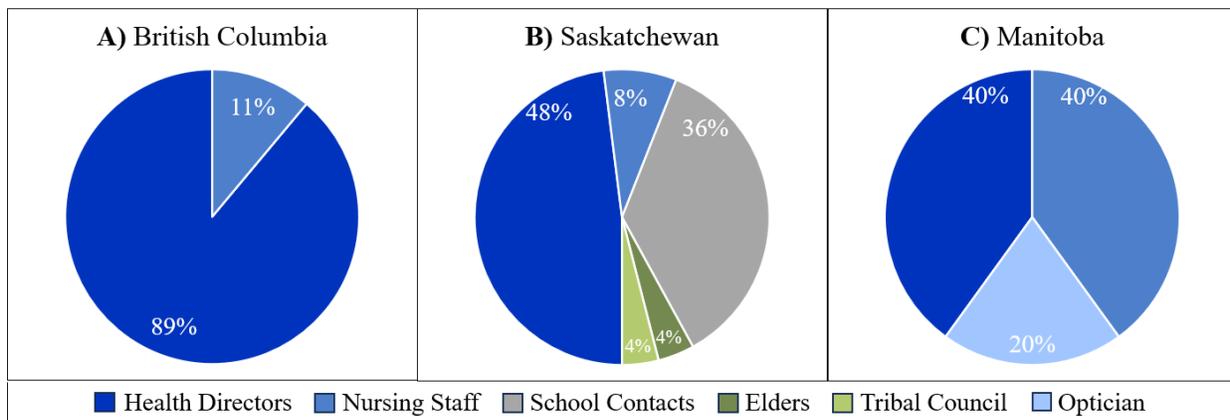


Figure 3.2: Primary community contacts reported as a proportion of total responses. A) *British Columbia: reported for 18/44 communities, B) Saskatchewan: reported for 16/16 communities, C) Manitoba: reported for 4/4 communities.*

3.2.2 Transportation and distance travelled

Participants reported travelling by road, air, and ferry to provide outreach care. Driving (on summer and winter roads) was the highest transportation method reported for all provinces, with some variation amongst combinations of flying and driving on summer or winter roads to reach the communities visited. Transportation is reported per province in Figure 3.3.

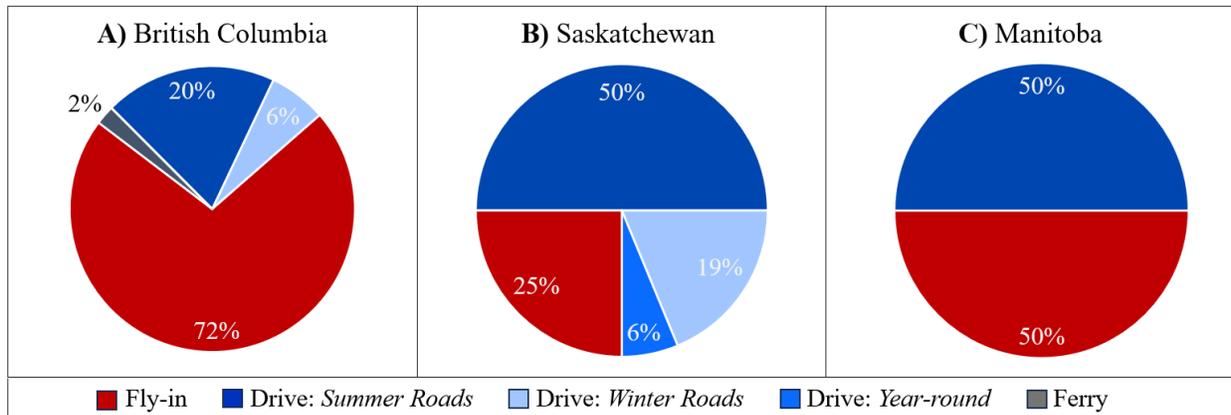


Figure 3.3: Primary transportation methods by optometrists providing outreach care as a proportion of total responses per province. A) British Columbia: reported for 44/44 communities. B) Saskatchewan: reported for 16/16 communities. C) Manitoba: reported for 4/4 communities.

Euclidean distances generated from questionnaire responses provide an interesting visualization of the approximate direction that participants choose to travel to provide outreach care. Participants from all provinces showed an overall Northern travel path in relation to their primary clinic location. There were subtle differences per province, where participants from British Columbia primarily travel North-West, participants from Saskatchewan primarily travel North-East, and participants from Manitoba primarily travel directly North (Figure 3.4).

Overall, there is high variability of Euclidean distance values (kms) represented from all provinces. Total distances range from 65 to 1405 kilometers (kms), (median: 438 kms, Table 3.1). There was no significant difference between the mean Euclidean distances between the three provinces (ANOVA, $df=2$, $F=0.471$, $p=0.628$), where differences are represented at the participant level, and not reflected at the provincial level. Participants from Saskatchewan had the highest maximum distances travelled (1,405.47 kms, Table 3.1) and the largest ranges reported (1340.55 kms, Table 3.1). Distribution of distance per community per participant (Figure 3.5) shows a positive skew; more participants from Saskatchewan reported travelling to communities that were closer to their primary clinic location. Participants from British Columbia had the second highest maximum distance and range of distances reported (maximum 1104.68 kms, range of 1013.95 kms, Table 3.1).

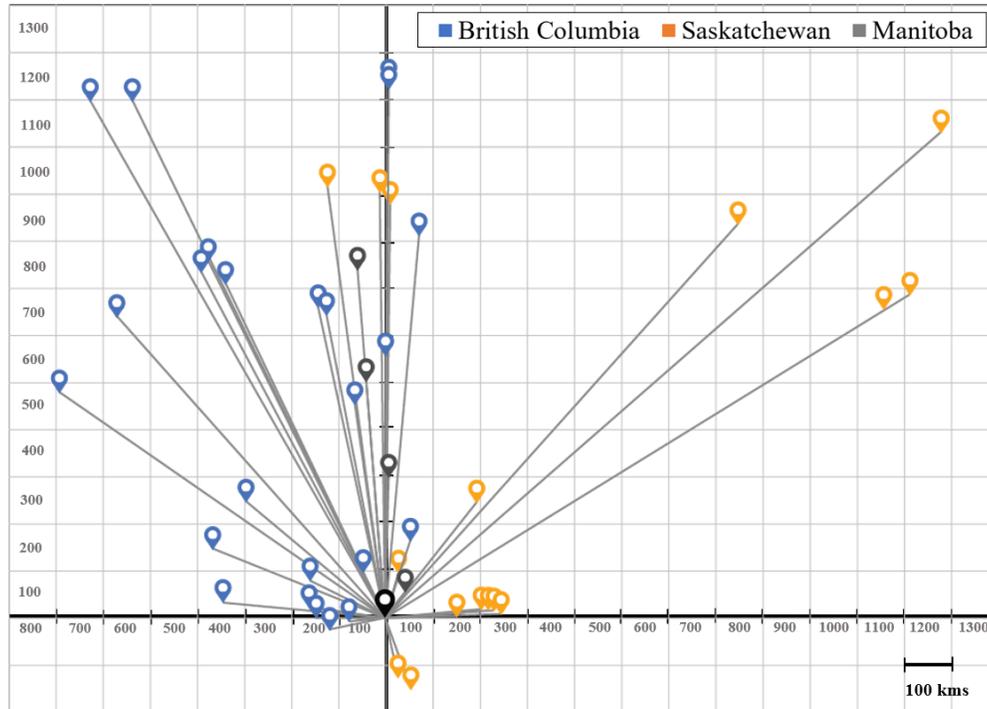


Figure 3.4: Aggregate visualization of distance and direction travelled by optometrists providing outreach care in British Columbia, Saskatchewan, and Manitoba. *Data points are removed from a spatially identifying map image and aggregated to a centrally fixed location across an X,Y grid coordinate.*

Table 3.1: Euclidean distance estimations between participants' primary clinic locations and communities visited.

Euclidean Distance Estimate (kms)	British Columbia n=24/44	Saskatchewan n=16/16	Manitoba n=4/4	Total n=44/64
Range	1013.95	1340.55	595.42	1340.55
Minimum distance	90.73	64.92	64.92	64.92
Median distance	606.465	233.195	369.555	438.485
Maximum distance	1104.68	1405.47	660.34	1405.47
Mean	560.8158333	513.283125	366.0925	525.8291
Standard error	68.39942193	112.8643223	126.944644	56.15906
Count	24	16	4	44

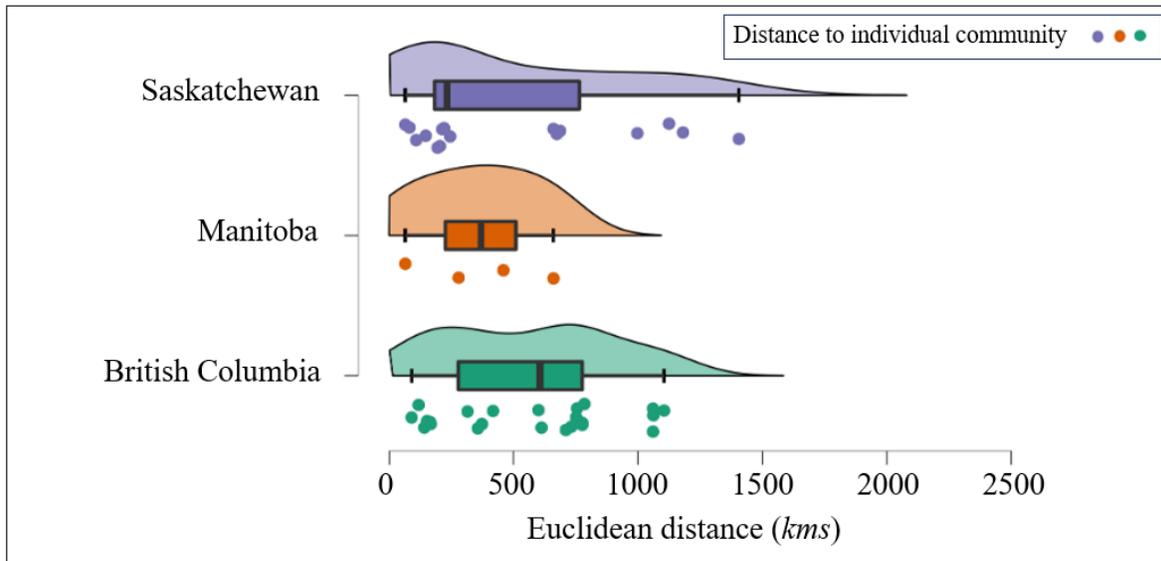


Figure 3.5: Frequency distribution of Euclidean distance estimates between participants' primary clinic location and communities reported per province. Box plots show the mean and range of distance per province. Individual data points are represented for each community reported. Saskatchewan $n=16/16$, Manitoba $n=4/4$, British Columbia $n=24/44$.

3.2.3 Equipment availability

All questionnaire participants reported transporting some, if not all their equipment for every visit. Participants from Saskatchewan did not report leaving any equipment or using any shared equipment ($n=16/16$). Participants in BC and MB reported leaving equipment in community and/or having equipment available to them ($BC n=5/8$ responses, $MB n=1/4$). From a populated list of 23 items, obtained from the British Columbia Doctors of Optometry, participants indicated which equipment they bring with them during outreach visits. Seventy-four percent of equipment and materials were transported for 90-100% of outreach visits. The remaining equipment listed was transported for $\leq 75\%$ of the outreach visits reported. Visual field analyzers and optical coherences tomography devices were the least transported for all provinces (Table 3.2).

Table 3.2: Equipment availability reported for optometry outreach visits.

Equipment	British Columbia <i>n=8/44</i>	Saskatchewan <i>n=16/16</i>	Manitoba <i>n=4/4</i>
Transported <i>(Transported for >90% of visits reported)</i>	Visual Acuity Charts	Visual Acuity Charts	Visual Acuity Charts
	Retinoscope and trial lens set	Retinoscope and trial lens set	Retinoscope and trial lens set
	Phoropter and stand	Phoropter and stand	Phoropter and stand
	Lensometer	Lensometer	Lensometer
	Interpupillary testing device or ruler	Interpupillary testing device or ruler	Interpupillary testing device or ruler
	Prisms	Prisms	Prisms
	Stereoacuity test	Stereoacuity test	Stereoacuity test
	Colour vision test	Colour vision test	Colour vision test
	Direct ophthalmoscope	Direct ophthalmoscope	Direct ophthalmoscope
	Diagnostic pharmaceuticals, stains, dyes	Diagnostic pharmaceuticals, stains, dyes	Diagnostic pharmaceuticals, stains, dyes
	Tonometer	Tonometer	Tonometer
	Penlight/transilluminator	Penlight/transilluminator	Penlight/transilluminator
	Amsler grid	Amsler grid	
	Foreign body removal kit	Foreign body removal kit	
	Condensing lens	Condensing lens	
	Biomicroscope	Biomicroscope	
	Autorefractor		

	Corneal Curvature device		
Occasionally not available <i>(Transported for equal to or less than 75% of visits reported)</i>	Adjunct services (i.e Low vision, contact lens, vision therapy management) ¹ Pachymeter Visual field device Optical coherence tomography device	Autorefractor Corneal curvature device Adjunct services (i.e Low vision, contact lens, vision therapy management) ¹ Pachymeter Visual field device Optical Coherence Tomography Device	Amsler grid Foreign body removal kit Condensing lens Biomicroscope Autorefractor Corneal Curvature device Adjunct services (i.e Low vision, contact lens, vision therapy management) ¹ Pachymeter Optical Coherence Tomography Device Visual Field Device
¹ Response limited by broad categorization of adjunct services			

3.2.4 Dispensing glasses

Dispensing glasses includes the completion of orders and the delivery of glasses to patients. Participants manage the dispensing of glasses following an outreach visit 98% of the time. Within an open-ended text option, one participant reported that dispensing is managed by an independent optician. Participants reported processing orders through their primary clinics and contract labs. Completed orders are sent to the patient through mail/courier to the exam site or patient or delivered by the optometrist in-person during their next outreach visit (Figure 3.6).

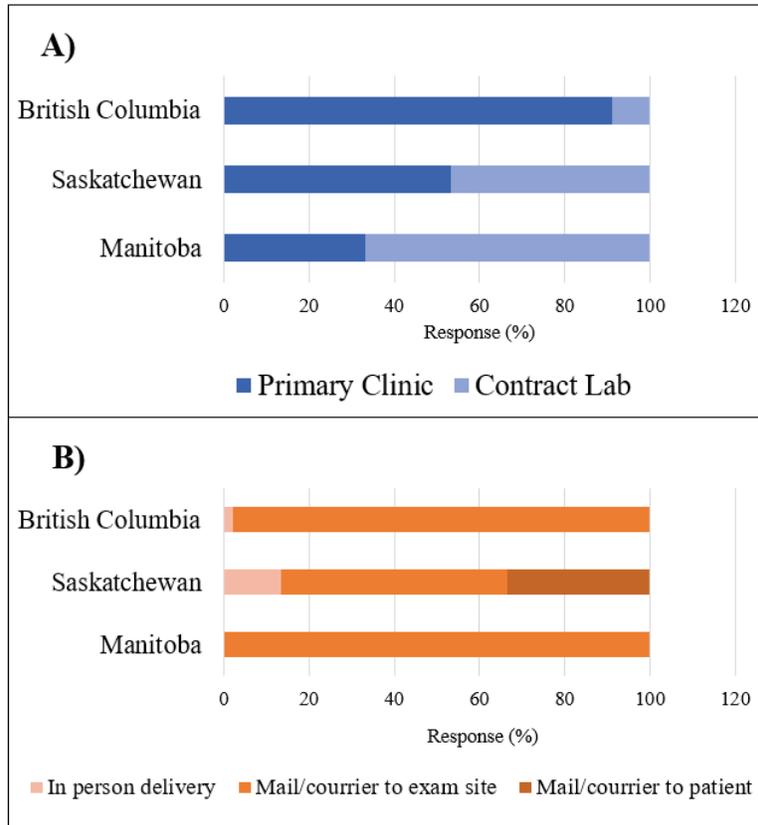


Figure 3.6: Optical management for outreach optometry as a proportion of total responses per province. A) Laboratory location for order processing, B) method for glasses delivery. Question response represents 44/44 BC communities, 15/16 SK communities, and 3/4 MB communities reported.

3.2.5 Associated costs

Expense categories to support outreach optometry include travel, lodging, administration, equipment and materials transport, and miscellaneous costs. Costs were compared between fly-in and drive in communities with associated cost data. Across a similar number of visits, fly-in trips are longer than drive-in trips (185 fly-in days, 75 drive-in days) with a lower cost per clinic day for fly-in clinic days (\$713.80), than drive-in clinic days (\$881.95).

Cost data was reported and analyzed for 39 of 64 total communities, representing 74 visits, 263 clinic days and 7370 exams. These visits totaled \$201,278, with an average cost of \$765.32 per outreach clinic day (Table 3.3). Associated costs were highly variable, ranging from \$174.44 to \$3,800 per clinic day. Averaged total costs reported per province were not statistically different from one another (Kruskal-Wallis, $F=0.482$, $p=0.786$), where provincial variance is shown in Table 3.3.

Table 3.3: Summary statistics of self-reported costs associated with travelling to provide outreach optometry care.

Costs (\$)	British Columbia <i>n = 39 visits</i> <i>(92 days)</i>	Saskatchewan <i>n= 18 visits</i> <i>(54 days)</i>	Manitoba <i>n= 17 visits</i> <i>(117 days)</i>	Total <i>n= 74 visits</i> <i>(263 days)</i>
Overall average cost per clinic day	1,090.08	1,418.07	208.68	765.32
Minimum average cost per clinic day	625.00	267.00	174.44	174.44
Maximum average cost per clinic day	3,040.00	3,800.00	835.00	3,800.00
Sum costs of visits in 2022	100,287.00	76,576.00	24,415.00	201,278.00

Overall, travel is the highest cost associated with outreach visits (45% of total costs), followed by lodging (24%), administrative costs (19%), “other” costs (7%), and transport of equipment (5%). Travel costs were the only expense category that was reported by all responding participants, with the highest proportion in each province (Figure 3.7). When accounting for all visits reported in 2022, travel costs were highest in Manitoba (64%), followed by British Columbia (45%) and Saskatchewan (38%). Lodging costs were the second highest proportional expenditure for British Columbia and Manitoba. Of the communities with costs reported, 21/22 from BC, 7/14 SK, and 2/3 MB communities represented had reported lodging costs.

Administrative costs account for the second highest allocation in Saskatchewan (32%, Figure 3.7). Not all participants reported their administrative costs associated with the clerical workload of outreach care; administrative costs were reported for 7/22 BC responses, 6/14 SK responses and 2/3 MB responses.

Costs associated with transporting equipment and materials were inconsistent as some participants had indicated this was included in the overall travel cost that they had reported. There was a small sample size in Manitoba and only one participant from British Columbia had reported costs for transporting equipment and materials, therefore this section was excluded from additional analysis.

There was a high variation of costs reported per category. Mean hypothesis testing of travel, lodging and administrative costs respectively, showed no significance difference between the three provinces (Kruskal-Wallis for travel, lodging and administration, $p > 0.05$; Student’s T-test for “Other” costs between SK and BC, $t = 0.239$, $p = 0.813$).

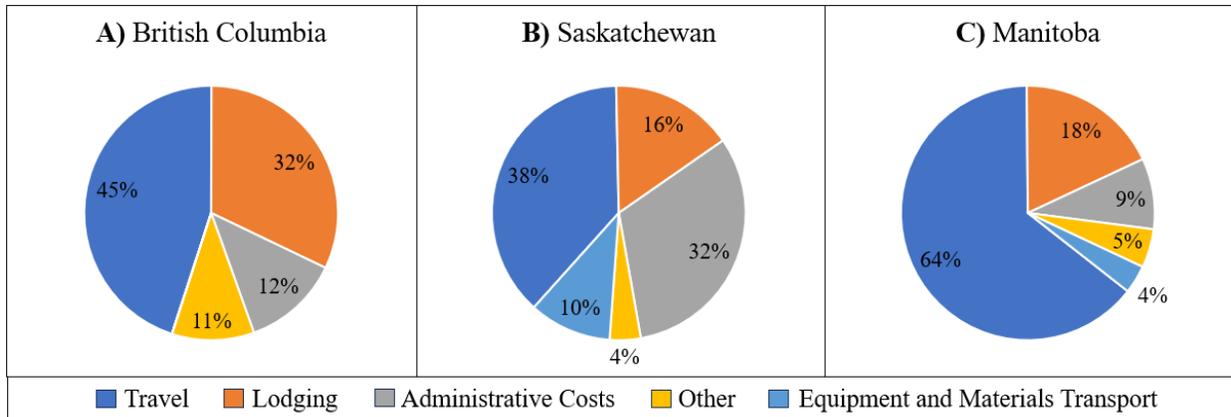


Figure 3.7: Self-reported costs associated with optometry outreach visits as a proportion of total costs reported per province. A) British Columbia: cost data reported for 22/44 communities. B) Saskatchewan: cost data reported for 14/16 communities. C) Manitoba: cost data reported for 3/4 communities.

