MASTER OF PUBLIC POLICY
CAPSTONE PROJECT

Telehealth's Potential in Rural Communities for Improving Specialist Care: Access to an Autism Diagnosis for Children in Alberta

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Capstone Approval Page

The undersigned, being the Capstone Project Supervisor, declares that

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Introduction

The COVID-19 pandemic accelerated the growth of telehealth (Madigan et al. 2021, 1; Virtual Care Task Force 2022, 1; Canadian Institute for Health Information 2023, 4). Virtual care went from 10 to 20 per cent in 2019 to 40 per cent in 2021 (Virtual Care Task Force 2022, 4). More recently, the 2023 Canadian Digital Health Survey found that 46 per cent of Canadians have had a telephone visit and 21 per cent have utilized video conferencing for a health care visit (Canada Health Infoway 2024, 12).

The 2023 Canadian Digital Health Survey suggests that there is unmet demand (Canada Health Infoway 2024, 13).[1] The report found that the unmet demand was 38 per cent for video visits and 27 per cent for telephone consultations. Unmet demand, combined the "the growth in Canadian physicians' adoption of information technology" shows promising telehealth growth for Canada (Canadian Institute for Health Information 2023, 4).[2]

Alberta is experiencing a shortage of physicians that is exacerbated in rural and remote communities (Alberta Medical Association, n.d.-a). On April 3, 2024, the Alberta government announced that it would be investing $224.8 million to train physicians in rural areas in hopes to alleviate rural health shortages (Platt 2024). While most of the concerns are about accessing primary care, rural and remote communities also face difficulty accessing specialists (Spice, Read Paul, and Biondo 2012; Bello et al. 2019; Watanabe et al. 2013; X. Liu et al. 2022; Benchimol et

[1] Canada Health Infoway calculates unmet demand by calculating "the difference between the percentage of respondents who expressed interest in accessing and the percentage of respondents who ever used each type of digitally-enabled health services" (Canada Health Infoway 2024, 13).
[2] Physician adoption data was from the 2022 Commonwealth Fund International Health Policy Survey of Primary Care Physicians (Canadian Institute for Health Information 2023, 4).

al. 2018). Karunanayake et al. found that there was a relationship between distance from an urban centre and difficulty accessing a specialist (Karunanayake et al. 2015, 94).

According to the O'Brien Institute for Public Health Centre for Health Policy, about "22 per cent of Albertan's live in rural or remote communities" (Johnston et al. 2023, 2). Despite over a fifth of Alberta's population living in rural or remote communities, only 2.7 per cent of specialists (excluding family medicine, general practice, and individuals needing supervision) listed on the College of Physicians and Surgeons of Alberta's (CPSA's) physician directory are in rural Alberta (see Appendix A). When only accounting for physicians with an Alberta location, 2.9 per cent of physicians are in rural Alberta (Appendix A). Additionally, only one physician is located on a reserve (Appendix A). Analysis also found that only 15 per cent of specialists in Alberta are located outside of Calgary and Edmonton.

The August 2022 Alberta Medical Association (AMA) Patients.First.ca Survey Findings found that 23.9% of respondents were waiting for a specialist appointment (Alberta Medical Association, 2022, 4). While the AMA did not break the results down by rural and remote, it noted that rural Albertans reported a "higher rate of health care deficit with longer wait times than urban for all types of services" (Alberta Medical Association 2022, 3).

The challenges of assessing specialist care are evident in the 2015 Rural Health Review Final Report (Rural Health Services Review Committee 2015). One individual quoted in this report stated: "we all have to go to Edmonton for five-minute speciality consultations, if you can afford it" (Rural Health Services Review Committee 2015, 14). The challenges for rural communities include travelling several hours only for the appointment to result in a cancellation, travelling for short appointments, and the lack of coordination resulting in repeated trips (Rural Health Services

Review Committee 2015, 14-15). An Albertan study concluded that rural patients pay an extra $450 out of pocket every time they travel to Edmonton (Pullin 2023). One of the recommendations found in the 2015 Rural Health Review Final Report is to "increase the use of technology to support the delivery of specialized health services" (Rural Health Services Review Committee 2015, 16). The Alberta Health Virtual Care Action Plan reports that an eHealth Strategy would "increase access to healthcare services for every Albertan, especially individuals with disabilities and those living in rural or remote locations, including Indigenous communities" (Health Canada 2022).