3.2.6 Qualitative results

Interview data relating to the process factors of outreach optometry are coded according to the sequential process: (1) Planning before the visit, (2) External clinic set-up, and (3) post-visit administration. These qualitative results are presented in a quasi-quantitative way as the logistical interview data is straightforward information with minimal room for misinterpretation. Quantification of qualitative data provides context to the frequency of codes within the data set and is not intended to represent consensus of logistic process amongst participants. An overview of the common planning process identified is illustrated in Figure 3.8.

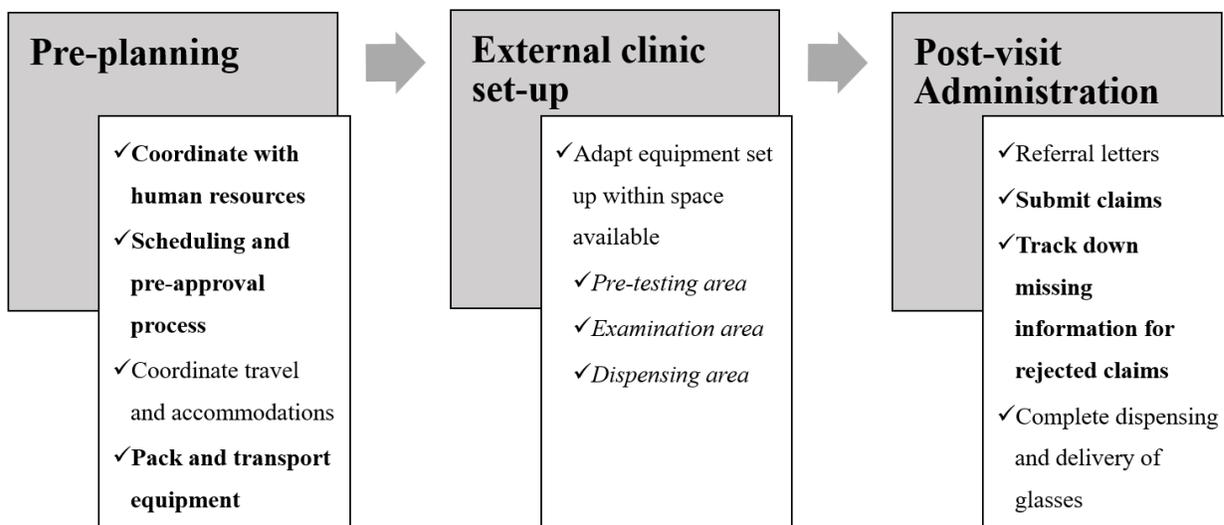


Figure 3.8: Thematic summary of the logistics of outreach optometry. *Bolded items are reported as logistical challenges (See Chapter 5). Data collected from semi-structured interviews with optometrists from British Columbia, Saskatchewan, and Manitoba (n=11).*

3.2.6.1 Pre-planning before an outreach visit

Planning before an outreach is completed remotely by participants in advance of the outreach visit. Sub-themes included: (1) Coordinating with human resources, (2) Scheduling and pre-approval process, (3) Coordinating travel and accommodations, and (4) Packing equipment and materials. Descriptive quotes for each procedural factor are provided within Table 3.4.

Coordinating with human resources

Planning outreach visits is dependent on support from human resources, which included community contacts and primary clinic staff. To establish relationships with community contacts for the first time, participants reported receiving calls from communities looking to have eye care (1/11), cold calling the health centers or tribal councils of the communities that they are able to travel to (3/11), or having community need identified and coordinated through a central organization like the professional association/college or Non-Insured Health Benefits (2/11).

Staff support included primary clinic staff, staff supports hired from the community, as well as support from friends and family. Most participants (10/11) discussed the ways that their primary clinic staff support the process of outreach visits. Participants reported that staff support the logistical pre-planning for visits (5/11) to complete the necessary communication, travel and lodging bookings, and paperwork for prior approvals or reimbursement allowance. Most participants travel with at least one staff member

(10/11), to upwards of four staff members. Multiple participants (4/11) reported paying out of pocket to hire additional staff from the community during visits. One participant reported that they do not take staff with them and only hire from the community. In addition to staff, (4/11) participants mentioned support from friends and family during outreach visits.

Scheduling and pre-approval process

Scheduling patients and creating waitlists ahead of time generates interest in the up-coming optometry visit. Participants discussed ways that community contacts supported scheduling and advertising (9/11). Participants shared that visits are promoted through local Facebook groups, by word of mouth, postings in the health center, and through local radio stations. Two interview participants from British Columbia reported that word of mouth is the most effective method of promotion for the visits.

Scheduling patients ahead of time is to support the process of obtaining pre-approvals for patient benefits and mobilization funding. One interview participant from British Columbia reported on the importance of the pre-determined schedule for the bureaucracy associated with approvals for mobilization funding from FNHA. Multiple participants (3/11) reported that the pre-planning process may occur weeks or months in advance to ensure accurate patient information is collected. Multiple participants (4/11) also reported creating a waitlist with potential patient information as part of the pre-clinic scheduling process. Necessary information includes patients' status number, health card number, date of birth, and legal name. Not all participants pre-scheduled patients before their outreach visits. Despite best efforts, patient information that is not available in advance of a visit is reported to be obtained during the visit, where any incorrect information gathered is tracked down after the visit.

Exam charting is completed electronically or on paper. Two participants reported preparedness to do either paper or electronic charting, depending on internet access and reliability. Four participants mentioned the primary use of their EMRs for electronic charting during visits, and three participants reported a preference for paper charting.

Pre-scheduling and preparation of paper charts was emphasized by participants from Saskatchewan who do school visits. Three interview participants who do school visits, obtain consent to prepare paper exam cards for all the children registered in the school in advance. Obtaining parental consent in advance is supported by community contacts. Paper charting was reported by these participants to increase efficiency to be able to see all the school grades during a visit.

Coordinating travel and accommodation

Method of transport is dependent on the accessibility of the community (drive-in vs. fly-in) and equipment transportation required. When visiting communities with road access, six interview participants reported using their own personal vehicles. Of the participants who use their personal vehicles, two participants had reported investing in trailer attachments for their equipment. The other four participants reported having large vehicles or flatbed trucks.

Flights are coordinated through commercial or charter airlines. Four participants discussed the process of visiting fly-in communities. Participants reported that commercial/charter flights need to accommodate the optometrist, staff members, and equipment. One participant from Manitoba reported purchasing two airline seats to bypass the weight limitation for checked luggage per person, to travel with 200lbs of equipment each visit. One participant from British Columbia reported an easy experience coordinating independent charter flights through a provincial not-for-profit organization.

Accommodation must be planned for outreach visits that are far enough to warrant overnight stays. Seven participants (7/11) spoke about the planning for overnight visits. All participants reported that there is variability in lodging quality and availability across the communities they visit. Participants from Saskatchewan and British Columbia reported that some communities have a lack of, or limited accommodations. One participant from Saskatchewan reported booking a whole year in advance. Two interview participants from British Columbia shared that lodging availability may be influenced by the demand during tourist season or lack of accommodations outside of tourist season. One participant from British Columbia reported camping during outreach visits.

Packing equipment and materials

Generally, optometrists will bring portable versions of equipment used within primary clinics. Four participants (4/11) reported purchasing portable equipment and relying heavily on portable equipment. Seven participants (7/11) spoke about the process of packing equipment and materials. Participants reported that travelling with equipment takes time to pack the equipment into specialized crates and stands, into trailers or onto charter flights. Occasionally, transporting equipment resulted in broken or lost instrumentation (*See challenges, chapter 5*).

A selection of frames for patients to choose from are transported for outreach visits. Two strategies for deciding frame selection were identified. Four participants spoke to the choice of bringing 4-500 frames for their visits, where they pre-adjust each frame to each patient and the patient will receive that specific frame. The other possibility reported is to bring a kit of approximately 200 sample frames, where patients

may order a frame of the same type, with their adjustment fit measurements written down. One participant from British Columbia shared that they carry a frame line that is designed by Indigenous artists in British Columbia.

3.2.6.2 External clinic set-up

The clinic set-up process is reported to require quick problem solving to adapt to clinic spaces available in community. Supporting quotes are presented in Table 3.5. Participants reported that the space available for outreach clinics is variable. Schools, health centers/nursing stations, and community centers are commonly reported, where no two buildings are the same. All interview participants (11/11) commented on the importance of flexibility and level of improvisation required to set up an external clinic, especially within a space that is being visited for the first time. Participants reported the ideal scenario where you have designated stations for pre-testing, examinations, and dispensing. These stations may be in separate or common rooms.

Participants reported a range of 30 minutes to 1.5 hours to set up their equipment for the clinic day(s). Two (2/11) participants reported doing set-up and take down multiple times during a visit to accommodate the population needs across multiple nearby schools or shift around rooms to accommodate space requirements for regular health center operation.

Participants reported access to reliable clinic space and equipment in some communities. One participant from Saskatchewan reported that each health center they visit has a dentistry room and the dental chairs work well for exams. Three participants from British Columbia reported access to a lane of optometry equipment within the health centers they visit. One participant from Manitoba reported access to most optometry equipment through a bricks and mortar optical they visit.

Table 3.4: Pre-planning outreach optometry clinics within Indigenous communities. *Quotes obtained from semi-structured interviews with optometrists from British Columbia, Saskatchewan, and Manitoba. (N=11)*

Sub-Theme	Procedural Factor	Descriptive Quote
Coordinating with human resources	Establishing Community Contacts	<p>1. “Usually, I will call the health director and set something up in terms of like, what do you need for service and when do you want it?”</p> <p>2. “The communities actually request through NIHB when they want to visit. And there's an official form they have to fill out. It's called an “In Community Vision clinic request form.” So, they would get a request from a community and then The NIHB office would look at their suppliers, people, optometrists who had signed up. And I think they would kind of go down the list, but they would, I think they would give preference to the optometrist who is at the Community last, and a lot of times the Community would request that optometrist. <i>(Manitoba participant)</i>”</p>
	Staffing	<p>1. “I usually take minimum two, sometimes three staff with me. So, it's dispenser, a pre-tester, and sometimes an administrator. We try on every trip to hire at least one person locally, and we pay them out of our pockets for that.”</p>
Scheduling and pre-approval process	Scheduling	<p>1. “We give them a sign-up list and it’s usually posted on their Facebook board which is really nice. That’s probably the most engaging way because all community members use Facebook. They also put it up in the Health Center. We usually have a runner in the community that’ll tell their aunts and uncles and nieces and nephews: ‘Hey, optometrists coming this day. Come get your eyes checked.’”</p> <p>2. “Scheduling... Again, it kind of just depends where I am. Sometimes I literally have a schedule or other times you just get a stack of consent forms and just start seeing patients.”</p>
	Patient Information	<p>1. “So we're usually asking for a month or two in advance class lists adult appointment lists with Treaty number, medical services [number], billing number, date of birth, last name, first name, and then we manipulate this data into our own spreadsheets.”</p>

		2. "The consent form goes out to whoever my contact is on the Reserve, if it's the health nurse or like a contact at the school. They're basically responsible for getting those consents out and collecting them. You do really depend on them a lot for that."
	Pre-approvals for mobilization funding	1. "They [FNHA] actually want everyone's numbers before you go, their FNHA numbers so they can see that you're seeing enough patients and then they kind of get pre-approved that which adds on a you know a lot more planning essentially. Generally, from an administrative side of things, we try to preschedule on patients before we go out. And that is purely due to kind of the bureaucracy of getting (MOBILIZATION) funding from FNHA." (<i>British Columbia Participant</i>)
	Exam charting	1. "Wi-Fi works, Wi-Fi doesn't work, doesn't matter. We usually take a paper chart with us, too." 2. "You know, some people will take laptops along and type the data into their electronic medical records. Some people like to do it on paper and then transfer it later just because of efficiency on the clinic. For us, we've actually put the results on paper and then transferred them afterwards."
Travel and Accommodations	Transportation	1. "We usually transport everything in the back of my truck. We stuff it full, it's a bit of a Tetris game." 2. "So, in our case, we were dealing with the health regions, so we give them the times that we'd like to go and they confirm that and then we organized the flights through them and they took care of renting a vehicle for when we're up there." (<i>Saskatchewan participant</i>) 3. "I'm only allowed to 60 pound [luggage] allowance and anything else above that can get bumped, and it often does. So, I actually have to pay for a second [airline] seat." (<i>Manitoba participant</i>)
	Availability of Accommodations	1. "There are some locations that I have to book a year in advance because there's such a shortage of accommodation in these locations." (<i>Saskatchewan participant</i>) 2. "And sometimes there's even some kind of seasonal issues around going so that you know, even if there is accommodations in a community, sometimes the accommodations they may not are only open from May till September. So, if you wanted to go in April,

		<p>that's not as easily an option... some of the communities don't even really have accommodations. So like, beyond camping, there wouldn't necessarily be places to stay." (<i>British Columbia participant</i>)</p> <p>3. "Mostly it's at the nursing station, but some of the bigger communities actually have hotels and the nursing stations can get filled up quite quickly with other visiting professionals, so some professionals may have to stay at the hotel." (<i>Manitoba participant</i>)</p>
Equipment and Materials	Equipment	<p>1. "We bring a lot of equipment. We tried to make it the same quality of care that they would get if they had seen me at the clinic."</p> <p>2. "I have it kind of all ready to go. I bought a bunch of; I had some custom cases made-up that kind of fit my equipment with cutouts. And I also get some just big generic toolboxes that you can buy Canadian Tire for some of the equipment as well. So because I do a lot of this, I kind of have my kits all ready to go. So, it's not like before.... I've accumulated quite a bit. It's about 200lbs and probably about 8 bags."</p>
	Frame Selection	<p>1. "... Sometimes in in the situation where we bought 5 or 600 frames, we would actually take that frame, we put it in a bag with a person's name measurements. Whereas another place where you might only bring 200 frames. You'll put the frame on and you make the measurements. You note the color. You notice that there are too long or too short on the side. If they're not, they're close. Then you actually would order that frame with lenses from the lab, and then you wouldn't actually use that frame. We put it back and that's right on the next person."</p> <p>2. "She designed the frames for them and they're like all inspired depending on different bands and different tribes and our communities love them because it's so nice and they actually fit well. They're fit for First Nations, right, because you need to have a specific set of frames for community members usually."</p>

Table 3.5: Setting up external optometry clinics within Indigenous Communities. *Quotes obtained from semi-structured interviews with optometrists from British Columbia, Saskatchewan, and Manitoba. (N=11)*

Sub-Theme	Procedural-Factor	Descriptive Quote
Clinic Setting	Variability	<p>1. “When we get there, we say, “where would you like us to set up?” Sometimes there’s a decent space and sometimes you’re working in not optimal space.”</p> <p>2. “One of the ones that we go to is in the school. They have a recreational room, so it has all kinds of different things in it. The other one we go to in the school, we use the library and then the other community that we've gone to, they have a Community Center that's actually just next door to the school.”</p> <p>3. “I usually work in the nursing stations.”</p>
	Set-up	<p>1. “It’s setting up your equipment, your dispensing area, your pretesting area, figuring out where your power sources are, getting all these cords and cables running all over the place and creating a bit of a flow that you feel is going to be efficient.</p> <p>2. “By the time we get done on let's say Friday or Saturday the following week and sometimes we have to move our equipment and set up in the evenings at a different school. Like, some communities have two schools they want you here for Monday, Tuesday, they want you there for Wednesday, Thursday. So there's a couple hours of work tearing down the equipment and resetting it back up.”</p>
	Access to equipment	<p>1. “So I just used the dental room because it's the right size and there's a sink and they have like the dental chair that goes up and down.”</p> <p>2. “We have the BCDO equipment there, which is honestly, an absolute game changer... So being able to provide that has really kind of increased the quality of care that we're providing and it also has kind of, I'd say, decreased the planning logistics of going out to [redacted community name] in particular, in that we don't have to pack quite so much relative to other communities.” <i>(British Columbia participant)</i></p>

3.2.6.3 Post-visit administrative tasks

Following outreach visits, administrative tasks reported include: (1) Referral communication (2) Submitting claims for reimbursement, and (3) Dispensing glasses. Supporting quotes are presented within Table 3.6. The administrative burden following a visit is the top challenge reported by participants from Saskatchewan and Manitoba, results that are explored further within Chapter 5.

All interview participants (11/11) commented on the administrative workload following the outreach visit, where they recognized the efforts of their staff members who may transfer paper files into the EMR, activate pre-approvals, communicate with community to track down patient information to resolve rejected submissions to FNHA and NIHB, resolve payments, and complete orders. Participants reported that these tasks get completed in addition to returning to the primary clinic workflow, resulting in a high workload.

Completing referral communication

Completion of referral letters is reported to take additional efforts to maintain the continuity of care for patients who have limited access, this may be completed during a visit or after a visit. Five participants reported extra efforts to coordinate with the health directors, or ophthalmologist to ensure that their referred patients are supported in accessing their follow up appointments. This included: informing the health director personally, involving patients' families where appropriate, or including in the referral letter that the patient may be late due to the travel required. One participant mentioned the decision-making for emergency referrals during the visit, where patients are medivac air-lifted from their community into the nearest urban center.

Submitting claims for exam reimbursement

The process of claim submission for patients covered under FNHA or NIHB is different. In British Columbia, claims to FNHA are submitted through Pacific Blue Cross (PBC). One participant reported that the switch from NIHB to PBC reduced the administrative burden of submitting claims. For patients covered through NIHB in Saskatchewan and Manitoba, all participants from Saskatchewan and one participant from Manitoba commented on the burden of submitting claims through the NIHB portal Express Scripts. NIHB claim submission is reported to be a redundant process with a high occurrence of rejections from incorrect patient information.

Participants reported the additional administrative task of resolving incorrect patient information with patchwork support from different community contacts. Incorrect patient information is reported to happen often for community members who do not have government identified personal information on hand (treaty number, hospital number, legal name, correct date of birth), where all correct information is necessary to submit a claim. One participant from British Columbia commented that the blame is not on the patients who do not have this information on hand, and there needs to be a solution at the organizational level. One participant from Saskatchewan shared that administration following a visit may take up to 150 hours. This participant reported seeing an average of 378 patients per visit within the questionnaire, resulting in an estimate of 30 minutes of paperwork per patient if not all patient information is accurate and easily accessible.

Dispensing glasses

The turn around times for patients to receive their glasses was reported to be between 2 weeks (1/11) or 4 to 6 weeks (3/11). Participants provided details on their shipping process, where participants from British Columbia stated that shipping costs were not covered (3/11), and participants from Manitoba and Saskatchewan reported that shipping costs were covered through NIHB (2/11). Participants commented on the different methods for shipping as presented in Figure 3.6. In the case that glasses are shipped to the community without the optometrist on site, participants reported that the delegated community contact will sign off when people receive their pre-adjusted glasses, to ensure an accurate paper trail (5/11).

Table 3.6: Administrative tasks following optometry outreach visits in Indigenous communities. *Quotes obtained from semi-structured interviews with optometrists from British Columbia, Saskatchewan, and Manitoba. (N=11)*

Sub-Theme	Procedural Factor	Descriptive Quote
Dispensing	Lab Choice	1. "Usually we use a (<i>contract/outsourced</i>) lab because imagine you're going into a vision clinic and you're going to be edging like 16 to 18 jobs per visit per day. And you have like, Three (<i>clinic days</i>) that week. That's like 60 plus jobs, plus your own (primary clinic jobs)."
	Shipping Costs	1. "NIHB covers the mailing fee." 2. "It's better for us to just send it to the band office because it's way less shipping." (<i>British Columbia participant</i>)
	Timing and Delivery	1. "...They (NIHB) take the month to get the approval and then we place the order... For patient is can be 6 weeks." (<i>Manitoba participant</i>) 2. "We make one or two shipments to the Health Center, and then they sign out the glasses, there are all are typically all paid for, for the most part. There might be one or two "stragglers" that, you know, have orders that are a little more complicated, and the lab takes a little longer... We don't hold those back in, so we don't hold the other orders up for the more custom orders." (<i>British Columbia participant</i>)
Claim submission	FNHA Claims	1. "...Since things have been switched over to Pacific Blue Cross [<i>For FNHA clients</i>]. That's radically increased our efficiency." 2. "At the end of the trip, we have to resubmit who we actually ended up seeing. You get into that level of bureaucracy and then I know when we went to submit the receipts, we had submitted a scan of all the receipts and they're like they got back to us a few weeks later and they said no, we want the originals. Then it meant that, you know, it hadn't really been dealt with. And we were like, two months after the trip."
	NIHB Claims	1. "Then the massive weeks on weeks of processing of the data and ordering of the glasses starts. And that's a huge job in itself too. Umm, you know, again, you're coming back with high volume of orders. You know, now you have to go back to the regional office again and get those approvals activated for the patients that you've actually seen. Now you have to take those names and send them back to the regional office and say, 'here's the patients we did see. And here's the data that you need to prove that we've seen them,' because they request the prescription. 'Please activate this prior approval so that we can go ahead and order these glasses now.' So there's a 2 step process to get that

		done. I did a calculation this one time. I think we spent something like 150 administrative hours after the clinic processing this data.” <i>(Saskatchewan participant)</i>
Referral communication	Letters and additional administrative efforts	<p>1. “So it all has to go through the Health Center initially. They're the ones that are gonna be picking up the call and <i>(to the patient)</i> , ‘hey, you have an appointment at this time,’ and they'll be arranging the ride for that person to go out. So, there's a lot of logistics. Imagine if you're gonna be late for that appointment, too, right? So if you let the ophthalmology clinic know, ‘hey, this patient's coming from <i>[redacted]</i>, there's a good chance they may be late.’ so that the clinic is prepared <i>(to accommodate)</i>.”</p> <p>2. “...If you're not coming back for six months, you have to modify your treatment plan and say well... I'm not gonna sit on this for six months, so the cases only become so hard before they become easy. And then you make the decision while this patient must be flown out. So, then I would go to the nursing charge and explain this is what we're dealing with. They need to be flown out and she'll arrange a travel warrant. They'll usually get them on the next scheduled flight out.”</p> <p>3. “So, this week I went out for four days, so I took a full day on my end. It's about four hours for every two days to kind of catch up... or 3-4 hours to catch up for every two days of clinic.”</p>

Chapter 4

Current State of Outreach Service Delivery

The results presented in this chapter includes analysis of aggregate retrospective data from outreach visits reported by participants, followed by participants perspectives on the current state of supply and demand for optometry outreach care.

4.1 Current State Summary

Questionnaire participants provided retrospective data on their outreach visits in 2022. Frequency of visits, number of exams completed, and participant reports of top diagnoses encountered provides insight into the current state of outreach optometry. Total survey completion represents 96 visits to 64 different communities, covering 316.5 clinic days and a reported 8,386 patients seen. Table 4.1 provides a high-level summary of the outreach care reported per province.

Table 4.1: Summary of outreach eyecare reported (2022).

Outreach Data <i>(n= individual optometrists)</i>	British Columbia <i>(n=8)</i>	Saskatchewan <i>(n=6)</i>	Manitoba <i>(n=4)</i>	Total <i>(n=18)</i>
Communities Visited	44	16	4	64
Number of Visits Reported	60	18	18	96
Number of Clinic Days	141	54	121.5	316.5
Number of Patients Seen	2,393	2554	3439	8,386

4.2 Index of Remoteness Analysis

Analysis of the index of remoteness (IR) value for each community reported provides interesting context to the degree of metropolitan influence within the communities that have received optometry outreach care within 2022. Of the 64 communities reported, indices of remoteness were available for 34 communities. The remaining 30 communities reported where either unnamed (i.e. participant had reported “community 1”, “community 2”) or may have been reported as a different name than the designated Statistics Canada Census Subdivision Name.

Overall, outreach care is provided to communities that rank above the provincial and national average index of remoteness (0.36) ranking (Table 4.2), where most communities reported (62%) fall between the “rural boundary” assigned at a rank of 0.45, and the remote boundary assigned at 0.7. Four communities reported (12% of total communities) were ≥ 0.7 , thus representing outreach care within the top 3.7% of remote census subdivisions in Canada.^{21,88} Between provinces, there was no difference between mean index of remoteness for communities visited (Kruskal-Wallis, $p=0.13$).

To protect the identity of communities with uniquely high IR values, some reporting of this analysis is aggregated. Maximum values were reported as “>0.7” to indicate a ranking within the top 3.7% of remoteness rankings in the country. The total maximum IR value from all results is reported as 0.8 as that is the average of the community rankings above the 0.7 cut-off (Table 4.2). Figure 4.1 visualizes the range of remoteness reported by participants from either province.

Table 4.2: Index of Remoteness for communities reported (2022) compared to provincial ranking (2021).

Summary Statistics (<i>n=communities</i>)	Results: British Columbia (<i>n=20/44</i>)	Reference: British Columbia 2021 ²⁰ (<i>n=743</i> CSD's)	Results: Saskatchewan (<i>n=11/16</i>)	Reference: Saskatchewan 2021 ²⁰ (<i>n=950</i> CSD's)	Results: Manitoba (<i>n=3/4</i>)	Reference: Manitoba 2021 ²⁰ (<i>n=230</i> CSD's)	Results: Total (<i>n=34</i>)	Reference: Canada 2011 ²¹ (<i>n=5,211</i>)
Minimum (Least remote)	0.39	0.06	0.30	0.15	0.43	0.14	0.3	0
Maximum (Most remote)	>0.7*	0.84	>0.7*	0.82	>0.7*	0.96	~0.8*	1
Median	0.525	0.38	0.46	0.37	0.66	0.42	0.52	-
Mean	0.542	0.37	0.48	0.39	0.68	0.42	0.53	0.36
Standard Deviation	0.090	0.16	0.16	0.09	0.27	0.16	0.14	0.17

*' Used to indicate approximate IR ranking to protect identity of communities with unique IR identifier.

CSD = Census Subdivision; IR is a measurement of geographic isolation in Canada, 0 = least remote, 1 = most remote; IR data obtained from Statistics Canada, 2021.²⁰

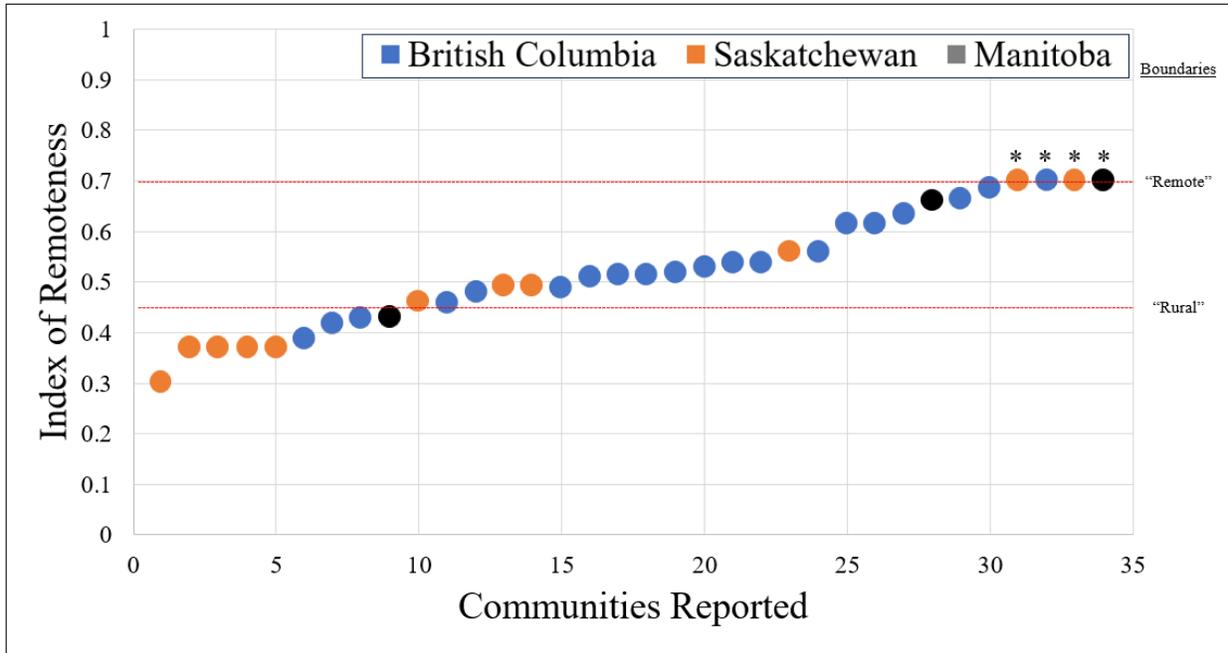


Figure 4.1: Index of Remoteness (IR) of communities visited for outreach optometry care in 2022. ‘*’ is used to indicate aggregated IR values to protect the identity of communities with uniquely high IR rankings. Boundary of 0.45 represents communities above the normal distribution of Canada (“rural”). Boundary of 0.7 represents communities within the top 3.7% remoteness ranking in Canada (“remote/isolated”).

4.3 Frequency and Duration of Outreach Visits

Results showed different seasonality of outreach visits for each province. Outreach visits occurred year-round in British Columbia, and Manitoba. Outreach visits in Saskatchewan occurred primarily during the spring and fall. The distribution of clinic days across the year for the three provinces are shown in Figure 4.2.

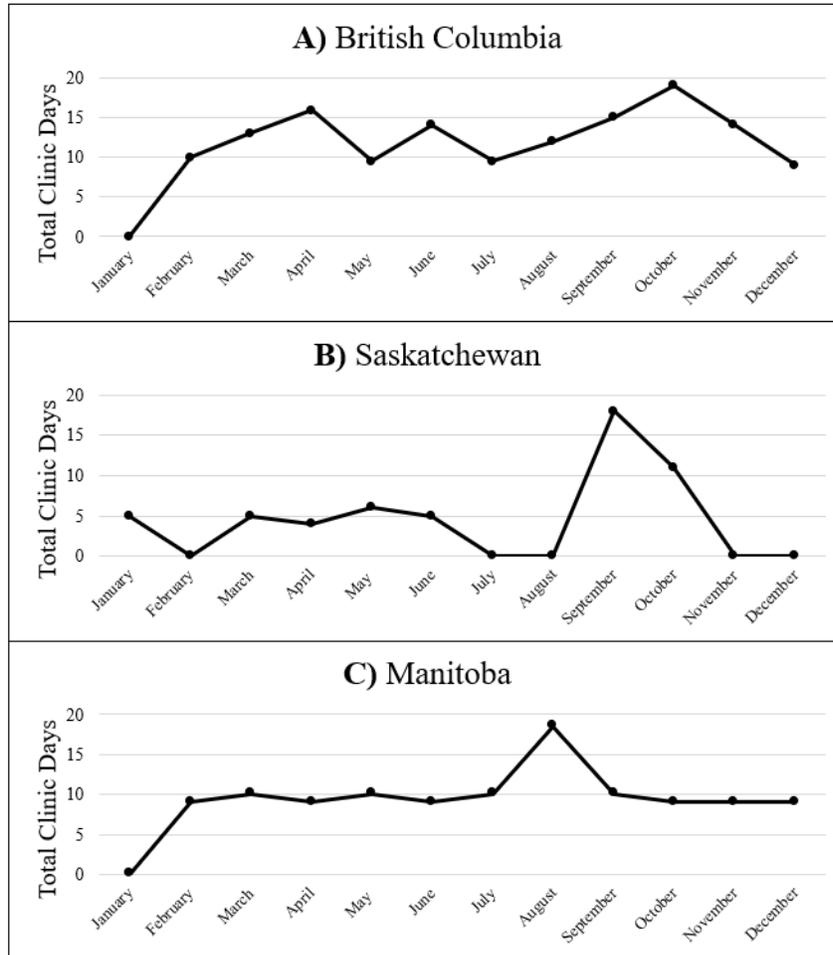


Figure 4.2: Number of outreach clinic days per month (2022). *A) Participants from British Columbia (n=8/8) reported 60 total visits. B) Participants from Saskatchewan (n=5/6 *missing data from one participant) reported 20 total visits. C) Participants from Manitoba (n=4) reported 18 total visits.*

The same community may be visited multiple times per year with number of visits ranging from once per year to once per month. Of the total communities represented, 81% (52/64) were visited once in 2022 (Figure 4.3). The context to the number of patients seen within a visit is confounded by the duration of each visit (Table 4.3). For example, one community reported to receive monthly visits had received 108 total clinic days in 2022. In contrast, one community reported to receive four visits per year had received 4 total clinic days in 2022. For communities receiving one visit per year, clinic days reported ranged from 1-5 days in British Columbia, 2-5 days in Saskatchewan and 4.5-5 days in Manitoba (Table 4.3). Irrespective of repeat visit frequency, there is no difference in mean visit duration between the provinces when reporting of different participants is included in multi-factorial analysis (Scheirer Ray Hare Test, Post Hoc: Dunn’s Test, p=1). Table 4.3 shows the mean and range of visit duration per province.

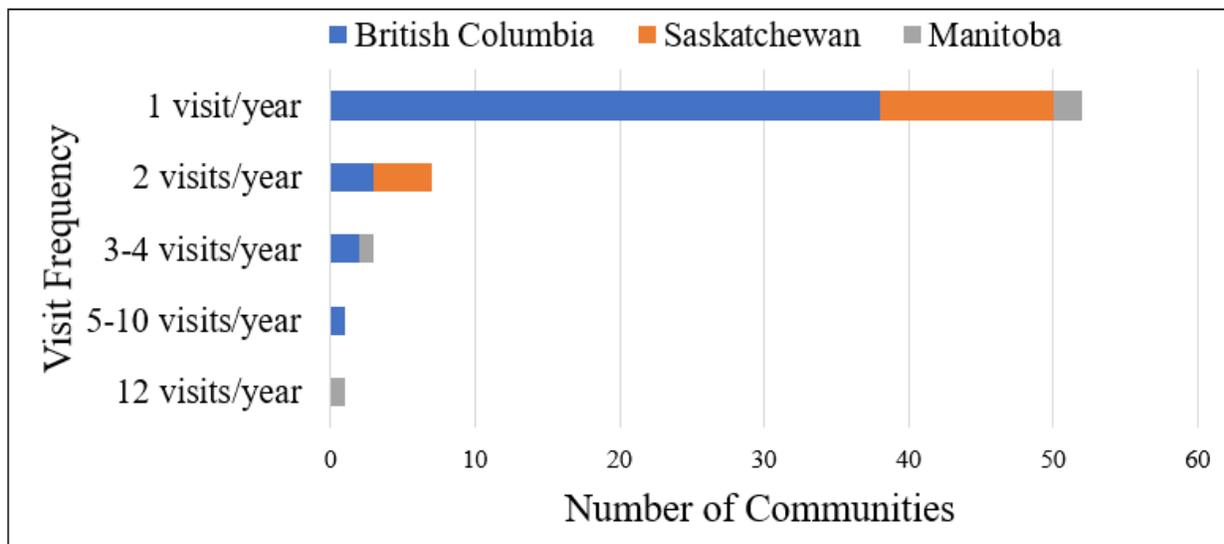


Figure 4.3: Frequency of repeat community visits (2022). Participants reported visits for 44 communities in British Columbia (n=8), 16 communities in Saskatchewan (n=5/8 *missing data from one participant), and 4 communities in Manitoba (n=4).

Table 4.3: Duration of outreach visits reported (2022).

Clinic days per visit	British Columbia n=44/44	Saskatchewan n= 14/16*	Manitoba n=4/4	Total n=62/64
Minimum	1	1	1	1
Median	2	2.5	9	2
Maximum	6	5	9	9
Mean	2.35	3	6.75	3.30
Standard Deviation	1.30	1.53	9.10	2.53

*is lower than total communities represented because number of clinic days were missing from survey for two communities

4.4 Examinations, Dispensing, and Outcomes Reported

A total of 8,386 eye exams were reported for outreach visits in 2022 (Table 4.4). Patients reported by participants from British Columbia and Manitoba were primarily adults (79% and 75% respectively) and patients reported by participants from Saskatchewan were primarily children (78%).

Glasses are the primary method for refractive correction provided for outreach visits. The overall proportion of dispensing to exams reported was highest for Manitoba patients (88% of patients seen), followed by British Columbia and Saskatchewan patients (76% and 74% respectively). One participant

from Manitoba did not report dispensing data as dispensing was completed by an independent optician. These responses were excluded within Table 4.4. All provinces reported similar dispensing trends for adult patients, where an overall 87% of adult patients seen were dispensed glasses. The proportion of children dispensed glasses varied by province, Manitoba had the highest proportion of dispensing (81%), followed by Saskatchewan (70%) and British Columbia (44%, Table 4.4).

Table 4.4: Examinations and dispensing reported for outreach optometry visits (2022).

Patients per clinic day	British Columbia <i>n=44/44</i>	Saskatchewan <i>n=14*/16</i>	Manitoba <i>n=4/4</i>	Total <i>n=62/64</i>
Minimum	5	7	21	5
Maximum	25	82	43	82
Median	16.58	19.45	27.77	18
Mean	16.85	38.55	27.95	23.00
Standard Deviation	3.94	30.61	4.23	15.96

Patients Seen	British Columbia <i>n=44/44</i>	Saskatchewan <i>n=16/16</i>	Manitoba <i>n=3/4</i>	Total <i>n=63/64</i>
Total Exams	2,393	2,554	439**	5,386
Proportion Dispensed Glasses (%)	76%	74%	88%	76%
<i>Adults Exams</i>	<i>1,892 (79.1%)</i>	<i>555 (21.7%)</i>	<i>331 (75.4%)</i>	<i>2,778 (51.6%)</i>
<i>Proportion Dispensed Glasses (%)</i>	<i>85%</i>	<i>90%</i>	<i>90%</i>	<i>87%</i>
<i>Children Exams</i>	<i>501 (20.9%)</i>	<i>1,999 (78.3%)</i>	<i>108 (24.6%)</i>	<i>2,608 (48.4%)</i>
<i>Proportion Dispensed Glasses (%)</i>	<i>44%</i>	<i>70%</i>	<i>81%</i>	<i>65%</i>

**Missing number of clinic days for two communities, **Dispensing was not reported for one participant, responses excluded (a total of 3,000 exams across 108 clinic days in 2022).*

Refractive errors (E.g., astigmatism, myopia, hyperopia, presbyopia), cataracts, glaucoma, and the management of diabetic patients were in the top rankings for each province. Four out of five top ranking conditions were the same for all provinces. Other high occurrence conditions reported were binocular vision conditions (E.g., amblyopia, strabismus) and anterior surface disease (E.g., blepharitis, dry eye, lid/lash infections) (Table 4.5). Binocular vision conditions were represented within the top 5 ranking condition for Saskatchewan and Manitoba. Anterior surface diseases were represented within the top 5

ranking conditions for British Columbia. Participants also reported diagnoses of retinopathy, macular degeneration, keratoconus, and ocular injury during outreach visits.

Table 4.5: Top 5 eye and vision conditions encountered during outreach visits per province.

Top 5	British Columbia	Saskatchewan	Manitoba
1	Cataract	Refractive Error	Refractive Error
2	Refractive Error	Binocular Vision Conditions*	Cataract
3	Diabetic Patients	Cataract	Glaucoma
4	Glaucoma	Diabetic Patients	Diabetic Patients
5	<i>Anterior Surface Disease</i>	Glaucoma	Binocular Vision Conditions*

Bolded items are shared for each province, separate of rank order.

Items that are shared for 2/3 provinces are flagged () to compare occurrence separate of rank order.*

4.5 Provider Perceptions of the Current State of Outreach Optometry

Through the dialogue of the semi-structured interviews, participants shared information about their perceptions on the current state of outreach optometry. A major theme identified through the thematic coding is ‘Access,’ as it relates to the (1) supply and (2) demand of outreach eye and vision care service. The supply of outreach care was represented through discussion about frequency, timing, and equipment availability. Demand for outreach care was represented through discussion of un-met community member needs and current workloads. Within this chapter, qualitative results extracted from the semi-structured interviews are presented in a narrative format, providing quotes throughout, due to the interpretive nature of provider perceptions of current state.

4.5.1 Current supply of outreach services

Timing and frequency of outreach care

Participants reported a return to outreach visits in 2022, following the Covid-19 Pandemic. Multiple interview participants (7/11) reported that the visits completed in 2022 were the first outreach trips since

before lockdowns. One interview participant remarked on one of the visits reported as being a newly established relationship:

“*[Redacted fly-in only community]* has never had optometry services provided ever. First time for optometry ever coming out to that community.”

The frequency of outreach visits is influenced by external factors from mobilization funding schedules, and patient exam eligibility. One interview participant from British Columbia shared that the FNHA will only fund two optometry trips per community per year:

“The FNHA only funds two trips a year for each community. With *[redacted]* community, there’s *[redacted population number, #,###]* people in the community and two trips a year doesn’t really cut it.”

No participants using NIHB mobilization funding or individual Band Council Funding had commented on the frequency of funding approved per year. One participant covered by NIHB mobilization funding justified annual visits to each community to see alternating patient groups within the constraints of the NIHB vision benefit schedule for exams and glasses:

“So, you could try and go exactly at the same time each year. Then you're usually OK for coverage for all the kids. That's for sure. And then you might see half the adults or a certain group of adults one year, and then you see another group of adults the next year because they're eligible for service as the glasses to every second year.”

One participant from Saskatchewan explained the overall trend for visits primarily occurring during the spring and fall in the province:

“You can typically only go do exams between middle of September and end of May because a lot of the students are not in school in the summer. People may disperse or go to a cabin on a lake or something like that, just like I would.”

Multiple participants irrespective of province, commented on the surplus of community need, despite their best outreach efforts within the region(s) they visit. For example:

“Especially where we live, there’s lots of small communities. Whether they’re a Reserve or a small rural town, I think there’s definitely a lot of opportunity for it *[outreach optometry]*. And even for myself, like, I know that I could probably do *[outreach visits]* once a month.”

Availability of ophthalmic equipment

Participants discussed the importance of equitable access to all eye and vision care services by discussing the current availability of in-office equipment. All participants reported their best efforts to ensure that the outreach care provided is to the same expectation as an exam within a primary clinic. Multiple participants from Saskatchewan and Manitoba reported the desire to have additional testing equipment available in community:

“In general, patients want to be seen in their community and they understand that we're doing the best we can to provide full care. We don't have an OPTOMAP or OCT, which would be fantastic.”

One participant reported the element of personal preference to refer complex patients to their primary clinic that is accessible by road, so they may use their full suite of standard equipment:

“When you're used to doing your exams with an OCT, and with a slit lamp, like a standard slit lamp, and then you're using handheld equipment... And I mean, there's no doubt I feel very strongly that I don't give an exam [*in the same way*] there as I can do in in my normal clinic. So, if I have somebody [*with an*] eye problem, I will often see them in the [*primary clinic*] and that's the luxury that we have because we are accessible by road.”