Physician shortages in rural and remote areas not only impact quality of life and health care, but also impact the economic sustainability of communities (Alberta Chamber of Commerce, n.d.). Individuals may choose not to work and live in rural and remote communities due to a lack of access to healthcare. Access to healthcare is even more important considering that rural Canadians have higher health care needs (Wilson et al. 2020, 32). Telehealth provides an opportunity to improve specialist care in rural communities (Jong, Mendez, and Jong 2019; Gagnon et al. 2006; Baylak 2020).

The objective of this paper is to determine the challenges and opportunities of improving specialist access in rural and remote communities using telehealth. In order to explore the policy impacts in a practical way, this paper includes a case study on the potential of telehealth for children and youth seeking a diagnosis for autism spectrum disorder in rural Alberta. A gap in literature exists regarding the policy opportunities of utilizing telehealth to increase access to specialists in rural Albertan communities, particularly in the context of children and youth with disabilities. This paper seeks to address this gap.

Background

The background will provide an overview of the telehealth landscape in Alberta starting with discussions around application legislation. The background will then investigate Alberta Health Services and Alberta Netcare to further understand what is publicly available for Albertans regarding telehealth. Lastly, this section will look at the location of specialists in Alberta.

Canada Health Act

The *Canada Health Act* is federal legislation on "publicly funded health care insurance" (Government of Canada 2024, para 1). Its purpose is "to protect, promote and restore the physical and mental well-being of residents of Canada and to facilitate reasonable access to health services without financial or other barriers" (Government of Canada 2024, para 2). There are five program criteria: public administration, comprehensiveness, universality, portability and accessibility (Tiedemann 2019, 4). Telehealth has the potential to address many of these objectives, with accessibility being the most direct impact. Accessibility "requires that a province or territory province provide reasonable access to insured health services on uniform terms and conditions and without financial and other barriers" (Tiedemann 2019, 4). Telehealth provides an opportunity to break down barriers to health care by reducing the need to travel (Rush et al. 2022, 571).

Constitution Act (1867)

The *Constitution Act*, specifically sections 91 and 92, assigns jurisdiction to either the "either Parliament or to provincial legislatures" (Tiedemann 2019, 2). There are jurisdictional complexities as "health" is not specifically referenced (Tiedemann 2019, 2). The federal government does have influence over "health" due to its spending power through the *Canada Health Act*. Provinces and territories must meet the conditions set out in the *Canada Health Act*

to receive the full cash contribution. Despite the *Canada Health Act* regulating health across provinces and territories, "generally, the provinces have jurisdiction over health care services, the practice of medicine, the training of health professionals and the regulation of medical profession, hospital and health insurance, and occupational health" (Tiedemann 2019, 2). Therefore, telehealth regulation is a provincial responsibility.

Telehealth Regulation in Alberta

Virtual care is regulated by the various Colleges of Physicians and Surgeons. In Alberta, the *Health Professions Act* (RSA 2000, c H-7) is the legal framework in which the College of Physicians and Surgeons of Alberta (CPSA) can regulate and oversee the practice of medicine in Alberta; the *Act* also enables the *Physicians, Surgeons, Osteopath, and Physician Assistants Profession Regulation* (Alta Reg 200/2020) which regulates the listed medical professions.

Section three of the *Health Professions Act*, RSA 2000, c H-7, allows for the CPSA to establish, maintain, and enforce standards of practice and code of ethics. The CPSA has developed a "Virtual Care Standard of Practice" (College of Physicians and Surgeons of Alberta 2022). It states that regulated members must:

- *Be held to the same ethical and professional standards and legal obligations, and the standards of care remain the same, as they are in the provision of in-person care. in-person care (2);*
- *Have a physical clinic or agreement with physical clinic (3);*
- *Provide their name, location, and licensure state and confirm the location of patient (4);*
- *Be in accordance with the Patient Record Content and Patient Record Retention standards of practice (5);*
- *Not prescribe opioids unless they have examined the patient in person, longitudinal treating relationship, or are in direct communication with another regulated-health*

professional who has examined the patient (College of Physicians and Surgeons in Alberta 2022, 5-6).[3]