Other participants who visit communities with road access reported making accommodations and coordinating with the health center to get patients into their primary clinics. For example, one participant from Saskatchewan will see patients again in their primary clinic for contact lenses:

“...So for those people that are really, really against glasses, quite often we'll say “why don't you come up to the primary office? We can fit you in some contacts. Let's see what you think of them.” So, we try to find other ways that they'll correct their eyes if they don't like the glasses.”

Participants from British Columbia, who reported access to full equipment lanes had discussed how these sites are helpful for additional in-person testing at a location closer than their primary clinics:

“We try to get patients in if they need any glaucoma testing or any extended testing. We bring them into the telehealth clinic... They [*patients*] have been receptive to that as well. It takes time because people don't like leaving the community, but they know that we have all this equipment there. When one person sees all the equipment, they'll tell all their friends and their aunts and uncles and they'll be more receptive to it, too.”

4.5.2 Demand for services

Participants spoke to their perceptions of the unmet eye care needs of the communities they visit. Three quotes are provided to illustrate the perceived needs for diabetic patients, school-age children with uncorrected refractive errors and medically complex patients experiencing barriers to access:

“About one in seven patients are diabetic, so you take a community of 7000 people. There's 1000 diabetics that should be seen every six months, and if we're only going in a couple of weeks a year [*we cannot see all patients*].”

“When we get there, a lot of times the health director will say, OK, well, we want you to go to the personal care home... The high school kids... Nobody has glasses and there's 300 kids in high school. There's just so much need. I mean, a lot of these communities could have a full-time optometrist each on their own.”

“In general, there's the people that leave the reserves to come into town, and then there's the people that don't leave reserves, or very often. And those are the patients that you may not have seen for an eye exam in 8-10 years, and often, they're the pretty complex patients.”

All participants reported working long clinic days to accommodate both scheduled patients and opportunistic walk-in patients. Two participants from British Columbia report working 8-9 hour days. One participant from British Columbia reported working as long as possible to see as many patients as possible. Three participants from Saskatchewan reported a sum of 11-13 hours days; clinic days are reported to be as long as 12 hours with another hour for paperwork after. One participant from Saskatchewan elaborated on the workload required to meet the demand for glasses from the communities that they visit:

“You know, when you're going to provide services in the north or in a remote community, the primary reason they want you there is that people need glasses. You know, the leading cause of blindness is refractive error. It's not always eye disease. And so, we're there to do that. They want us to see as many people in that five days as we can, and we want to provide as [comprehensive] of an eye exam within that time frame as we can... We will refer patients as necessary. You are absolutely going hard, and people understand that like sometimes I'd have 15 adults waiting for me in the last half of the day, and they understand they want you to be efficient. They want you to be quick, but they also don't want you to miss something if something bad going on.”

Chapter 5

Provider Experience

One on one interviews ranged from 25 to 58 minutes. The semi-structured format allowed flexibility for participants to guide the conversation to spend time speaking about what was most important to them. This resulted in high variation within the data. Minimal quantification is justified as reaching consensus on specific concepts was not the purpose of the individual interviews. In some instances, quantification is reported to provide some context to frequency of themes within the data set.

Participants reported that they were initially introduced to providing outreach care through peer mentorship or on their own. Three participants reported support from mentors to get familiar with the process, and six participants had reported developing their own process through trial and error.

“Let's start with planning [*an outreach visit*]. Nobody tells you about this. I mean, there was no direction initially. Nobody knows because not many optometrists do this type of [*outreach*] eye care, right?”

Major themes related to provider experience are: (1) ‘Motivators,’ for participating in outreach visits; (2) ‘Relationship building,’ to provide context to the importance of trust when providing care within Indigenous communities; and (3) ‘Challenges and new enablers,’ related to the current state of outreach service delivery.

5.1 Motivators

All participants were highly motivated, engaged, and passionate about providing and improving outreach services. All participants reported that outreach visits are highly rewarding. Multiple (5/11) participants recognized that outreach visits are not financially motivated because of the additional time and costs associated. Frequent motivators identified through thematic coding included: (1) ‘Improving access,’ (2) ‘Relationships with community,’ (3) ‘Atmosphere and fun,’ and (4) ‘The Challenge’ of outreach visits.

Participants reported being motivated by improving access to patients who may not have access or have difficulty receiving care otherwise, reporting that the patient gratitude and relationships within the communities they visit make the challenges of providing care worth it:

“And then again of course, you know, you get the kids and you put in a trial frame of their prescription and put it on them.... And like, just like the tears, the joys, the high fives, those are ones too that you're like “ohhhhh this is why I do it, this is why I leave the office.” So, lots of positive experiences have happened.”

Participants reported enjoying the atmosphere of being able to work in a different setting and enjoy nature and activities within the community. Participants shared stories of how they are invited to participate in fishing (3/11) sports (2/11), surfing (1/11), excursions with community liaisons (2/11), cultural ceremonies (1/11) and other indoor activities (1/11) after clinic hours. One participant reported that they make outreach visits a family occasion:

“...I kind of started it because my children were young and it was kind of neat experience for them as well. We live in the city, we’re European ethnicity. We know we kind of don’t get the same exposure to different groups of people that live not very far from us. So, we bring the kids along and it can kind of be an experience of what it what it’s like for other kids their age that live on the reserve and getting to see what their communities look like.”

Many participants (6/11) specifically referenced enjoying the challenge of outreach care. This related to the challenges of seeing complex patients and the challenge of providing care within unpredictable clinic settings.

“There’s really a million and one things that can go wrong with these trips, which I mean, is [also] part of the fun.”

5.2 Relationships

All participants reported on the importance of building trusted community relationships: These relations provide the foundation of their visits. The sub-themes identified within the theme of Relationships are: (1) ‘Personal reflections,’ on providing culturally appropriate care; (2) ‘Building trust,’ to facilitate community and patient relationships; and (3) ‘Capacity building,’ to improve outreach initiatives. One participant had shared a comment that touched on all the sub-themes associated with trusted relationship building:

“You have to build trust. This has to be a partnership. This has to be [*the community*] wanting you as much as you wanna be there. This has to be their program. This isn’t just your program, so I would go in with humility and be authentic and be down to Earth, [*take time to*] understand the culture.”

Participants personal reflections

Participants (8/11) shared personal reflections on their commitment to providing culturally appropriate care. A common sentiment was shared, where the ability to provide culturally safe care as an “outsider” optometrist starts with personal reflection and an openness to the social and cultural contexts of each unique community:

“OK, I have to lose all my training and all my formality of being a doctor and just become a person... I think somehow you lose a little bit of the empathy to understand what it's like to not [*be able to*] see and what it's like to live in a more remote or challenged area. I think sometimes you have to get out of your office and take off that white coat and get out of your comfort zone and then really kind of understand why we're doing optometry in the first place.”

Building trust at the community-level

Participants (9/11) reported that trust begins at the community level and discussed their experiences establishing trust in greater detail. One participant shared that the relationship begins with establishing the trust in the quality of the eye care provided:

“Once we've had a conversation over the phone, before we had established long relationships with them, we would actually drive out and show them sort of a video of what an exam would look like. So, I think their biggest concern is they wanted to make sure that we are offering quality exams, that they're not just kind of, you know, a slam through as quick as you can. So, we've made a video up in terms of what an exam would look like in our clinic and then the modifications and changes that we must make to take it on the road.”

Participants reported that trusted relationships take time to build and are reliant on a commitment to continuity. The sentiment of commitment was expressed very similarly by six participants across the provinces, where these participants recognize that the providers' capacity for commitment to future outreach visits must be considered before relationships are established:

“They don't want a different optometrist coming every time. They wanna know your name, right? And know who's coming. So, you gotta make sure when you are providing care into those communities that you're committed to them because they're committed to you. There's a lot of planning for them as well. Right? So, they're giving you space, usually at no charge. They're giving you everything you need and lunch usually too... They open their arms to you, but you gotta open your arms to them as well.”

“If you're going to begin servicing a community, you should make sure that you're going to be able to follow up on that and really, you know, make those connections for those patients that do need further care after you leave.”

One participant reflected on their experiences doing outreach care within Indigenous communities multiple decades ago, highlighting that it takes time to establish relationships. This process may be facilitated through establishing trust before visits, as reported within the previous two quotations:

“When I first used to go up there, the first five years, you know, we were this minority. You know, a person coming into *their* community and there was a little bit of uncertainty of what we were doing and why we were there and why we were living in their community for a week. And you know, after five years, and once we establish that trust, folks would ask us to come play volleyball with them in the evening and do fish fries and have cookouts. We became community members and, you know, really felt a sense of belonging there and that took years to establish. But that was the other rewarding part of it, for sure.”

Participants reported that establishing bonds allow for the long-term continuity of care, which can sometimes arise as a challenge. Three participants, all from different provinces, reported that a community contact may change job positions or move from the community resulting in the loss of institutional memory. Participants reported occasionally having to re-build their relationships, especially within the context of returning for outreach visits post-covid:

“Like oftentimes in the communities, I've found that there's often a turnover of health directors. I try and reach out to the person that I had been in contact with the year prior. Or I know that after COVID, there was this two-year gap between going there, so then a lot of times there were different health directors. So, one of the challenges is getting in contact with the right person and then building trust with that person. At first, they didn't know who I was.”

“She [*community contact*] had since retired so we got in contact with the new school principal, and we heard nothing back. So, we just... didn't go [*that year*].”

Building trust at the individual-level

Participants reported that trusted relationships are fostered through engagement with community members outside of the clinic day. For example, by participating in outdoor and cultural activities when invited, and by taking the time to engage with patients and Elders:

“(Some days) You wanna work till like 3 or 4 so you can enjoy the landscape and you can actually talk to the community. That's how we build our bonds. It's actually meeting all the Elders and sitting and chatting with the Elders because they're the voice of the community. You gotta [*make time to*] talk and communicate.”

One participant shared the following story, which highlighted that communication and familiarity with the seasonal context allowed for better connection with a patient:

“When you get to know your patients enough you see that what they use their vision for, it might be different than what someone who presents to your [*primary clinic*] office uses their vision for.

Your conversations might be different, right? What's a culturally sensitive eye exam look like?
So, you kind of ask like, what do you use your vision for, what's important to you?

...One person's chief complaint was they 'couldn't count the points on a moose.' Meaning, how big the antlers are on the moose. So, I was like, 'Oh yeah, I'll fix you up with some glasses, this will help you with your moose hunting.'"

Community Capacity Building

When it comes to direct patient care, participants discussed their approaches to improve cultural safety during patient encounters, reporting that community capacity building helps to facilitate individual trust. Five participants from all provinces reported hiring or having volunteer translators and community liaisons present during the clinic days:

"The Elders tend to be community members that all of the children know... So we almost pair an Elder with every one of [*the primary clinic staff members*]. So, my pre-tester has an Elder that sits and works with her. The dispenser has an Elder that will sit and work with him... It's kind of like two teams working parallel to kind of complement each other."

These relationships also support the continuity of care for the patient by being a contact person to support patients who have concerns in between visits:

"I find it's much better to hire somebody in the community... They're my liaison. So in between visits, if people have trouble with their glasses or trouble with their vision, my assistant has direct contact with me. They can also do some minor repairs when the glasses are done."

One participant who is relatively new to providing outreach care shared challenges with capacity building and hiring staff for infrequent optometry visits, stating that support through the existing health center infrastructure may help to identify, train, and retain optometric assistants and community liaisons:

"The most beneficial is like trying to get people from the community to actually be involved with the clinics, so that they know that it's a possible like career option for them, almost like opening the door because eventually what you wanna have is people *from* the community that are doing the service, not [*outside*] people going in.

That's been the one thing that I wanted to do, and it's proven to be really, really difficult in terms of like trying to get people to see that this is something that you can build within your community.

I'm sure it'll work out... I feel like part of it is because our clinic is not affiliated with the Health Center. It's almost like, OK, well, maybe [*the job opportunity*] can't come from us, it has to come

from somebody in the community. Maybe a position in the health clinic that the band operates instead of a position from us.”

5.3 Challenges and Enablers

Challenges and enablers refer to anything that a participant had stated in response to specific question prompts. Other challenges and complementary enablers may have been mentioned elsewhere within the conversation. Presentation of prompt-induced data is a strategic choice to represent what participants consider the most critical challenges associated with providing eye and vision care, and the enablers that are the most helpful. Challenges reported were thematically coded within two sub-themes: (1) ‘Inherent Challenges,’ that are (mostly) outside of the scope of control of the profession and (2) ‘Actionable Challenges’ that have potential resolutions. Actionable challenges are presented with their complementary enablers.

5.3.1 Inherent Challenges

Inherent challenges provided context to providers experiences with the environment of providing outreach visits. The main inherent challenges identified included: (1) ‘Workload and physical demand,’ (2) ‘Finding time,’ (3) ‘External barriers,’ and (4) ‘Travel availability.’ Each sub-theme is described with supporting quotes presented in Table 5.1.

The workload and physical demand of outreach visits were the most frequently reported inherent challenge. The physical demand is from the long clinic days and ergonomics of unconventional clinic spaces. Participants shared that finding time to leave their primary clinic is a challenge to doing more outreach visits, particularly for catching up with the pent-up demand post-covid within primary urban clinics.

External barriers included challenges and interruptions that are out of providers’ control. Participants reported that weather has cancelled travel and cancelled visits. Occasionally, community events will cancel clinic days while they are in the community. For example, the health center may close for the day if there is a funeral in the community. One participant reported that a sense of safety may be an external barrier to some, sharing that other providers had visited communities where they did not feel safe as an outsider.

Challenges related to travel availability was reported primarily by participants from British Columbia and Manitoba, sharing issues with rental car companies and airlines. One participant shared an anecdotal story where a ride did not arrive, and the optometry team ended up hitch hiking into the community center.

Table 5.1: Inherent challenges of providing outreach eye and vision care within Indigenous communities. *Quotes obtained from semi-structured interviews with optometrists from British Columbia, Saskatchewan, and Manitoba. (N=11)*

Theme	Sub-theme	Descriptive Example
Inherent Challenges	Workload and Physical Demand	1. “So if we're gonna be there, we might as well work hard. We're leaving our clinics and our expenses behind. So if we're gonna be there, it's 'harvest time.' You know, let's 'make hay' and get it done. So, we work hard and usually come home with strep throat and colds and everything you might imagine because you've got, you know, literally hundreds of children breathing on you all day while you're, you know, you're working long hours and you're exhausted.”
	Finding Time	2. “Especially post COVID... You just don't have time. Everybody's in the same boat, like all offices are behind that they're booking far out so it's kind of that the priority is just getting the patients in your own office.”
	External barriers	1. “Assuming there's no school event going on or funeral or field day or sporting trip or whatever. All these things can cause interruptions.” 2. “So, safety is also an issue if you have to walk four or five blocks through the community at night after you're done at 9:30, things like that. So not only for females, but males as well. Safety is also a concern that prevents some people from going.”
	Travel availability	1. “You know, not me personally, but I know we've sent people up to [<i>fly-in community</i>] and no one showed up at the airport to pick them up. So, they had to hitchhike into town.” 2. “For challenges, I would have to say the inclement weather and the just the unpredictability of the airlines”

5.3.2 Actionable Challenges and Enablers

For every actionable challenge reported, analysis of the qualitative results identified a complementary enabler. Enablers were identified by the participant who reported the challenge, or other solutions reported by another participant. Sub-themes for actionable challenges identified included: (1) ‘Equipment,’ relating to travel burden and equipment availability, (2) ‘Data access,’ relating to access to patient information to obtain pre-approvals before a visit, (3) ‘Administrative burden,’ referring to claim submission and rejections (4) ‘Financial burden,’ from fragmented funding, rejected claims, and financial loss to the optometrist, (5) ‘Community coordination,’ relating to the continuity of relationships, building new connections, and capacity building, and (6) ‘Professional support,’ for association programming and coordination. These challenges and their complementary enablers are categorized into three groupings: ‘Logistics’, ‘Economics’, and ‘Organizational’ challenges and enablers, as summarized within Figure 5.1.

Participants from different provinces reported mostly similar challenges, where the number of participants to identify each specific challenge varied. Overall, more participants from Saskatchewan and Manitoba reported actionable challenges than participants from British Columbia. The proportion of participants reporting each actionable challenge is presented per province within Figure 5.2. For each challenge and complimentary enabler, provincial differences are detailed and supported by narrative quotes throughout this section.

Challenges and Complementary Enablers for Optometry Outreach								
<i>Challenges</i>	LOGISTICS	<i>Enablers</i>	<i>Challenges</i>	ECONOMICS	<i>Enablers</i>	<i>Challenges</i>	ORGANIZATIONAL	<i>Enablers</i>
A. Equipment			D. Financial Burden			E. Community Coordination		
1. Travel burden. 2. Risk of broken equipment. 3. Access to in-office testing equipment.	I. Investments for optometry exam lanes within existing community infrastructure.	1. Financial risk from rejected claim submissions. 2. Fragmented mobilization funding in SK and MB. 3. High staff wages during outreach visits. 4. Inadequate exam reimbursement in SK and MB.	I. See B.I II. Dedicated optometry outreach funding for mobilization and staff support. III. Negotiate with payors for improved exam remuneration.	1. Maintaining community connections. 2. Limited clinic space available in some regions.	I. Dedicated institutional contact between association and community governance. II. Capacity building for dedicated optometry clinic space and optometric assistants			
B. Data Access			F. Professional Support					
1. Access to PX information to determine exam eligibility.	I. Agreements between communities, payors, and providers to facilitate appropriate data sharing.			1. Overlapping service delivery from other eye care providers. 2. Difficulty in identifying areas of need.	I. Support from Provincial Associations of Optometry to inform coverage and gaps in care, and to protect existing provider-community relationships.			
C. Administrative Burden								
1. Staff time required for inefficient claim submission process.	I. Engagement with payors to improve billing software. ii. Support for billing during outreach initiatives							

Figure 5.1: Descriptive summary of challenges and enablers of providing outreach optometry within Indigenous communities. (N=11).

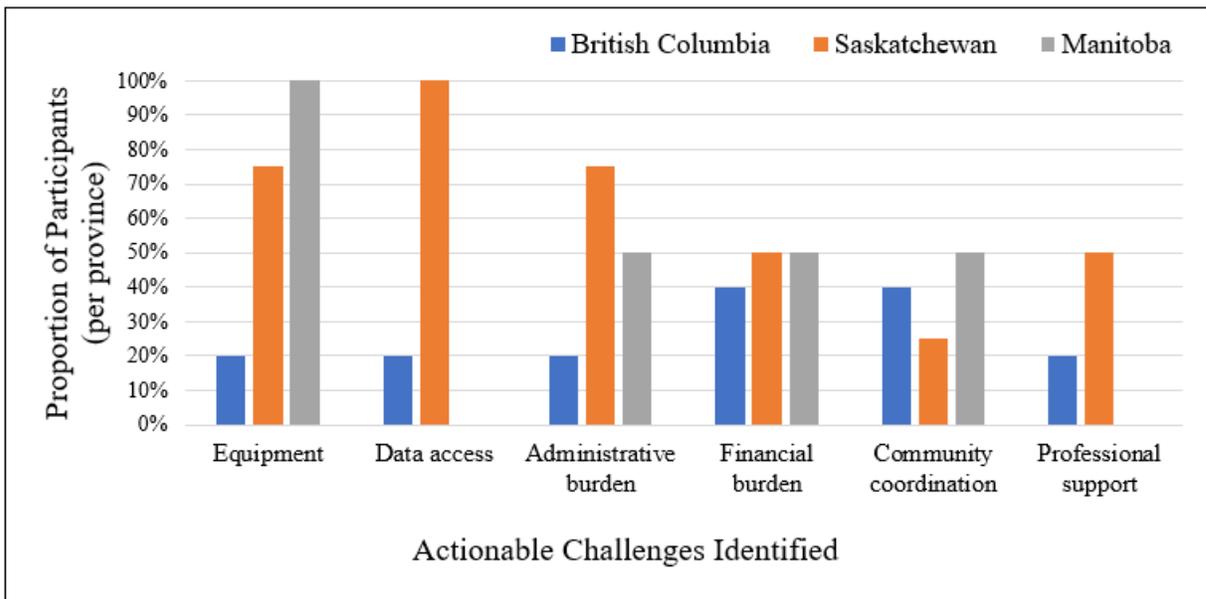


Figure 5.2: Proportional reporting of actionable challenges associated with providing outreach optometry care to Indigenous Communities in British Columbia, Saskatchewan, and Manitoba. (N=11)

5.3.2.1 Logistic Challenges and Enablers

Equipment

Equipment challenges reported included the initial investments for mobile equipment, missing, lost and broken equipment, and desire for in-office testing equipment:

“My initial hurdle was getting the equipment that I needed to be able to do it. So, purchasing a handheld slit lamp and purchasing the phoropter arm.”

“I package [*the phoropter*] up, I put it in foam, I package inside another box and hopefully it makes it there all in one piece. I actually have shown up and found it cracked in the middle in two pieces, which, it’s made of cast iron and a \$10,000 piece of equipment. So fortunately had some ties with me, lock ties. So, I’ve kind of put it back together to salvage the trip.”

“You can still do all the elements of a basic eye exam with the handheld stuff. It would be nice to have all the other stuff but it’s not really feasible [*to transport*].”

One participant who leaves some equipment in community, reported challenges in being able to find that equipment when they return.

“Sometimes we can leave some equipment up there. Like not the optometry equipment, but we leave the kind of vertical frame boards that we have, OK and few other things. And sometimes somebody moves them, but nobody knows where.”

Access to equipment is an enabler. Multiple participants from Saskatchewan and Manitoba had reported that investing in clinic space in the community would eradicate these challenges and prove to be cost effective:

“That would be the big thing- equipment that can be securely locked and left in the community. Not a community visit has gone by where we didn’t forget something. Sometimes it’s really minor, but sometimes it’s really important, like the visual acuity chart.”

“And if we could eventually get equipment into some of these communities, that would make it a lot easier for optometrists to jump on the plane with a little suitcase. You know, for three days, five days, whatever. Cost wise, I don’t think it would be hard to convince governments to do this when we look at what they spend.”

Evidence to support this enabler is provided by participants from British Columbia who have access to in-office equipment. Participants reported the benefits of the reduced travel burden and increased range of testing possible:

“So being able to provide that has really kind of increased the quality of care that we’re providing, and it also has kind of, I’d say, decreased the planning logistics of going out [*for visits*] in that we don’t have to pack quite so much relative to other communities.”

Data access

Access to patient information before an outreach visit is a challenge reported by nine out of eleven participants. This information is required to determine eligibility for exams and glasses (NIHB clients) or obtain mobilization funding from FNHA (BC). Participants from Saskatchewan reported this as the number one challenge of doing outreach visits. Participants reported that community support for this challenge varies. Patients may be not-covered under insurance, already have used their benefits, or not have accurate personal information to submit a claim. Participants reported taking the risk to see the patient and then attempting to piece together missing or incorrect patient information after the visit:

“You just can’t wait to get that eligibility information with the patient in the chair. You have to see them and take the chance.”

“The schools in Saskatchewan, as far as I know from the principals, they do not carry some of that personal and private information in their school systems anymore, which has made it a little bit more challenging for us. We tend to work then with the medical clinic to try and help with the school clinics. But sometimes that can be challenging too.”

Agreements to facilitate data access is an enabler. Data sharing solutions reported by multiple participants would be to include optometry within the trusted circle of care, while maintaining sensitivity to First Nations personal data and information. Participants recognized that not all patients may have all their necessary information (accurate name, date of birth, treaty number), where a solution to access information must be resolved at the organizational level. Multiple participants from Saskatchewan shared their suggestions for a secure database to facilitate trusted access to this necessary information. For example:

“So, we need to make it easier to get information, to bill information, you know, to go ahead and do our jobs. It just requires some coordination with provincial and federal governments that are, you know, handling these billing platforms or data platforms.”

Evidence to support this organizational enabler was provided by one participant from Manitoba who has an existing agreement. A patient eligibility list is provided by NIHB ahead of time and kept in the hands of a trusted community contact. The information is not directly released to the optometry team and is referenced as required to verify eligibility and patient information. This was reported to also relieve the burden of pre-scheduling patients:

“So, what NIHB has done now is they will actually compile what's called an ‘eligibility list,’ which is basically a list of everybody in that community by band number. The 10-digit band number, the 1st 3 numbers actually designate the community. So, if I go into a community, let's say [Redacted], their first three numbers are (###), so they'll do a search of their database of all the (###) numbers and actually print out a list. It's 100 pages long and with the eligibility of exam or glasses.

NIHB wanted to go through the community first, they won't give that to me myself because of the privacy legislation. So, it has to go to somebody in the community, either the nurse in charge who has access to those records already, the health director, or maybe even the community health representative, and then they, at their discretion, they can share information with me. That list is really a requirement because otherwise you could end up seeing a lot of people who aren't eligible.”

Administrative burden

The administrative burden of billing through NIHB ExpressScripts portal is both a logistic and economic challenge. Most participants from Saskatchewan and Manitoba reported the administrative burden of billing. The process is reported to be redundant, inefficient, and there is a high rejection rate for approvals from inaccurate patient information (*See Table 3.6 for descriptive quotes*).

An improved billing process, or organizational support for billing is an enabler. Participants from Saskatchewan and Manitoba report that there needs to be a co-developed solution to this issue. Two participants addressed the issue in slightly different ways, highlighting how improving the billing process would benefit the patient, and how this would reduce the burden on the optometrist.

“We have to work with is the other stakeholders that are involved in the billing, the integration, the data... We need to fix this. We can't have a system where one of the barriers is just that it's too complicated to bill and to find the information, right? If the patient wants to be seen, and the only reason I'm not seeing them is because I can't get a prior approval in time or I can't get their health number or date of birth, that's a problem, right?”

“If we wanna get more optometrists doing this work, we have to make this computer program that Express Scripts is using a little more friendly. It's one thing if you have a staff person assigned to sit there for an afternoon muddling through all these Express Scripts, submitting and resubmitting. But if you're going to be doing it on mass, it's an incredible amount of work that doesn't need to be done.”

Evidence to support this enabler is reported by a participant from British Columbia. One participant commented that the switch from NIHB to billing through Pacific Blue Cross through FNHA had reduced the administrative burden of pre-approvals and reimbursements (*See Table 3.6*).

5.3.2.2 Economic Challenges and Enablers

Figure 5.2 shows a similar proportion of participants from each province reporting financial burdens. The interview results show the provincial difference in which types of financial burdens were reported.

Rejected Claims

The financial risk from seeing ineligible patients during outreach visits is reported within the data access section above. Participants reported absorbing financial losses from rejected claims that could not be resolved. Improved data access is reported as an enabler.

Mobilization Funding

Fragmented and inadequate outreach mobilization funding is reported as a challenge, particularly within Saskatchewan and Manitoba. Participants who provide care within northern First Nations communities reported eligibility for NIHB funding. Participants who provide care to southern communities rely on individual band council funding or have no mobilization funding available. A main financial challenge reported is the time and costs of travel. Outreach visits may be a financial risk for participants without funding, especially when visits are cancelled due to circumstances beyond control. NIHB is reported to cover travel for a cancelled visit, but not the providers' time:

“So much time is lost and wasted to travel. It’s not a money thing but at some point... Not many people can afford to take three days off their practice, fly up to [*Lay-over community*], sit there for three days and come back. There are several trips where I didn't see any patients at all. (*due to weather*)... And NIHB gives me a lot of freedom to just make those decisions on whether to cancel the trip. I don't have to get approval. When I come back, I just submit the receipts.”

Accessible optometry outreach funding is reported as an enabler. One participant who does not have a funding option had reported that a financial aid program would be an enabler:

“In terms of like loading up a trailer, getting the equipment that I need, the gas, lugging my staff down there, no, we don't get currently reimbursed by the band or the province or anything. So that’s where I know that in British Columbia, they’ve kind of set up a financial aid that would be very, very, appreciated. We haven’t had that to date.”

Optometry outreach funding is reported to incentivize optometrists. Evidence to support this enabler was provided by participants from British Columbia who received BCDO Rural Access Program funding. Participants reported that the BCDO funding reduced the financial risk of outreach visits, and allowed for repeat visits:

“Some of the days that FNHA said they'd fund, we had lots of First Nations patients booked then, people just didn't show up. They [FNHA] really go into it and they're like, no, we're not paying for this. It just adds to the complexity of planning the trip. Now granted, [*Community*] is kind of the exception of the trips just because it's one of the few communities where there is such a large non-First Nations population [*as well*]. But it is very helpful with the rural access funding that you know, it doesn't quite break the funding down in that way. It just says, you know, this is a rural community. They need eye services.”

“It incentivizes the optometrist. It makes it easier for an optometrist to wanna go into a community... I found that it's helped my clinic and has helped me provide more options for the

community and more regular visits because we have the funding for it. The regular business has been a key factor. Now we can go more regularly because we can actually afford to go there.”

Outreach funding is reported to have a secondary benefit for communities. One participant recognized that the BCDO funding reduced the burden on the individual communities who would otherwise obtain sponsorship to fund the optometry visits:

“The Rural Access fund, it made a difference, I think on the community end, that they didn't have to get as much sponsorship to make it happen.”

Staff Wages

Extra staff wages required for outreach visits are reported as a financial burden. All participants reported an increase in staff hours for the pre-planning and administration required after a visit. Participants from British Columbia reported that there is a high number of over time hours required during outreach clinic days (*Table 3.6 for descriptive quotes*).

Staffing support, or funding for staff wages is reported as an enabler. Participants from British Columbia reported that funding for staff wages or hiring of a central “floating staff” for outreach visits would reduce the burden on their primary practice:

“My staff are already overworked. So that [*a floating staff member*] would help during that summer burnout. Everybody gets burnt out during the summer because of all these vision clinics we do.”

One participant from Manitoba suggested that NIHB should cover community-hired staff wages, instead of covering travel funding for a staff member from the primary clinic location:

“I know that NIHB, they've got a travel section and then they've got a section that coordinates the specialist going up, and they don't really communicate or share budgets... They'll pay for the travel for my assistant to go up and back.

So, they're willing to pay \$1500 to fly an assistant up and \$1500 to fly them back, total \$3000. And what I said, well... ‘Why don't you let me take that money and pay an assistant \$20.00 an hour for the, you know, the 40-50 hours of working in a week instead of paying the travel?’

And they said, ‘Well, that's a different budget that comes out. That's a travel budget that's different from what we're dealing with.’ So, they don't really look at the global picture. So somehow, they've got to tie it all together.”

Reimbursement

Exam remuneration is reported as a challenge that makes outreach care less financially feasible, reported most often by participants from Saskatchewan and Manitoba. Participants from Manitoba and Saskatchewan reported a lower vision benefit coverage from NIHB, than what is provided in British Columbia through the First Nations Health Authority. Participants reported seeing a higher number of patients during outreach visits to make the same remuneration as they would within their primary clinics:

“It's not all about the money, but at some point, it has to be because the economics have to make sense for an optometrist who's gonna leave his office, who is able to book appointments at \$120.00 [*down south*] and go up north and spend a day travelling. During the 12-hour day(s) that you're working, you're seeing a lot of people, you're dispensing a lot of glasses, treating a lot of eye disease, but it's still one heck of a trip to get up there and get set up.” (*Manitoba participant*)

“Reimbursement is an issue... NIHB reimburses \$80.00 for an adult [*In Saskatchewan*]. So basically, it's like you have to see twice as many people to make the same amount of money that you would in an office. So that's a barrier.”

5.3.2.3 Organizational challenges and enablers

Community coordination

Building and maintaining the continuity of community relationships is reported as a challenge. Multiple participants reported a high turn-over of community contacts (*See section 5.2 for descriptive quotes*). Additionally, some participants reported long response times between communications. Two participants from different provinces commented that communication is easiest in person, which is not always feasible. Having a dedicated liaison at the organizational level is reported as an enabler to facilitate new relationships and establish connections to maintain continuity.

“If there was maybe like someone a coordinator from the association or for the government that just made health directors aware like, ‘hey, this [*on-reserve optometry*] is something that's available. Let me let me connect you with someone that will come to your community.’ and I think that that would be valuable, because then it's not a cold call.”

“...And then again, someone who can help us with some of the support, the faxing, the calling, the administrative stuff, we just need someone who knows that community and that's the hard part, is just who? Who do I call? Where do I go and when do they want us?”

Limited clinic space in some communities is reported as a challenge. Participants reported instances where the shared clinic room may be double booked with other health care providers. Participants reported that community contacts must be aware of potential conflicts. Beyond improved community

coordination, capacity building to support dedicated clinic space is reported as an enabler (*Descriptive quote provided within section 5.3.3*).

Professional support

Multiple eye care providers visiting the same communities was reported as a challenge for providers and for the continuity of patient care. Participants from British Columbia and Saskatchewan reported that overlapping efforts are well-intentioned to improve the frequency of care, but they increase the burden for the providers who already have relationships. For example, one participant from Saskatchewan made the following comment:

“My concern is that right now there's such a rush trying to provide care. All of a sudden there's this emphasis on that. If you have five or six groups and then also practices that are trying to do this all at once, not only is it uncoordinated and then you'll have patients that overlap, but you'll also have a bit of a nightmare for the organizations too. So that's the hard part: Coordinating information and coordinating the different groups that want to be providing services. It's all warm and fuzzy when an ophthalmologist from (Other province) states he's coming to do free eye exams on the weekend, but the logistics of that is a problem. Because [redacted name] is also going to that same community. OK, did they see 100 people and who did they see, and when did they see them? Did they all get glasses?”

Organizational support from the provincial associations is reported as an enabler. One participant recommended a database, where individual optometrists may inform other optometrists where they visit, and to highlight gaps in access:

“We need that single database system where this group of optometrists, whether they represent two or three organizations or not, they can still communicate together.”

One participant had suggested that the associations support optometrists with long-standing relationships by preventing the overlap in outreach service delivery:

“I think that one of the big roles that the association is attempting to fill is to coordinate the patchwork of services, which I think is wonderful. In practice, they're doing that, but I've also seen that they're not actually necessarily enforcing that. They're not saying “No, this person was here first.”

Chapter 6

Discussion, Recommendations and Conclusions

6.1 Discussion

The aim of this project was to characterize the context of the current state of optometry outreach care provided to Indigenous communities in British Columbia, Saskatchewan, and Manitoba. Interpretation of the results allow for some comparison between the provinces. Recommendations to support a strategic approach to outreach optometry initiatives are provided.

6.1.1 Providing visibility to various outreach efforts

Outreach services are defined by the mobilization of providers to bring services to patients who otherwise face barriers to access.^{89,90} This study is the first to represent the outreach efforts of optometrists at the aggregate provincial level for multiple provinces. Optometrists visit some of the most remote communities throughout the year. Outreach visits are reported year-round in British Columbia and Manitoba. In Saskatchewan they primarily occur in the spring and fall, to see children during the school year. Overall, the highest frequencies of outreach trips occur during months with better weather, during late summer into fall. This study represented optometry care within 64 non-metropolitan rural and Indigenous communities across the three provinces, representing 8,386 patient encounters, and 316.5 clinic days across 96 visits.

Outreach optometry is an established method of service delivery, with longstanding relations lasting decades in some regions. Of the total community relationships reported, 20% were relationships established within the last three years. Newer relationships identified within the results suggests a trend that more optometrists are becoming involved in outreach efforts. It could be that these communities are receiving optometry care for the first time, having established new relationships to catch up with the demand for services following the peak of the covid pandemic.²² However, relationship durations are confounded by participants age and years in practice, which is information that was not collected for the questionnaire. It may also be that the participating optometrists have inherited pre-existing longstanding relationships from their mentors.

Outreach care begins with connections, where trusted relationships are key to facilitating community-based and patient-centered optometry service delivery. Interview results reinforce the importance of committed relationships for the impact on the continuity of patient care, which is an overarching sentiment that is represented in other Indigenous health focused research⁹¹⁻⁹⁴ and grey literature⁹⁵ in

Canada. Integration of local community health workers is reported by multiple optometrists to support cultural safety⁹⁶ during cross-cultural clinic days. The benefit of community health workers is reported for other Indigenous focused outreach services both nationally^{93,94,97} and globally.^{98,99} For example, it is reported that hiring local staff improves the enrolment and continuity of children's oral health care provided within remote Indigenous communities in Canada's North.⁹⁷

Overall, planning and delivery of outreach services was similar between the provinces, however there were nuances to individuals and between provinces. This is represented by the wide range and distribution of distances travelled, number of visits per year, and numbers of clinic days per visit. Participants choose how far and how often that they are willing to travel to provide outreach care, where they may stay in community overnight or provide day trips for nearby communities. Outreach visits are coordinated with community health staff, school contacts, or community leadership, where the clinic location is variable between communities. These differences show how the planning required for outreach is unique for each method and context of service delivery.

The results show how outreach optometry care can be highly individualized according to provider preferences and community contexts. This study identified optometrists who provide care occasionally, as well as some optometrists who are semi-retired and do outreach optometry as their primary mode of practice. There is an element of choice for incorporating outreach visits within personal constraints and availability, thereby encouraging more optometrists to engage with outreach initiatives.

6.1.2 Access to equipment

Optometrists dedicate their resources to travel with equipment for primary comprehensive eye examinations. Multiple participants reported personal investments in ophthalmic equipment that is modified for easier transportation (*mobile equipment*). Modifications are permissible as long as the equivalent standard of practice is maintained. For example, studies show that there is comparable agreement between retinoscopy and autorefraction as tools to obtain objective refraction results in school age children.^{100,101}

Equipment availability during outreach trips was queried, which identified that visual field devices, optical Coherence Tomography (OCT) devices, and pachymeters are not available for a proportion of outreach visits reported in all provinces. It is unsurprising that visual field and OCT devices are commonly left behind for outreach visits across all provinces because they are logistically challenging to transport. Visual field (VF) analyzers assess patients central and peripheral vision to detect for visual defects¹⁰² and OCT devices obtain cross sectional ultrasound images of the eye to assess the eye health and detect ocular abnormalities.¹⁰³ Both OCT and VF analyzers are used routinely for patients with eye

disease. These devices generally have a large footprint and are not meant to be transported because of the sensitive calibration. Pachymeters are a device to measure the central corneal thickness (CCT), a relevant metric for glaucoma patients.¹⁰⁴ CCT may be measured by a physical pachymeter, that must come into contact with the eye, or by non-contact methods using OCT devices or slit-lamp attachments.¹⁰⁵ Interview data suggests that patients with complex needs are referred out for monitoring, influenced by the constraints of visit frequency.

There are recent technology advancements in the development of mobile OCT and VF devices, which may be used as solutions for outreach optometry care.^{106,107} Mobile solutions are beneficial to providing optometrists with the flexibility to travel. However, the benefit of mobile equipment solutions will depend on the context of outreach visits, as some participants who already use mobile equipment for fly-in communities have reported a significant travel burden.

A hybrid model for the use of mobile and in-office equipment availability during outreach visits is modelled in British Columbia. The BCDO tele-optometry enabled locations allow for a “hub and spoke model”^{108,109} for equipment access and service delivery. Stationary equipment within strategically located rural First Nations Health Centers serve as the primary hub, and mobile equipment is used for additional outreach to even smaller surrounding communities (spokes). During a single outreach “trip” a participant may visit multiple communities. The presence of optometry within larger rural centers builds trust and visibility for patients from smaller centers to receive advanced care closer to home. The results provide evidence to support the investments for in-office equipment within strategic rural centers, to improve provider experience and improve patient access to additional testing.

6.1.3 Geographic spread of outreach services

Optometrists travel to visit some of the most remote regions within the provinces represented. Optometrists generally travel North from their primary clinic locations to visit communities that primarily fall above the normal distribution of remoteness ranking in Canada. Data includes representation of communities that rank within the top 3.7% of Canada’s remoteness index.²⁰

An environmental scan of outreach optometry in Ontario concludes that school visits to fly-in remote communities have better access to optometry care than less remote (rural) communities, due to the focus of outreach support for the most remote areas.¹¹⁰ The results obtained for BC, SK and MB contrast the trends reported in Ontario, showing that optometrists travel a wide range of distances from their primary clinics, including near-by rural communities at a minimum Euclidean distance of 65 km and very remote northern communities.

The trends of distance travelled by optometrists within each province may also suggest which regions require targeted inquiry of the current state of outreach service delivery. The questionnaire response rate was comparable to other online surveys for health professionals.^{111,112} However, a questionnaire response rate <100% means there are gaps remaining, therefore it cannot be assumed that areas not represented are not receiving any outreach optometry care. Within the data set, most participants from Saskatchewan travel to communities that are near to their primary practice, with less participants providing care to communities that are very far. This may suggest a need for identifying the current state of service delivery within areas that are >500kms (*Euclidean*) from a bricks and mortar optometry clinic. In British Columbia, there was a somewhat bimodal distribution of distances travelled, suggesting further investigation for communities within medium distances represented (250-750 kms). Distance data in Manitoba is limited by a small sample size (n=4). Communities in the ranges not captured by the study may benefit from additional outreach efforts. For communities accounted for, further regional analysis would need to account for the confounders of population demographics, accessibility of community, and distance to the nearest bricks and mortar optometry clinic, as it is not always the closest optometrist who provides the outreach care.

6.1.4 Outreach services in 2022

For some communities, outreach services are a temporary solution in the absence of rural health care providers. In other communities, where small population needs are not high enough to support a full-time provider, outreach care can be a sustainable solution.^{52,70} The impact of outreach health care service depends on the community needs.⁵² Community-led optometry needs assessments would inform areas that could benefit from a transition from outreach care to the community capacity building and workforce recruitment for permanent optometry clinics. For these areas, tele-optometry may be a promising solution to bridge to gap for year-round access to the full scope of optometry services.^{44,52}

The purpose of this study was not to assess the community demand for outreach, though the results provide a benchmark of the current state of service delivery, which is related to patient utilization. Eighty-four percent of communities represented in the study receive one outreach visit per year, with a variable number of clinic days per year. Patients from communities receiving repeat visits have opportunity for follow-up care, where communities without repeat visits would need to be referred out for any follow-up required before the next optometry visit. The number of patients seen in relation to community population data was beyond the scope of this study, as investigation would need to involve individual communities.

It was identified within the interviews that annual outreach visits may not be satisfactory to meet comprehensive eye care needs beyond primary care optometry, especially for larger communities,

communities without road access, and patients requiring complex or frequent follow-up care.¹⁴ One participant reported how they time their visits according to the NIHB vision benefit schedule for glasses.⁶⁷ This is a useful reference for visit frequency, though it does not account for clients who are eligible for medically necessary optometry care in between bi-annual or annual eligibility.