The CPSA also regulates who can practice in the province. Physicians providing virtual care to Alberta patients must be registered with the CSPA; the CPSA does offer a Telemedicine Registration for out-of-province physicians (College of Physicians and Surgeons of Alberta 2022). Additionally, an out-of-province physician without a Telemedicine Registration can provide care in the following three circumstances (College of Physicians and Surgeons of Alberta 2022, 3):

- *if the care sought is not readily available in Alberta (e.g., specialty care) (3);*
- *to provide follow-up care or continuity of care for which an established physician - patient relation exists (3);*
- *if the virtual care encounter is for emergency assessment or treatment of the patient where there are no other care options available (College of Physicians and Surgeons of Alberta, 3).*

The "Virtual Care Standard of Practice" also includes clauses about regulated members providing virtual care in other provinces; regulated members must "comply with licensing required in the jurisdiction in which the patient is located" and "have appropriate liability insurance" (College of Physicians and Surgeons of Alberta 2022, 3).

It is important to acknowledge the crucial role that the CPSA plays in regulating virtual care in Alberta. If a recommendation was to suggest changing the circumstances in which an out-of-province physician can practice in Alberta, the CPSA would ultimately be responsible for the decision.

[3] Each bullet point contains a quotation from the CPSA Virtual Standard of Practice. Page numbers align with the printed standard.

Alberta Health Services (AHS)

Alberta Health Services (AHS) is the authority responsible for delivering health care in Alberta; it is a "provincewide, integrated health system" (Alberta Health Services, n.d.-c).

Alberta Health Services does offer virtual care - "Delivering Quality Virtual Care – Anytime, anywhere" (Alberta Health Services, n.d.-b). AHS defines virtual care as using "technology, video, email and secure messaging to help [one] connect with or talk to [their] healthcare provider when [there] not is the same place" (Alberta Health Services, n.d.-b). AHS's website, "Virtual Health" provides information for patients and families, providers, and researchers (Alberta Health Services, n.d.-b).

On the "Information for Patient and Families" page, they outline the benefits, how to prepare , information on how the patient will be connected, what to expect and tips for a good appointment (Alberta Health Services, n.d.-d). AHS offers interpretation services, closed captioning and live transcription and extends the services to community specialists (Alberta Health Services, n.d.-d). Notably, AHS mentions Zoom and MyAHS Connect as platforms that can be used for virtual visits. In the researcher section, AHS provides a Virtual Care Evaluation Framework (Alberta Health Services, n.d.-b). The Framework was developed to provide a "consistent approach to evaluating the acceptability, accessibility, appropriateness, effectiveness, efficiency, and safety of virtual care services at AHS" (Alberta Health Services 2023, 6).

On the "Rural Health" page, AHS includes a list of telehealth technology: Clinical Telehealth Service, TeleHome Care, Pediatric TeleSurgery, Virtual Pain and Symptom Control/Palliative Radiotherapy Clinic, and TeleMental/Psychiatry Services (Alberta Health Services, n.d.-a). The description from the website are as follows (Alberta Health Services, n.d.-a):

- ***Clinical Telehealth Services*** *allow health-care professional to use telehealth for appropriate clinical appointments, consults, follow ups, meetings and educational sessions.*
- ***TeleHome Care*** *allows patients' health information to be monitored and collected from their own homes, and then transmitted to nurses for review and intervention if required.*
- ***Pediatric TeleSurgery*** *improves access to specialized pediatric surgical services for assessment, pre-op assessment and teaching, follow up or health maintenance care, case reviews and discharge planning.*
- ***Virtual Pain and Symptom Control/Palliative Radiotherapy Clinic*** *is offered through telehealth linkage with the Cross Cancer Institute. Patients can be connected with a multidisciplinary, specialist driven pain and symptom control consultation service.*
- ***TeleMental/Psychiatry Services*** *is a province-wide telemental health psychiatric consultation service that provides timely, appropriate and specialized services in response to referral requests from rural physicians. Psychiatrists in all subspecialty areas provide routine and urgent consultations to facilities across the province (Alberta Health Services, n.d.-a).*

While Alberta's health care is operated by AHS as of the time of writing this capstone, Alberta's health care system is currently undergoing change. Rather than one agency – AHS – the provincial government intends to create four specialized agencies: primary care, acute care, continuing care, and mental health and addiction.