Most outreach visits are to provide primary optometry care. There is limited “specialty” optometry care being provided during outreach visits (Low vision rehabilitation, specialty contact lenses, and vision therapy). Some interview participants had mentioned alternative accommodations to provide contact lens services for community members, and follow-up visits for vision therapy. It is unknown if low vision rehabilitation is currently provided during outreach visits. Both low vision rehab and vision therapy are optometric services that may be provided remotely through tele-optometry.¹¹³ This is an area for future investigation, particularly for the communities in British Columbia that have access to tele-optometry enabled equipment.

Outreach visits are primarily coordinated and delivered through health centers and schools. Coordinated services supported by familiar front-line staff and within a central and familiar Indigenous-centric space, has been shown to improve utilization and satisfaction of health services,^{28,114} including eyecare.^{93,115–117} Location of outreach visits was different between provinces. British Columbia only reported health center visits. Saskatchewan reported a high number of school visits. Manitoba is not considered within this comparison due to the comparatively smaller sample size and variation of primary contacts reported. The difference between BC and SK is reflected in the opposite proportion of adults and children seen between the two provinces. In 2022, participants from Saskatchewan reported primarily seeing children (78% of exams reported) and participants from British Columbia reported primarily seeing adults (76% of exams reported). Considering the transfer of health services from NIHB to FNHA,⁶⁶ the health center trend reported by participants from British Columbia is unsurprising. However, the results from the current study led to the question of why there were less children seen and no school visits reported by participants from BC.

Census of population data (2021) was referenced to identify if there is a population skew that could explain the different proportions of patients seen during outreach care in either province. Population data for school-aged children (5-14 years) with census reported Indigenous identity were compared for all provinces. No obvious trends to explain the results reported in BC and SK were found. Province-wide sub-populations are similar (range: 40,935 - 50,510)⁶², where Saskatchewan has the lowest school-aged population (40,935)⁶² compared to British Columbia (50,510),⁶² with Manitoba populations falling in-between (49,070)⁶² (*for reference*). This comparison is limited as the population data are not specific for

rural and remote dwellings. The most likely explanation is the coordination of outreach care in health centers for BC versus schools for SK. There may be other programs to support eye care for children which were not captured within the sample of eligible participants who avail of BCDO rural access funding. Additional investigation specific to school programming for eye and vision care would be beneficial and may explain the lower proportion of glasses dispensing for children patients in BC.

A large range of patients seen per outreach clinic day was reported (5-82 patients per day.) The number of patients that an optometrist can see in one day will vary according to the complexity of each case. The difference in number of patients seen per day between BC and SK may be explained by the number of children and adults seen by the participants. Participants from Saskatchewan can see more patients across a similar number of outreach visits and clinic days, as they are seeing a higher proportion of children. Comprehensive eye examinations for adults may take longer than exams for children because of the increased risk for and prevalence of age-related eye conditions,^{118,119} including presbyopia, cataracts, diabetic retinopathy, age related macular degeneration and glaucoma.¹²⁰ Multiple confounding factors (hours of clinic days, number of staff members on hand, and patient ages) prevent conclusions regarding statistically significant differences in the number of average patients seen per external clinic day between the provinces.

The difference in children and adult examinations provided is also reflected in the top eye and vision conditions reported for each province. Most ocular pathology is age related. Children have a higher prevalence of refractive error than ocular pathology¹²¹ and cataracts are an age-related eye condition,¹²⁰ supporting the results that cataracts were the highest-ranking condition in BC, and refractive errors were the highest-ranking condition in SK. Caution should be taken in comparing top ranked conditions between provinces. The ranking system used within the questionnaire is not a quantitative representation of how many patients had these conditions. The data only captured the diagnoses frequently managed during outreach visits, without direct linkage to the prevalence of the condition within each community population. The result of the top diagnoses reported is further limited by participant reporting. The difference between each rank value was up for interpretation by the participant, and some participants reported diagnoses with differing levels of specificity.

Unsuccessful outreach visits are a reported reality. If visits are not well coordinated, or circumstances beyond provider's control arise, outreach visits can be a risk. Interview data captured anecdotal stories from optometrists sharing times that they had planned a visit and ended up seeing zero patients, either from weather and travel challenges, poor communication, or conflicting community events. It is reported that NIHB will provide coverage in these cases. The results are not clear for FNHA coverage. There is

significant financial burden of failed outreach visits for optometrists who do not receive outreach funding, which could inhibit participation in outreach service delivery that is year-round.

In contrast, high demand for eye care, particularly for school aged children can result in very successful outreach visits. Interview data provided context for the high number of patients seen per day. Participants reported having a highly coordinated process following decades of experience doing outreach school visits, where they see children during the day and adults into the evening. During 12+-hour clinic days, patient flow is supported by multiple staff and community members. Paperwork for each potential patient is prepared ahead of time. The motivation to see so many patients is from the desire to meet the primary needs for correcting refractive error, as defined by the collaborating communities.

For outreach visits, providers have found creative ways of dealing with frame adjustments since no optometrist or optician would be present to adjust frames when delivered. Participants shared that they pre-adjust the exact frames and/or do measurements in advance to make sure that the glasses dispensed will fit. For interim adjustments, it is suggested by participants to train health center staff within the community for availability of this service year-round.

6.1.5 Costs incurred during outreach visits

Outreach care is not financially motivated, but it still must be financially feasible. Less financial pressure on the provider improves the opportunity for more patients to receive care during a single visit, thus making the most of mobilization funding provided for each visit. A lack of financial incentives is related to rural physician burnout,⁹⁴ and is therefore a valid consideration for the retention of current outreach efforts and recruitment for future expansion.

Mobilization costs are reported to be highly variable per clinic day. Due to this variability, reporting of average cost per clinic day must be interpreted with caution. The average cost per patient seen was not reported due to the variability in the number of patients seen, and individual patient needs in different communities. The average cost per clinic day provides a starting point to representing the costs associated with outreach visits, where further investigation is necessary and out of scope of this thesis.

To understand the variation represented in the data, economic analysis backed by receipts must account for the market costs of travel, food, and lodgings, and distances travelled within the communities visited in either province. Additional further investigation is required to develop appropriate financial models for reimbursement of outreach expenses, according to each provincial and regional context. Negotiations with participating optometrists would inform the preferences for incentivization of outreach care.

The community demand and pressure to make the most of mobilization funding provided are identified as motivators to work hard during outreach visits, with clinic days often running into over-time hours. Without staff funding, optometrists incur overtime wages, which can offset the potential economic benefit from additional patients seen. Alternatively, optometrists may turn down patients to not incur additional costs. Optometrists are responsible for their staff wages, however additional funding for staff travel and over-time would appear to be of benefit.

6.1.6 Improving service delivery

It is recognized that optometrists in independent/primary care settings may not have the capacity to direct structural changes without the support of dedicated health care improvement teams or programs that may be supported in other health care systems.¹²² Therefore, it is particularly important to recognize the roles that peer relations, support from the professional regulators and associations, and payors must play in supporting the changes and opportunities required for improved outreach service delivery.¹²²

The workload reported to be associated with these types of outreach clinics raises the question towards sustainability and provider burn-out. Rural and locum health care providers, including optometrists, are reported to have a higher workload burden and lower work life balance.^{94,123–125} Despite the best efforts from participating optometrists, results show that the current supply and demand for Indigenous outreach optometry are not balanced, signalling the need for strategic improvement and increase of outreach service delivery, with the support of all stakeholders.

Priority areas for improvement differ according to the provincial context, where the provinces have different degrees of environmental support from associations and payors. Results from British Columbia may be used as a case example to show how improvements to environmental support reduces the burden on providers. Participants from British Columbia reported less challenges than participants from Saskatchewan and Manitoba. BC is the only province to have dedicated optometry outreach programming provided through the provincial association, and the responsibility of the First Nations vision benefit is transferred to FNHA. Logistical challenges related to mobilization costs, claim submission, and access to equipment are reduced because of the accessibility of BCDO rural access funding, BCDO equipment sites within some communities, and higher remuneration, plus an easier claim submission process for First Nations exams through FNHA-Pacific Blue Cross. There is a need for structural collaboration between optometry and NIHB within SK and MB, to address financial and administrative challenges reported to improve provider experience and maximize the benefit of current mobilization funding.

Individual optometrists rely on their community connections, especially in the absence of an established coordination of services for optometry care. Maintaining community connections has been

reported as a challenge from participants in British Columbia and Saskatchewan, due to the turnover rate of contacts within the school or health center. This rate of turn-over is a structural issue that has been acknowledged with the First Nations Health Authority Evaluation Report (2020), having been cited as an area for improvement.⁶⁶ The results show that participants suggest that improved coordination between optometry representatives and FNHA/NIHB or community governance would foster the institutional trust for continued relationships and identification of community eye and vision care needs.

Professional coordination amongst optometrists, communities and regulatory bodies is essential to prevent redundancy of services between eye care providers. It is important that communities have options for who provides their eye care, however, overlapping “one-off” visits have created unintended consequences for the pre-established optometrist and for the patients, suggesting the need for communication and coordination. Overlapping efforts result in high rejection rates for the regular visiting optometrist when patients do not realize that they have used their full benefits. Patients may show up to the pre-established optometrist to fix issues with glasses that they did not dispense. This project has re-enforced that outreach care is built upon trusted relationships;²⁶ Therefore, encouraging stakeholder dedication to coordinate services and redirect efforts and resources to communities that do not receive any eye and vision care to reduce redundancy and maximize access.

It is anticipated that improved internet access for rural communities will improve the delivery of outreach care. Participants use either paper charts or Electronic Medical Records (EMRs) during their outreach visits, contingent on personal preference or out of necessity for communities without reliable internet access. Logistical challenges from lack of internet access are anticipated to decrease as the Government of Canada continues to make progress towards Canada’s Connectivity Strategy,¹²⁶ to ensure access to high-speed internet across the country. Improving access for optometrists who use EMRs may support the continuity of patient care during outreach visits by retaining access to previous exam records without having to travel with paper charts.

Optometrists who participate in outreach care are motivated to improve access to care even in the face of the logistical, economic, and organizational challenges reported. Characterizing areas for improvement provides evidence towards the importance of coordination between stakeholders (payors, associations, and communities) to improve outreach services through improving provider experience, which may recruit more optometrists into outreach initiatives.

Additionally, there is potential for outreach visits to support community capacity building through visibility for a career in optometry. Recruitment of rural students and programming for rural exposure during professional education is referred to as the rural pipeline, which has been supported by a positive

relationship with rural retention in other health professions in Europe.^{127,128} Optometrists, provincial associations, and Canadian optometry schools may support the co-development of Indigenous-led programming, education, and incentives¹²⁷ to support Indigenous representation in optometry and the rural distribution of optometrists in the country.

6.2 Recommendations

Recommendations are generated from the project results and interpretations (Table 6.1). Five general recommendations are suggested to support the considerations for regional specific guidelines for the coordinated delivery of outreach optometry care. The primary audience for these recommendations is members from the provincial regulatory bodies, however, the recommendations require engagement amongst all stakeholders: individual optometrists, professional regulators, payors, and community representatives.

Table 6.1: Recommendations to improve optometry outreach service delivery in collaboration with Indigenous communities.

Recommendation	Purpose
1. Assess and monitor the current state of outreach optometry	To establish baseline data to inform gaps in services and support coordination of future outreach initiatives.
2. Build trusted structural relationships between organizations	To support continuity of relationships and collaboration towards a sustainable model for access, created in response to the needs of providers and patients.
3. Invest in community-based clinics.	To improve provider experience and increase patient access to in-office equipment.
4. Incentivize outreach care.	To increase number of participating optometrists by reducing financial risk.
5. Make outreach care a strategic priority and standing agenda item for interprofessional and interorganizational¹²⁹ collaboration	To improve service delivery and work towards a common goal for improved access to eye care for Indigenous communities.

6.3 Implications and Future Directions

Implications

This thesis provides a blueprint of the current state of outreach optometry within Indigenous communities in three Canadian provinces. The results provide a snapshot of logistical practices, current state of service delivery, and provider experience that may encourage participation in outreach initiatives and be used as a benchmark for future research and planning. The methodology has potential to be transferrable to other provinces and other sub-populations who benefit from optometry outreach efforts, such as outreach efforts for homeless and precariously housed populations¹³⁰⁻¹³² and populations living in long-term care homes¹³³. Overall, this project may be of interest to optometrists, other health professionals, payors, and policy makers to facilitate improvements to access to primary eye and vision care for multiple sub-populations within Canada, where the implication is to improve eye and vision health outcomes.

The evidence of the current state may be used for the continued monitoring and evaluation of outreach optometry care. The results of this study are useful for the provincial associations of optometrists. As per sharing agreements, the data representing communities visited during 2022 has been mapped in relation to primary optometry communities within the provinces. This snapshot-environmental scan is to be used by the associations for the purpose of identifying potential gaps in care and directing outreach efforts. Logistical data has been used by the associations to support the dialogue around outreach efforts with association members during annual general meetings during spring, 2023.

Detailed representation of outreach optometry service could generate interest amongst new or hesitant optometrists who are interested in providing outreach optometry care. Procedural factors may be of interest to individual optometrists or other health care professionals who are looking to build capacity for providing outreach services within Indigenous communities. However, they are not to be used in place of individual community engagement and preferences.

Discussions between stakeholders may be facilitated by the results and recommendations presented. These discussions may support meaningful progress towards a common goal for improved service delivery, and ultimately improved access to year-round eye and vision care from solutions that are co-developed and tailored to the unique needs of specific communities, health regions, and provinces.

Future directions

The results of this study are presented in aggregate and are intended to be an overview of the current state. Therefore, there are several specific short and long-term research opportunities that may be pursued. Future directions must follow best practices for community based participatory research,^{53,54,134} therefore, this section only provides suggestions that may be used as a starting point in advance of community engagement and incorporation of Indigenous perspectives, priorities, and ways of knowing throughout future research projects.¹³⁵

Suggested future directions include continued investigation of Indigenous outreach optometry care along the elements of the quadruple aim framework for health system assessment,¹³⁶⁻¹³⁸ to continue monitoring provider experience, and to assess economic impact, patient experience, and health outcomes.

The costs of outreach care (mobilization costs and reimbursement rates) could be explored further, with improved data quality to report the true costs of outreach care covered by payors and covered by individual optometrists. Return of investment for on-site optometry equipment could be investigated in relation to patient travel costs avoided, and equipment transportation costs saved. Economic studies could inform a potential “premium” added to reimbursement of exams that are provided through outreach visits, to incentivize outreach optometry. Longitudinal studies could investigate relationships for communities with local access to outreach care and the impact on downstream eye-related health expenditures within the region. For example, Lavoie et al., (2010) show that First Nations communities with access to on-reserve primary care had less urgent health care expenditures from ambulatory services and emergency room visits in Manitoba, which has implications for economic benefit and improved outcomes.¹³⁹

Patient experience, utilization, and cultural safety of outreach visits could be investigated. The results show that most participating optometrists reported elements of culturally safe care⁹⁶ during cross-cultural outreach visits, including the incorporation of local community health care workers and Elders, and personal reflections. These results are something to be celebrated, however, they should be interpreted with caution as they do not conclude that all optometry outreach reach efforts are to be labelled as “culturally safe.” This was not the purpose of this study and warrants future research. For example, a study of patient experience with an on-reserve arthritis clinic within a First Nations

community in Alberta found that the service delivery of outreach clinics had passed monitoring and quality assessments, though patients had identified that there were improvements to be made to improve patient-centered care.⁹¹

Future research to incorporate virtual outreach in complement to the current outreach efforts are warranted. Tele-optometry is an area of interest from multiple stakeholders, due to the potential to improve access and reduce costs.^{6,44,140} When considering the challenges associated with delivery of rural care,^{141,142} it is important to confirm that new systems, such as tele-optometry, work within the unique context to ensure uptake and sustainability. Future assessments of tele-optometry must be co-designed and factor in the social and cultural context of each participating Indigenous community.

6.4 Strengths and Limitations

The main strength of this project is from the collaboration with provincial associations, and optometrists. Mixed-methods analysis is a strength of the study. Follow-up interviews provided additional context to questionnaire results received. Qualitative data provided rich information from a highly engaged group of optometrists, with a wide array of experience participating in outreach care. Limitations come from self-selection participation bias, questionnaire validity and data quality, statistical testing, and timing of individual semi-structured interviews.

Participants were highly engaged and passionate about providing outreach care. There may have been self-selection participation bias, favouring optometrists who are already highly engaged. Optometrists who are not interested in or have failed to succeed in providing outreach visits were not represented in the study. Inclusion of these provider perspectives would improve the reporting of challenges associated with outreach optometry care. The overall representation of the target population was relatively high at ~40% response rate for each province, although, there were eligible optometrists who did not participate in either questionnaire or interview. Data representing the current state of service delivery must be interpreted as a snapshot, not a complete environmental scan, due to the less than 100% response rate.

The questionnaire was reviewed iteratively through a stakeholder focus to inform content and clarity. However, it was the first time that the questionnaire was released. A major limitation of this project is from the validity of questions and resulting quality of survey data collected. High response

time indicates the need to trim down the survey to reduce the response burden. Survey metadata showed an average of 18.4 minutes to complete the question block for each community visited. Data from British Columbia is limited as not all participants had reported all questions for each community they visit. This was because of the response burden for optometry teams that provide care to over a dozen communities within the span of one year.

Multiple participants inquired about specific questions through contact with the project specific e-mail. These questions are to be flagged for improvement in iterative versions of the questionnaire. Inconsistent data reporting helped to identify questions that were unclear. For example, a multiple-choice question was used for participants to indicate their primary methods of travel. The options included “summer roads,” and “winter roads,” however, ‘winter roads’ was not specific language to differentiate between driving on roads during the winter versus ice channel formations during the winter. Some questions were omitted from the final data reporting because of low response or inconsistent responses between participants. For example, participants were asked to report the presence and estimated wait times for other health services within the communities they visit. Response rate for these questions were low and there was no way to confirm the validity of responses provided.

Several questions would be better pursued as individual studies coordinated with specific organizations. For example, the ranking of top diagnoses encountered during outreach care would be more suitable for retrospective file review completed in collaboration with all relevant data stewards (Indigenous patients and providing optometrists). This self-reported and aggregate data collection is beneficial as a general benchmark in the absence of other data, though the statistical impact or implications are limited.

Cost data reported is limited by participant reporting, and costs were not reported for all communities represented in the total data set. Therefore, total sum costs are anticipated to be higher for each province than what was reported. It was assumed that repeat visits across the year would incur the same costs as reported for a single visit. For participants who reported repeat visits, it is unknown if they had provided an average cost per category for one visit, or if they had used actual values from a single visit as an example.

There are limitations in the statistical testing reported for comparisons between provinces and communities reported. The questionnaire data collected for each community are dependant upon the participating optometrist who may report data for multiple communities. Another layer of dependence is factored in at the provincial level, where participants are nested by province. The data were assumed to be independent for the purpose of hypothesis testing. In reality, the data for each community are non-random and dependent on the nesting of province and provider. Uneven sample sizes and non-parametric results complicated the statistical testing of questionnaire responses. Applying an assumption of independence can increase the likelihood for type II error,¹⁴³ which is the failure to reject a null hypothesis that is false (aka: over-reporting significance). Unequal sample sizes may cause more sensitivity for significance. Conclusions of non-significance are limited to the reliability of the testing applied. Due to non-significant results for all testing reported, it is anticipated that any effect of the increased likelihood of type II error is minimal.

Individual interviews were beneficial for capturing a rich variety of information about the experience providing outreach care, though inconsistent reporting of logistical components limits the generalizability of interview data to represent any single province. There may have been shared experiences among participants that were not captured, as a participant may not have thought to share a specific detail during the interview. Focus groups would be a better approach to hear from all eligible optometrists within a specific region, and would signal to the areas of consensus for visit planning and consensus on challenges and enablers associated with outreach care. This limitation is especially true for the interviews with participants from Saskatchewan. The weekend before the interviews scheduling had commenced, eligible optometrists had gotten together to discuss Indigenous outreach care during their annual general meeting. This was reflected in the interview results as multiple participants spoke to the experiences of their colleagues as well, therefore it is possible that challenges reported for Saskatchewan were over-represented within the thematic coding (*Figure 5.2*).

6.5 Conclusions

Optometrists provide primary eye care within some of the most remote communities in Canada through outreach efforts beyond their primary clinics. This project provides visibility into the impact of trusted in person care provided to Indigenous communities in British Columbia, Saskatchewan, and Manitoba. Outreach requires considerable dedication and effort by optometrists. Variability between individuals, communities, and provinces require flexibility to adapt effective solutions to improve care.

Current challenges relate to the logistics, economics, and organizational support for outreach care. Primary enablers to increase the number of participating optometrists and number of outreach clinic days provided include investments in equipment, organizational support for a reduced administrative burden, and appropriate reimbursements for outreach care provided. Future community-based research is needed to represent patient perspectives of outreach care.

Recommendations to improve outreach service delivery include multi-stakeholder coordination and collaboration. Professional commitments to tailored outreach services are in line with the Truth and Reconciliation Commissions' Calls to Action in Health, by raising the standard for access to comprehensive eye and vision care that is close to home for non-urban Indigenous populations.

References

1. Canadian Association of Optometrists, Canadian Council of the Blind, CNIB, The Foundation Fighting Blindness. The Federal Role in Eye Health and Vision Care. Published 2017. Accessed November 1, 2022. <https://opto.ca/document/canadians-support-federal-role-eye-health-and-vision-care#:~:text=Canadians%20support%20a%20federal%20role%20in%20eye%20health,emerging%20crisis%20in%20eye%20health%20and%20vision%20care.>
2. McNamara NA, Polse KA. Community Health Centers: A Model for Integrating Eye Care Services with the Practice of Primary Care Medicine. *Optometry and Vision Science*. 2019;96(12):905-909. doi:10.1097/OPX.0000000000001458
3. Irving EL, Harris JD, MacHan CM, et al. Value of Routine Eye Examinations in Asymptomatic Patients. *Optom Vis Sci*. 2016;93(7):660-666. doi:10.1097/OPX.0000000000000863
4. The Canadian Council of the Blind. The Cost of Vision Loss and Blindness in Canada. Published 2021. Accessed July 13, 2023. https://www.fightingblindness.ca/wp-content/uploads/2021/05/Final-draft-summary-report-Cost-of-Vision-Loss-and-Blindness-In-Canada-2020-Summary-Report-5-3-2021_TA_CLEAN_COPY-EG.pdf
5. Centre for Disease Control and Prevention. Vision Loss and Age. Published 2020. Accessed June 14, 2023. <https://www.cdc.gov/visionhealth/risk/age.htm>
6. World Health Organization. *World Report on Vision.*; 2019.
7. Public Health Agency of Canada. Making Prevention a Priority: A Declaration on Prevention and Promotion from Canada's Ministers of Health. Published 2010. Accessed May 3, 2023. <https://www.canada.ca/content/dam/phac-aspc/migration/phac-aspc/hp-ps/hl-mvs/declaration/pdf/dpp-eng.pdf>
8. Public Health Agency of Canada. Population Health Approach. 2013. Accessed November 10, 2022. <https://www.canada.ca/en/public-health/services/health->

promotion/population-health/population-health-approach/what-population-health-approach.html

9. Canadian Association of Optometrists. Vision care benefits in Canada: The case for reform. Published 2020. Accessed July 13, 2023. https://www.dontlosesight.ca/sites/default/files/2020-08/VisionCareBenefitsInCanada_TheCaseForReform.pdf
10. Aljied R, Aubin MJ, Buhrmann R, Sabeti S, Freeman EE. Eye care utilization and its determinants in Canada. *Canadian Journal of Ophthalmology*. 2018;53(3):298-304. doi:10.1016/J.JCJO.2018.01.021
11. Jin YP, Trope GE. Eye care utilization in Canada: disparity in the publicly funded health care system. *Can J Ophthalmol*. 2011;46(2):133-138. doi:10.3129/i10-120
12. Canadian Association of Optometrists. Overview of provincial coverage for optometric care. Published March 2021. Accessed May 3, 2023. <https://opto.ca/sites/default/files/resources/documents/Prov%20Health%20Coverage%20with%20social%20income%20support%20Mar%202021%20FINAL.pdf>
13. van Staden D. The universal eye health imperative for Canada: an inescapable reality of unmet need. *Can J Public Health*. 2020;111(4):627-630. doi:10.17269/S41997-020-00307-4
14. Brise LS, de Leeuw S. View of Seeing Clearly: A Community-Based Inquiry Into Vision Care Access For a Rural Northern First Nation. *Canadian Journal of Optometry*. 2015;77(2):34-43.
15. Lee EY, Cui K, Trope GE, et al. Eye care utilisation in Newfoundland and Labrador: access barriers and vision health outcomes. *Canadian Journal of Ophthalmology*. 2018;53(4):342-348. doi:10.1016/j.jcjo.2017.11.012
16. Government of Canada. Indigenous Peoples and Culture. Published 2021. Accessed August 22, 2022. <https://www.canada.ca/en/services/culture/canadian-identity-society/indigenous-peoples-cultures.html>

17. Statistics Canada. Population growth in Canada's rural areas, 2016 to 2021. Published 2022. Accessed June 14, 2023. <https://www12.statcan.gc.ca/census-recensement/2021/as-sa/98-200-x/2021002/98-200-x2021002-eng.cfm>
18. Plessis V Du, Beshiri R, Bollman RD. Definitions of "Rural." Published December 2002. Accessed July 13, 2023. https://www150.statcan.gc.ca/n1/en/pub/21-006-x/21-006-x2001003-eng.pdf?st=-lMCPyh_
19. Shah T, Milosavljevic S, Bath B. Geographic availability to optometry services across Canada: Mapping distribution, need and self-reported use. *BMC Health Serv Res.* 2020;20(1):1-12. doi:10.1186/S12913-020-05499-6
20. Statistics Canada. *Index of Remoteness 2021: Update with 2021 Census Geographies and Populations.*; 2023. Accessed June 19, 2023. <https://www150.statcan.gc.ca/n1/pub/17-26-0001/2020001/meta-doc-eng.htm>
21. Alasia A, Bédard F, Bélanger J, Guimond E, Penney C. Measuring Remoteness and Accessibility : A Set of Indices for Canadian Communities. Published May 9, 2017. Accessed July 13, 2023. <https://www150.statcan.gc.ca/n1/en/pub/18-001-x/18-001-x2017002-eng.pdf?st=LyKeBe52>
22. Indigenous Services Canada. Non-Insured Health Benefits program: First Nations and Inuit Health Branch: Annual report 2020 to 2021. Published 2020. Accessed July 13, 2023. https://www.isc-sac.gc.ca/DAM/DAM-ISC-SAC/DAM-HLTH/STAGING/texte-text/nihb-annual_report_2020-21_1648555902486_eng.pdf
23. Asare AO, Wong AMF, Maurer D, Nishimura M. Access to vision services by vulnerable populations in Canada: A scoping review. *J Health Care Poor Underserved.* 2019;30(1):6-27. doi:10.1353/hpu.2019.0003
24. Kahiel Z, Aubin MJ, Buhrmann R, Kergoat MJ, Freeman EE. Incidence of visual impairment in Canada: The Canadian Longitudinal Study on Aging. *Can J Ophthalmol.* 2022;57(1):1-7. doi:10.1016/J.JCJO.2021.01.020
25. Aljied R, Aubin MJ, Buhrmann R, Sabeti S, Freeman EE. Prevalence and determinants of visual impairment in Canada: cross-sectional data from the Canadian Longitudinal

- Study on Aging. *Canadian Journal of Ophthalmology*. 2018;53(3):291-297.
doi:10.1016/j.jcjo.2018.01.027
26. Venne JF. Aboriginal Canadians' Ocular and Visual Health: A Daunting Challenge. *Opt!k Magazine*. Published online 2011:46-53.
 27. Lavoie JG, Kaufert J, Browne AJ, et al. Negotiating barriers, navigating the maze: First Nation peoples' experience of medical relocation. *Canadian Public Administration*. 2015;58(2):295-314. doi:10.1111/CAPA.12111
 28. National Collaborating Centre for Indigenous Health. *Access to Health Services as a Social Determinant of First Nations, Inuit and Métis Health.*; 2019. Accessed July 13, 2023. <https://www.nccih.ca/docs/determinants/FS-AccessHealthServicesSDOH-2019-EN.pdf>
 29. Burn H, Hamm L, Black J, et al. Eye care delivery models to improve access to eye care for Indigenous peoples in high-income countries: a scoping review. *BMJ Glob Health*. 2021;6(3):1-23. doi:10.1136/BMJGH-2020-004484
 30. Canadian Association of Optometrists. Strategic Plan: 2020-2022. Published 2020. Accessed October 10, 2022. <https://opto.ca/document/cao-strategic-plan-2020-2022>
 31. Ross SA, McKenna A, Mozejko S, Fick GH. Diabetic retinopathy in native and nonnative Canadians. *Exp Diabetes Res*. 2007;2007:1-6. doi:10.1155/2007/76271
 32. Tousignant B, Brûlé J. Refractive error, risk of amblyopia and eye care services utilisation among Nunavik Inuit in Northern Canada. *Clin Exp Optom*. 2022;105(8):872-877. doi:10.1080/08164622.2021.1993057
 33. Rozema JJ, Boulet C, Cohen Y, et al. Reappraisal of the historical myopia epidemic in native Arctic communities. *Ophthalmic Physiol Opt*. 2021;41(6):1332-1345. doi:10.1111/OPO.12879
 34. Roy M. Analysis of uveitis in a Canadian aboriginal population. *Canadian Journal of Ophthalmology*. 2014;49(2):128-134. doi:10.1016/J.JCJO.2013.09.020

35. Chiarelli CA, Chris AP. Visual Status of First Nations Children: The Sagamok First Nation Vision Care Project. *Canadian Journal of Optometry*. 2013;75(4):39-46.
36. Hooper P. Ocular inflammatory disease in Canadian First Nations communities. *Can J Ophthalmol*. 2014;49(2):119. doi:10.1016/J.JCJO.2014.02.008
37. Rudnisky CJ, Wong BK, Virani H, Tennant MTS. Risk factors for progression of diabetic retinopathy in Alberta First Nations communities. *Canadian Journal of Ophthalmology*. 2017;52:S19-S29. doi:10.1016/J.JCJO.2017.09.023
38. Truth and Reconciliation Commission of Canada. *Calls to Action.*; 2015.
39. Federation of Optometric Regulatory Authorities of Canada. Declaration of Commitment to Cultural Safety and Humility. Published 2020. Accessed August 22, 2022. <https://www.forac-faroc.ca/about/commitment-to-cultural-safety/>
40. Blais N, Tousignant B, Hanssens JM. Tele-refraction in tele-eye care settings. *Clin Exp Optom*. Published online 2022:1-9. doi:10.1080/08164622.2021.2009736
41. Sreelatha OK, Ramesh SVS. Teleophthalmology: Improving patient outcomes? *Clinical Ophthalmology*. 2016;10:285-295. doi:10.2147/OPHTH.S80487
42. McCarty CA, Taylor HR. Reviewing the impact of social determinants of health on rural eye care: A call to action. *Clin Exp Ophthalmol*. Published online 2022:1-4. doi:10.1111/CEO.14086
43. Federation of Optometric Regulatory Authorities of Canada. Policy on Teleoptometry Preamble and Definition. Published 2020. <https://fmrac.ca/fmrac-framework-on-telemedicine/>
44. Morris R. Background, Definitions, and An Introduction to Ocular Telehealth. In: *Ocular Telehealth*. Elsevier; 2023:1-6. doi:10.1016/b978-0-323-83204-5.00001-9
45. Canadian Association of Optometrists. Teleoptometry and Artificial Intelligence: Opportunities and Challenges for the Profession. A Discussion Paper for OLF 2023. Published 2023. Accessed July 13, 2023.

<https://opto.ca/sites/default/files/resources/documents/OLF%202023%20Discussion%20Paper.pdf>

46. National Quality Forum. *Creating a Framework to Support Measure Development for Telehealth.*; 2017. Accessed August 25, 2022.
https://www.qualityforum.org/Publications/2017/08/Creating_a_Framework_to_Support_Measure_Development_for_Telehealth.aspx
47. Turner AW, Xie J, Arnold AL, Dunn RA, Taylor HR. Eye health service access and utilization in the National Indigenous Eye Health Survey. *Clin Exp Ophthalmol.* 2011;39(7):598-603. doi:10.1111/j.1442-9071.2011.02529.x
48. Anjou MD, Boudville AI, Taylor HR. Local co-ordination and case management can enhance Indigenous eye care--a qualitative study. *BMC Health Serv Res.* 2013;13(255):1-10. doi:10.1186/1472-6963-13-255
49. Hsueh YSA, Dunt D, Anjou MD, Boudville A, Taylor H. Close the gap for vision: The key is to invest on coordination. *Aust J Rural Health.* 2013;21(6):299-305. doi:10.1111/AJR.12061
50. Taylor HR. How to Fix a Leaky Pipe. *Ophthalmology.* 2020;127(4):442-444. doi:10.1016/J.OPHTHA.2020.02.016
51. Ford CL, Miller WC, Smurzynski M, Leone PA. Key components of a theory-guided HIV prevention outreach model: Pre-outreach preparation, community assessments, and a network of key informants. *AIDS Education and Prevention.* 2007;19(2):173-186.
52. Roodenbeke E de, Lucas S, Rouzaut A, Bana F, World Health Organization, International Hospital Federation. Outreach services as a strategy to increase access to health workers in remote and rural areas : increasing access to health workers in rural and remote areas. Published 2011. Accessed July 13, 2023.
https://www.ncbi.nlm.nih.gov/books/NBK310729/pdf/Bookshelf_NBK310729.pdf
53. Wallerstein N, Duran B. Community-Based Participatory Research Contributions to Intervention Research: The Intersection of Science and Practice to Improve Health

Equity. *Am J Public Health*. 2010;100(No. S1):S40-S46.
doi:10.2105/AJPH.2009.184036

54. Minkler M, Wallerstein N. *Community-Based Participatory Research for Health: From Process to Outcomes*. 2nd ed. Jossey-Bass; 2008.
55. Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans – TCPS 2 (2022). Accessed June 8, 2023. https://ethics.gc.ca/eng/policy-politique_tcps2-eptc2_2022.html
56. The First Nations Principles of OCAP™ What is OCAP™? Accessed January 3, 2022. <http://www.fnigc.ca/ocap.html>
57. Canadian Association of Optometrists. Overview of provincial health coverage for optometric care. Published March 2021. Accessed July 13, 2023. <https://opto.ca/sites/default/files/resources/documents/Prov%20Health%20Coverage%20with%20social%20income%20support%20Mar%202021%20FINAL.pdf>
58. British Columbia Ministry of Health. *Medical Services Plan: Optometry Services Preamble and Payment Schedule*. Accessed June 7, 2023. <https://www2.gov.bc.ca/assets/gov/health/practitioner-pro/medical-services-plan/preamble-payment-schedule-optometry.pdf>
59. Government of Saskatchewan. Fully Covered Services | Health Benefits Coverage. Accessed June 8, 2023. <https://www.saskatchewan.ca/residents/health/prescription-drug-plans-and-health-coverage/health-benefits-coverage/fully-covered-services>
60. Manitoba Health. Vision and Eye Care. Accessed June 7, 2023. https://www.gov.mb.ca/betterhealth/health_services/vision.html
61. Indigenous Services Canada. Guide to vision care benefits for First Nations and Inuit. Published 2023. Accessed June 8, 2023. <https://sac-isc.gc.ca/eng/1579545788749/1579545817396>

62. Statistics Canada. Census Profile. Census of Population. Statistics Canada Catalogue number 98-316-X2021001. Published March 29, 2023. Accessed June 7, 2023. <https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E>
63. Indigenous Services Canada. Jordan’s Principle. Published 2023. Accessed June 10, 2023. <https://sac-isc.gc.ca/eng/1568396042341/1568396159824>
64. Northern Inter Tribal Health Authority. The Partnership – Northern Inter-Tribal Health Authority. 2023. Accessed June 25, 2023. <https://www.nitha.com/the-partnership/>
65. Lavoie JG, Forget E, O’Neil JD. Why Equity in Financing First Nations On-Reserve Health Services Matters: Findings from the 2005 National Evaluation of the Health Transfer Policy. *Healthcare Policy*. 2007;2(4):79-96. doi:10.12927/hcpol.2007.18877
66. First Nations Health Authority. *Evaluation of the First Nations Health Authority.*; 2020. Accessed June 10, 2023. <https://www.fnha.ca/Documents/FNHA-Evaluation-Report.pdf#:~:text=The%20FNHA%E2%80%99s%20unique%20BC%20First%20Nations%20health%20governance,BC%20Ministry%20of%20Health%20and%20Indigenous%20Services%20Canada.>
67. First Nations Health Authority. Vision Care Benefit. 2023. Accessed June 10, 2023. <https://www.fnha.ca/benefits/vision-care>
68. World Health Organization. Integrated people-centred care. Accessed June 10, 2023. https://www.who.int/health-topics/integrated-people-centered-care#tab=tab_3
69. MacKenzie M, Turner F, Platt S, et al. What is the “problem” that outreach work seeks to address and how might it be tackled? Seeking theory in a primary health prevention programme. *BMC Health Serv Res*. 2011;11(1):1-12. doi:10.1186/1472-6963-11-350/FIGURES/3
70. Shin HY, Kim KY, Kang P. Concept analysis of community health outreach. *BMC Health Serv Res*. 2020;20(1):1-9. doi:10.1186/S12913-020-05266-7/FIGURES/2

71. Szelest I, Black C, Brown SM, et al. Evidence-based support for community outreach worker programme in Rural British Columbia, Canada. *Can J Rural Med.* 2021;26(3):110-118. doi:10.4103/CJRM.CJRM_63_20
72. Gruen RL, Bailie RS, Wang Z, Heard S, O’rourke IC. Specialist Outreach to Isolated and Disadvantaged Communities: A Population-Based Study. 2006;368(14):130-138. doi:10.1016/S01406736(06)68812-0
73. Donaghy C, Smith N, O’Dea F. Orthopaedic Outreach: An innovative programme for orthopaedic patients in remote areas of Newfoundland and Labrador. *Can J Rural Med.* 2022;27(4):143-147. doi:10.4103/CJRM.CJRM_43_21
74. British Columbia Ministry of Health. Northern and Isolation Travel Assistance Outreach Program. Published 2020. Accessed June 10, 2023. <https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/physician-compensation/rural-practice-programs/northern-and-isolation-travel-assistance-outreach-program>
75. British Columbia Ministry of Health. Rural Practice Programs. 2022. Accessed June 10, 2023. <https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/physician-compensation/rural-practice-programs>
76. Morgan DL. *Focus Groups as Qualitative Research*. 2nd ed. (, ed.). SAGE Publications Inc.; 1997.
77. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: *Analyzing Qualitative Data*. Vol 1st Edition. Routledge; 1994:173-194. doi:10.4324/9780203413081-10
78. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care.* 2007;19(6):349-357. doi:10.1093/INTQHC/MZM042
79. Trochim W. *The Research Methods Knowledge Base*, 2nd Edition. . Published 2006. Accessed April 15, 2023. <http://www.socialresearchmethods.net/kb>

80. Canadian Association of Optometrists. *Optometry in Canada. Optometric Leader's Forum 2023.*; 2023.
81. Stratton SJ. Population Sampling: Probability and Non-Probability Techniques. *Prehosp Disaster Med.* 2023;38(2):147-148. doi:10.1017/S1049023X23000304
82. Malterud K, Siersma VD, Guassora AD. Sample Size in Qualitative Interview Studies: Guided by Information Power. *Qual Health Res.* 2016;26(13):1753-1760. doi:10.1177/1049732315617444
83. Richardson D. Dealing with Geoprivacy and Confidential Geospatial Data. Published 2019. Accessed April 15, 2023. <https://www.esri.com/about/newsroom/arcnews/dealing-with-geoprivacy-and-confidential-geospatial-data/>
84. Roots R, Brown H, Brainbridge L, Li L. Rural rehabilitation practice: perspectives of occupational therapists and physical therapists in British Columbia, Canada. *Rural Remote Health.* 2014;14(2506):1-16. Accessed February 11, 2023. <https://pubmed.ncbi.nlm.nih.gov/24528153/>
85. Kemper E, Willis K, Simpson A. "When you are on your own, everything is your responsibility": Experiences of audiologists and audiometrists working in rural Australia. *Aust J Rural Health.* 2021;29(3):382-390. doi:10.1111/AJR.12711
86. Shrivastava R, Couturier Y, Simard-Lebel S, et al. Relational continuity of oral health care in Indigenous communities: A qualitative study. *BMC Oral Health.* 2019;19(287):1-8. doi:10.1186/s12903-019-0986-z
87. Andrewartha J, Allen P, Hemmings L, Dodds B, Shires L. Escape to the country: Lessons from interviews with rural general practice interns. *Aust J Gen Pract.* 2020;49(9):606-611. doi:10.31128/AJGP-03-20-5274
88. Subedi R, Roshanafshar S, Greenberg TL. *Developing Meaningful Categories for Distinguishing Levels of Remoteness in Canada.*; 2020. Accessed June 14, 2023. <https://www150.statcan.gc.ca/n1/pub/11-633-x/11-633-x2020002-eng.htm>