Alberta Netcare - eConsult

Alberta Netcare is the system which manages the province's Electronic Health Records (Alberta Netcare, n.d.). One of their programs is the eReferral eConsult where primary care providers are able to submit non-urgent questions to a specialist and receive a response within five calendar days (Alberta Netcare 2024).

eConsult was developed by Dr. Clare Liddy and Dr. Erin Keely with the goal of solving extensive specialist wait times (The Ottawa Hospital, n.d.). They launched the Champlain BASE eConsult system. The Champlain BASE eConsult system found that two thirds of patients received treatment without further referral (The Ottawa Hospital, n.d.). If a patient needed to see a specialist,

the primary care provider could prescribe tests and medications prior to the appointment. Additionally, Champlain BASE eConsult system found that four percent of patients received a referral to a specialist due to the information received from the consultation (The Ottawa Hospital, n.d.). For primary care physicians, the benefit of eConsult is that they can support their patients more quickly while reducing the need to see a specialist (The Ottawa Hospital, n.d.). The benefit for patients is that this provides timely support while reducing transportation and time barriers (The Ottawa Hospital, n.d.).

Specialist Locations in Alberta (Appendix A)

According to a search completed on August 5, 2024, there are 18,868 specialists in Alberta according to the College of Physicians and Surgeons of Alberta (CPSA) physician directory (College of Physicians and Surgeons of Alberta, n.d.). Of the 18,868, only 11,641 are active.[4] Excluding physicians only practicing family care and those who are listed as supervised practice only, there are 6,691 specialists practicing in Alberta.[5] Below is a breakdown of physician locations:

TABLE 1. Location of the active specialists listed on the CPSA physician directory

Location	Number of Specialists	Percentage
Urban	6204	92.72
Rural	183	2.74
Ermineskin Cree Nation	1	0.01
Out-of-Province	211	3.15
Out-of-Country	32	0.48
N/A	60	0.90
Grand Total	6691	100

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).

[4] Of the 11,641 active physicians, 4,495 are listed under family medicine, 1,308 are listed under general practice, 54 are physician assistants, and 6 are supervised practice only (College of Physicians and Surgeons of Alberta, n.d.).
[5] The practice disciplines of family medicine and general practice are specialties. However, for the purposes of this paper they were excluded due to the focus on primary care.

Of the 6,691 specialists, only 6,388 or 95.5 per cent of specialists have an Alberta location listed.

TABLE 2. Location of specialists who have an Alberta address

Location	Number of Specialists	Percentage
Urban	6204	97.12
Rural	183	2.86
Reserve	1	0.02
Total	6388	100.00

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).

Table 2 can further be broken down by examining the number of physicians in Edmonton and Calgary. Analysis found that there are 2,548 physicians located in Calgary and 2,877 physicians located in Edmonton. Below is the breakdown of physicians located in Edmonton and Calgary compared to the rest of Alberta:

TABLE 3. Breakdown of specialists with urban locations in Alberta

Location	Number of Specialists	Percentage
Edmonton	2548	39.89
Calgary	2877	45.04
Other Urban	779	12.19
Total (Urban)	6204	97.12

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).

Literature Review

The goal of this literature review is to synthesize the available literature on telehealth in Alberta with emphasis on specialist access in rural and Indigenous communities (Green, Johnson, and Adams 2006, 106). [6]

The following questions were used to guide the review:

- What are opportunities and challenges for telehealth in rural and Indigenous communities in Alberta?
- What telehealth research currently exists in Alberta regarding specialists?

Keywords or the searches were "rural", "Indigenous", "Alberta", "Canada", "on-reserve", "telehealth", "telemedicine", "specialists" and "virtual care".