89. INTRODUCTION - Outreach Services as a Strategy to Increase Access to Health Workers in Remote and Rural Areas - NCBI Bookshelf. Accessed April 5, 2023. <https://www.ncbi.nlm.nih.gov/books/NBK310732/>
90. Levesque JF, Harris MF, Russell G. Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. *Int J Equity Health*. 2013;12(1):1-9. doi:10.1186/1475-9276-12-18/FIGURES/2
91. Loyola-Sanchez A, Pelaez-Ballestas I, Crowshoe L, et al. “There are still a lot of things that I need”: a qualitative study exploring opportunities to improve the health services of First Nations People with arthritis seen at an on-reserve outreach rheumatology clinic. *BMC Health Serv Res*. 2020;20(1076):1-14. doi:10.1186/S12913-020-05909-9
92. Kyoon-Achan G, Lavoie J, Phillips-Beck W, et al. What changes would Manitoba First Nations like to see in the primary healthcare they receive? A qualitative investigation. *Healthcare Policy*. 2019;15(2):E85-E99. doi:10.12927/HCPOL.2019.26069
93. Arora S, Kurji AK, Tennant MTS. Dismantling Sociocultural Barriers to Eye Care with Tele-Ophthalmology: Lessons from an Alberta Cree Community. *Clinical and Investigative Medicine*. 2013;36(2):E57-E63. doi:10.25011/CIM.V36I2.19567
94. Hansen N, Jensen K, MacNiven I, Pollock N, D’Hont T, Chatwood S. Exploring the impact of rural health system factors on physician burnout: a mixed-methods study in Northern Canada. *BMC Health Serv Res*. 2021;21(869):1-10. doi:10.1186/s12913-021-06899-y
95. Bablitz C, Killeen V. Special Issue: Equitable and healing Indigenous health care. Trust, knowledge, relationships. Alberta Doctors’ Digest. Published 2021. Accessed July 6, 2023. <https://add.albertadoctors.org/issues/special-issue-indigenous-health/basis-equitable-healing-health-care/>
96. Curtis E, Jones R, Tipene-Leach D, et al. Why cultural safety rather than cultural competency is required to achieve health equity: a literature review and recommended definition. *Int J Equity Health*. 2019;18(174):1-17. doi:10.1186/S12939-019-1082-3

97. Mathu-Muju KR, Kong X, Brancato C, McLeod J, Bush HM. Utilization of community health workers in Canada's Children's Oral Health Initiative for indigenous communities. *Community Dent Oral Epidemiol.* 2018;46(2):185-193. doi:10.1111/cdoe.12352
98. S C, J M, A T. Understanding Indigenous patient attendance: A qualitative study. *Aust J Rural Health.* 2017;25(5):268-274. doi:10.1111/AJR.12348
99. Turner AW, Mulholland WJ, Taylor HR. Coordination of outreach eye services in remote Australia. *Clin Exp Ophthalmol.* 2011;39(4):344-349. doi:10.1111/J.1442-9071.2010.02474.X
100. Mukash SN, Kayembe DL, Mwanza JC. Agreement between retinoscopy, autorefractometry and subjective refraction for determining refractive errors in congolese children. *Clin Optom (Auckl).* 2021;13:129-136. doi:10.2147/OPTO.S303286
101. B A, Adyanthaya S. A comparison between retinoscopy and autorefraction in acceptance of subjective correction in school age children. *Indian Journal of Clinical and Experimental Ophthalmology.* 2020;6(3):418-421. doi:10.18231/j.ijceo.2020.090
102. American Academy of Ophthalmology. Visual Field Test. Published 2022. Accessed June 29, 2023. <https://www.aao.org/eye-health/tips-prevention/visual-field-testing>
103. American Academy of Ophthalmology. What Is Optical Coherence Tomography? Published 2023. Accessed June 29, 2023. <https://www.aao.org/eye-health/treatments/what-is-optical-coherence-tomography>
104. Pillunat KR, Waibel S, Spoerl E, Herber R, Pillunat LE. Comparison of Central Corneal Thickness Measurements Using Optical and Ultrasound Pachymetry in Glaucoma Patients and Elderly and Young Controls. *J Glaucoma.* 2019;28(6):540-545. doi:10.1097/IJG.0000000000001231
105. Agarwal T, Bhartiya S, Dada T, Panda A, Jhanji V, Yu M. Agreement of corneal thickness measurement using slitlamp and ultrasound pachymetry. *Eye Contact Lens.* 2012;38(4):231-233. doi:10.1097/ICL.0B013E318250884E

106. Mendez N, Nayak N V., Kolomeyer AM, Szirth BC, Khouri AS. Feasibility of Spectral Domain Optical Coherence Tomography Acquisition Using a Handheld Versus Conventional Tabletop Unit. *J Diabetes Sci Technol.* 2016;10(2):277-281. doi:10.1177/1932296815624712
107. Groth SL, Linton EF, Brown EN, Makadia F, Donahue SP. Evaluation of Virtual Reality Perimetry and Standard Automated Perimetry in Normal Children. *Transl Vis Sci Technol.* 2023;12(1):6. doi:10.1167/TVST.12.1.6
108. Jayakumar AR, David Ochoa-de La Paz L, Barlati S, Nuzzi R, Marolo P, Nuzzi A. The Hub-and-Spoke Management of Glaucoma. *Front Neurosci.* 2020;14(180):1-12. doi:10.3389/fnins.2020.00180
109. Elrod JK, Fortenberry JL. The hub-and-spoke organization design: an avenue for serving patients well. *BMC Health Serv Res.* 2017;17(457):25-33. doi:10.1186/s12913-017-2341-x
110. Chris PA, Young NL, Belanger K, Greasley L. Results of an Environmental Scan to Determine the Level of Uncorrected Refractive Error in First Nations Elementary School Children in Ontario. *Canadian Journal of Optometry.* 2017;79(1):7-19. Accessed June 14, 2023. <https://openjournals.uwaterloo.ca/index.php/cjo/article/view/440/302>
111. Meyer VM, Benjamens S, El Mounni M, Lange JFM, Pol RA. Global Overview of Response Rates in Patient and Health Care Professional Surveys in Surgery A Systematic Review. *Ann Surg.* 2022;275(1):E75-E81. doi:10.1097/SLA.0000000000004078
112. Cho YI, Johnson TP, VanGeest JB. Enhancing Surveys of Health Care Professionals: A Meta-Analysis of Techniques to Improve Response. *Eval Health Prof.* 2013;36(3):382-407. doi:10.1177/0163278713496425
113. Wong TA, Chu G, Bossie T, et al. The Use of Telehealth in Optometry: Present and Future Clinical Applications. In: *Digital Eye Care and Teleophthalmology.* Springer International Publishing; 2023:63-72. doi:10.1007/978-3-031-24052-2_5

114. Clark W, Lavoie JG, McDonnell L, et al. Trends in Inuit health services utilisation in Manitoba: findings from the Qanuinnigitsiarutiksait study. *Int J Circumpolar Health*. 2022;81(1):1-15. doi:10.1080/22423982.2022.2073069
115. Kim J, Driver DD. Teleophthalmology for First Nations Clients at Risk of Diabetic Retinopathy: A Mixed Methods Evaluation. *JMIR Med Inform*. 2015;3(1):e10. doi:10.2196/MEDINFORM.3872
116. Ng MC, Nathoo N, Rudnisky CJ, Tennant MTS. Improving access to eye care: Teleophthalmology in Alberta, Canada. *J Diabetes Sci Technol*. 2009;3(2):289-296. doi:10.1177/193229680900300209
117. Taylor HR, Stanford EE. Coordination is the key to the efficient delivery of eye care services in indigenous communities. *Clin Exp Ophthalmol*. 2011;39(2):186-188. doi:10.1111/J.1442-9071.2010.02431.X
118. American Optometric Association. *Evidence Based Clinical Practice Guideline: Comprehensive Adult Eye and Vision Examination 2nd Edition.*; 2023.
119. Sloan FA, Picone G, Brown DS, Lee PP. Longitudinal analysis of the relationship between regular eye examinations and changes in visual and functional status. *J Am Geriatr Soc*. 2005;53(11):1867-1874. doi:10.1111/J.1532-5415.2005.53560.X
120. Canadian Association of Optometrists. The Eye Exam. Published 2023. Accessed April 7, 2023. <https://opto.ca/eye-health-library/eye-exam>
121. Ganz ML, Xuan Z, Hunter DG. Prevalence and correlates of children's diagnosed eye and vision conditions. *Ophthalmology*. 2006;113(12):2298-2306. doi:10.1016/J.OPHTHA.2006.06.015
122. Toomey M, Gyawali R, Stapleton F, Ho KC, Keay L, Jalbert I. Facilitators and barriers to the delivery of eye care by optometrists: a systematic review using the theoretical domains framework. *Ophthalmic and Physiological Optics*. 2021;41(4):782-797. doi:10.1111/OPO.12801

123. Canadian Association of Optometrists. Position Statement Rural and Remote Optometry. Published 2017. Accessed July 13, 2023.
<https://opto.ca/sites/default/files/resources/documents/Rural%20and%20Remote%20Optometry%20EN.pdf>
124. Terry DL, Woo MJ. Burnout, job satisfaction, and work-family conflict among rural medical providers. *Psychol Health Med*. 2021;26(2):196-203.
doi:10.1080/13548506.2020.1750663
125. Lesperance S, Anaraki NR, Ashgari S, Churchill A. Systemic challenges and resiliency in rural family practice. *Can J Rural Med*. 2022;27(3):91-98.
doi:10.4103/CJRM.CJRM_39_21
126. Government of Canada. High-speed Internet for all Canadians. Published 2023. Accessed June 29, 2023. <https://ised-isde.canada.ca/site/high-speed-internet-canada/en>
127. Carson DB, Schoo A, Berggren P. The “rural pipeline” and retention of rural health professionals in Europe’s northern peripheries. *Health Policy (New York)*. 2015;119(12):1550-1556. doi:10.1016/j.healthpol.2015.08.001
128. Kirkman JM, Bentley SA, Armitage JA, Woods CA. Could adoption of the rural pipeline concept redress Australian optometry workforce issues? *Clin Exp Optom*. 2019;102(6):566-570. doi:10.1111/cxo.12873
129. Karam M, Brault I, Van Durme T, Macq J. Comparing interprofessional and interorganizational collaboration in healthcare: A systematic review of the qualitative research. *Int J Nurs Stud*. 2018;79:70-83. doi:10.1016/j.ijnurstu.2017.11.002
130. Tousignant B. Eye care for the homeless: First year of data from a mobile teaching clinic. In: *American Academy of Optometry Annual Meeting*. ; 2018.
131. Yelle B, Beaulieu K, Ety MC, et al. The prevalence and causes of visual impairment among the male homeless population of Montreal, Canada. *Clin Exp Optom*. Published online February 13, 2022:1-5. doi:10.1080/08164622.2022.2036578

132. Etty MC, Michaelsen S, Yelle B, et al. The sociodemographic characteristics and social determinants of visual impairment in a homeless population in the Montreal area. *Can J Public Health*. Published online August 15, 2022:1-12. doi:10.17269/s41997-022-00676-y
133. Kergoat H, Boisjoly H, Freeman EE, Monette J, Roy S, Kergoat MJ. The perceived needs and availability of eye care services for older adults in long-term care facilities. *Canadian Geriatrics Journal*. 2014;17(3):108-113. doi:10.5770/cgj.17.116
134. Cacari-Stone L, Wallerstein N, Garcia AP, Minkler M. The Promise of Community-Based Participatory Research for Health Equity: A Conceptual Model for Bridging Evidence With Policy. *Am J Public Health*. 2014;104(9):1615-1623. doi:10.2105/AJPH.2014.301961
135. Shrivastava R, Couturier Y, Girard F, Papineau L, Emami E. Two-eyed seeing of the integration of oral health in primary health care in Indigenous populations: a scoping review. *Int J Equity Health*. 2020;19(1). doi:10.1186/S12939-020-01195-3
136. Bodenheimer T, Sinsky C. From triple to Quadruple Aim: Care of the patient requires care of the provider. *Ann Fam Med*. 2014;12(6):573-576. doi:10.1370/afm.1713
137. Berwick DM, Nolan TW, Whittington J. The Triple Aim: Care, Health, And Cost. *Health Aff*. 2008;27(3):759-769.
138. Spinelli WM. The phantom limb of the triple aim. *Mayo Clin Proc*. 2013;88(12):1356-1357. doi:10.1016/j.mayocp.2013.08.017
139. Lavoie JG, Forget EL, Prakash T, Dahl M, Martens P, O'Neil JD. Have investments in on-reserve health services and initiatives promoting community control improved First Nations' health in Manitoba? *Soc Sci Med*. 2010;71(4):717-724. doi:10.1016/J.SOCSCIMED.2010.04.037
140. Morris R. Monitoring Quality and Improving Services in Ocular Telehealth Programs. In: *Ocular Telehealth*. Elsevier; 2023:199-205. doi:10.1016/b978-0-323-83204-5.00016-0

141. Marcin JP, Shaikh U, Steinhorn RH. Addressing health disparities in rural communities using telehealth. *Pediatric Research* 2016 79:1. 2015;79(1):169-176.
doi:10.1038/pr.2015.192
142. Lightfoot N, Strasser R, Maar M, Jacklin K. Challenges and rewards of health research in northern, rural, and remote communities. *Ann Epidemiol.* 2008;18(6):507-514.
doi:10.1016/J.ANNEPIDEM.2007.11.016
143. Scariano SM, Davenport JM. The Effects of Violations of Independence Assumptions in the One-Way ANOVA. *Source: The American Statistician.* 1987;41(2):123-129.

Appendix A

Questionnaire Tool

<u>Outreach Optometry Current State Questionnaire as Released in 2023</u>
Contact information (Name, Business Address, City, Postal code, Phone, Fax, Email)
Consent Section
<p>By providing your consent, you are not waiving your legal rights or releasing the investigator(s) or involved institution(s) from their legal and professional responsibilities.</p> <p><input type="checkbox"/> I agree to participate in this study.</p> <p><input type="checkbox"/> I do not agree to take part in this study (please close your browser now).</p>
Community List
<p>Please list the location(s) of the Indigenous communities at which you provide comprehensive eye and vision care services. Our question set will repeat for each community that you specify.</p> <p style="padding-left: 40px;">Community 1: (open)</p> <p style="padding-left: 40px;">Community 2: (open)</p> <p style="padding-left: 40px;">Community 3: (open)</p> <p style="padding-left: 40px;">Etc....</p>
Current state question set (repeated for each community listed)
1. Please re-input your name (surname, first name) (open)
2. When did you first start providing eye care services to (community name)? (DD/MM/YYYY)

3. How far is (community name) from the nearest optometry clinic? (sliding scale for kms)

3. Is your primary contact(s) (community name) through... (Select all that apply):

Health director

Community Elders

Tribal Council

Other

3.a. If Other, please type in primary contact for (community name): (open text)

4. Annual distribution of clinic days in (community name) (2021)

	Number of clinic days			Number of eye exams completed		Number of patients seen in optical services?		Number of patients seen in school screenings (if applicable)
	Comprehensive eye exams (exclusively)	Dispensing (exclusively)	Both	Adult Patients (≥19 Years of Age)	Children (≤18 Years of Age)	Adult Patients (≥19 Years of Age)	Children (≤18 Years of Age)	Children (≤18 Years of Age)
Jan								
Feb								
March								
April								
...etc								

5. Please list the top 5 eye conditions diagnosed at your clinic amongst your patients in (community name) and the approximate percentage. Examples include refractive error, diabetic retinopathy, cataract, glaucoma, and binocular vision dysfunction.

Eye conditions diagnosed		
	Eye condition (name)	Percentage (%)
#1		
#2		
#3		
#4		
#5		

6. Frequency of patient visits in (community name) (acknowledging that this may be an estimate as some individuals may receive off-Reserve care in interim)

Frequency of patient visits			
	% Annual basis	% Every other year	% >2 years between visits
Percentage of total patients seen			

7. Proportions of refractive and ocular health patient outcomes in (community name)

Patient outcomes			
	% Patients with refractive error (exclusive)	% Patients with eye conditions (exclusive)	% Patients with both refractive and eye conditions

Percentage of total patients seen			
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8. Proportions of refractive patient outcomes in (community name)

Patient outcomes			
	% Patients with spectacles	% Patients with contact lenses	% Patients with both spectacles and contact lenses
Percentage of total patients seen			

9. Proportions of patient ocular health outcomes in (community name)

Ocular health management			
	% Patients with ocular condition managed through optometry	% Patients with condition co-managed through referrals:	
		% Referral to ophthalmology	% Referral to other physician (i.e. diabetes specialist)
Percentage of total patients seen			

10. On average, how long is the wait time for the following services within (community name)

Wait times			
	Does referral appointment take place in community? (yes/no)	Wait time? (Number of days)	Notes (optional)
Comprehensive eye examination			
Optical services			
Optometry follow up			
Referral to ophthalmology			
Referral other medical			

11. Each time you travel, what are the approximate costs for delivering care to (community name)

Costs		
	Cost (\$ Amount)	Notes on cost breakdown or additional expenses (optional)
Travel		
Lodging		
Administration		
Other		

12. How much do you charge (total) for a comprehensive examination in (community name)?

- For adults (≥ 19):
- For children (≤ 18):

13. For comprehensive eye examinations, what is the payor mix (%) amongst your patients in (community name)

- First Nations Health Authority (FNHA) Pacific Blue Cross (PBC) (Exclusively)
- Non-Insured Health Benefits (NIHB) (Exclusively)
- Provincial Medical Services Plan (MSP) (Exclusively)
- Combination PBC + MSP
- Combination NIHB + MSP
- No insurance / private pay
- Other, please specify:

14. For materials (spectacles, contact lenses, low vision devices), what is the payor mix (%) amongst your patients in (community name)?

- First Nations Health Authority (FNHA) Pacific Blue Cross (PBC) (Exclusively)
- Non-Insured Health Benefits (NIHB) (Exclusively)
- Provincial Medical Services Plan (MSP) (Exclusively)
- Combination PBC + MSP
- Combination NIHB + MSP
- No insurance / private pay
- Other, please specify:

15. Please review the following College mandated list for equipment and ophthalmic

instrumentation in place of practice:

- visual acuity charts, distance and near; and
- keratometer, topographer, or other modern instrument for measuring corneal curvature;
- and
- retinoscope and trial lens set; and
- phoropter; and
- lensometer; and
- inter-pupillary testing device; and
- prisms; and
- stereoacuity test; and
- colour vision test; and
- Amsler grid (black background, white lines); and
- direct ophthalmoscope; and
- indirect ophthalmoscope; and
- condensing lenses for viewing the posterior segment of the eye; and
- biomicroscope; and
- tonometer; and
- penlight or transilluminator; and
- appropriate sterile equipment for foreign body removal; and
- appropriate diagnostic pharmaceuticals, stains and dyes; and
- equipment appropriate for providing adjunct services such as low vision management,
- contact lenses management or vision therapy, where the registrant provides these services.

Registrants must have access to the following:

- computerized visual field device; and
- pachymeter; and
- other specialized equipment as may be required

15. Do you use any equipment beyond the College mandated list for "Equipment and Ophthalmic Instrumentation in Place of Practice" in (community name) (yes/no/unsure)

16. Do you leave equipment in place in (community name) (yes/no)

17. If you leave equipment in (community name), please list the pieces of equipment: (open text)

18.a Is there equipment in (community name) that you do not own that is available to you during clinic days? (yes/no)

18.b If yes, who owns the equipment that is available to you? (open text)

18.c Please list the pieces of equipment that are available to you: (open text)

19. Section for additional comments on eye and vision care in (community name): (open text)

(Submission Button and Appreciation Letter)

Appendix B

Semi-structured Interview Guide

Suggested opening dialogue:

“Just a reminder that the purpose of this study is to better understand the process and planning that goes into your rural outreach visits. This is a semi-structured interview with 9 main questions, where we can follow to flow to spend time talking about what is most important to you. The total interview is anticipated to take 45 minutes, but this is flexible.”

Interview Prompts and Sub-Prompts

What do you enjoy the most about providing care within rural and Indigenous communities?
A. Do you have any particularly memorable stories that you would be comfortable sharing?
You are aware that there is a lot of work that goes into planning a rural visit. Walk me through the process of preparing for a rural visit. This could include how you schedule your visits, who goes with you, how you pack and transport any equipment and materials, and how you get to the community.
Talk me through what a typical clinic day looks like from the time you arrive in community.
A. On average, how long are your visits and how many patients do you see each day?
B. How does the community support your visit?
C. What are the challenges that you encounter?
D. How are referrals handled?
Once you finish a visit, what do you need to do to wrap up? This could be handling the paperwork reimbursement, glasses orders and dispensing glasses.
A. Who completes these tasks?
B. Approximately how many hours does this take?

<p>Do you appreciate that providing outreach care can be costly. How do you offset and manage the expenses that you incur during a visit?</p>
<p>A. What reimbursement programs support your visits? NIHB, community funds, or others?</p>
<p>B. What is the process for getting paid for your visits?</p>
<p>Walk me through what a typical clinic day looks like from the time you arrive in community.</p>
<p>A. On average, how long are your visits and how many patients do you see each day?</p>
<p>B. How does the community support your visit?</p>
<p>C. What are the challenges that you encounter?</p>
<p>D. How are referrals handled?</p>
<p>Once you finish a visit, what do you need to do to wrap up? This could be handling the paperwork, reimbursement, glasses orders and dispensing glasses.</p>
<p>A. Who completes these tasks?</p>
<p>B. Approximately how many hours does this take?</p>
<p>Do you appreciate that providing outreach care can be costly. How do you offset and manage the expenses that you incur during a visit?</p>
<p>A. What reimbursement programs support your visits? NIHB, community funds, or others?</p>
<p>B. What is the process for getting paid for your visits?</p>
<p>Is there anything that we haven't covered that would make it easier for you to do outreach care? This could be support from the community, staffing support, support from payors, or your professional college or association of optometrists, just to name a few.</p>
<p>Concluding question: Do you have anything else you'd like to share about your experiences?</p>
<p>Concluding question: What advice would you give to an optometrist who wants to start doing outreach?</p>

Demographic questions (Answered through a one-time online Qualtrics survey following the interview):

1. Age
2. Gender
3. Years in practice:
4. Years providing outreach care:
5. How many rural communities have you visited?
6. Have you ever lived in a rural area?