Telehealth Defined

Telehealth is the use of "digital technology to provide healthcare services in various fields and disciplines" (Passamani et al. 2024, 1). The World Health Organization's (WHO's) definition is "the delivery of health care services, where patients and providers are separated by distance" (World Health Organization 2022 - b, v). The WHO also utilizes the word "telemedicine": "the delivery of health-related services and information using information and communications technologies (ICTs)" (World Health Organization 2022 – a, iv). Another commonly used term is

[6] The search was completed on Google Scholar for academic articles (Sukhera 2022, 414). In addition to academic articles, Google was used to look for grey literature such as reports, government documents, and working papers (McKenzie 2023). Due to the rapid uptake of telehealth during the COVID-19 pandemic, literature was limited to publications on or after 2019; however exceptions were made when looking at specialist telehealth delivery in Alberta to allow for knowledge synthesis of historical initiatives (Sukhera 2022, 414). Google Scholar and Google were chosen for the review due the size of their databases rather than doing a search in specific journals and organization websites.

"virtual care". The College of Physicians & Surgeons of Alberta (CPSA) defines virtual care in their Standards of Practice: "any interaction between patients and members of their circle of care occurring remotely, using any forms of communication or information technology with the aim of facilitating or maximizing the quality of patient care" (College of Physicians and Surgeons of Alberta 2022, 7). There are various synonyms of telehealth with telemedicine and virtual care being the most common. At the center of all three definitions is the use of technology to provide health care.

Rural Communities

Rural communities face greater barriers to health due to limited resources; as a result there is a inverse relationship between remoteness and healthcare (Baylak 2020, 3). In the context of Alberta, it is also important to note that patients in the Alberta Central zone have higher rates of chronic conditions (Thesenvitz et al. 2022, 29).

Telehealth has been marketed as a solution to rural health inequities (Rush et al. 2022, 565). That is not to say there is no criticism to using telehealth as a method of reducing health inequity in rural communities. Baylak expands upon two of the main criticism: resources would be better spent elsewhere and that remote communities do not have the high network bandwidth (Baylak 2020, 8). To the first, Baylak states that focusing the resources on recruitment would "ignore the requirements of rural communities to have healthcare that is able to adapt to their unique needs" (Baylak 2020, 8). To the second, Baylak states that technology is evolving and individuals in rural communities have increasing access to phones and the internet. However, throughout the literature, technology is consistently identified as a challenge for telehealth in rural communities. Rush et al. found that rural adults had "difficulties with using telehealth technologies due to poor digital literacy, cognitive and psychomotor impairment, equipment failure and/or limited access and

connectivity to reliable equipment and internet/mobile services" (Rush et al. 2022, 570). Rush et al. also found that "individuals with higher levels of e-literacy are more willing to use telemedicine"; the same study found that telehealth faced challenges of unreliable internet and perceptions of impersonal service (Rush et al. 2021, 11-12).

Leader at el. looked at implementing community telehealth services in Saskatchewan, primarily in Indigenous communities and found that there were challenges with human resources such as "telehealth coordinators, onsite facilitators, and IT" due to limited funding (Leader et al. 2023, 218). The study also discovered that "where telehealth technologies are located matters" (Leader et al. 2023, 221). There were "scheduling challenges with multi-purpose rooms, telehealth units located away from clinical equipment, and difficulties relocating technology due to limited mobility"(Leader et al. 2023, 218). There were also issues of privacy due telehealth units lacking adequate soundproofing (Leader et al. 2023, 218).

Despite challenges, telehealth does offer opportunities to reduce barriers to health; Leader et al. found that " telehealth was viewed as a profound benefit in terms of ease of access without having to leave the community and familiarity with local staff, inclusion of family and supports in health appointments, and greater access to fluent language supports" (Leader et al. 2023, 218-219). Rush et al. also discovered that rural older adults found that accessing telehealth was easier than travelling (Rush et al. 2022, 565).

From an economic perspective, there are savings for both the health care system and patient (Rush et al. 2022). Telehealth also potentially translates to fewer emergency visits, reduced staffing costs, and preventative savings (Rush et al. 2022, 571). For the patient, it means a reduction in travel costs. A research team at the University of Alberta found that rural patients spend an extra $450

to travel to Edmonton for each specialist appointment (Pullin 2023). A British Columbia study found that transportation costs for rural patients to was $856; the study also found accommodation costs of $674 (Kornelsen et al. 2021, 1). These costs are borne by the patient, not the healthcare system. These challenges for patients requiring health care outside of where they reside are further exacerbated when considering those who do not have the ability to drive and/or afford the additional costs.

Indigenous Communities

Although rural and Indigenous communities face similar challenges regarding health care, the implementation of telehealth should not be standardized (Leader et al. 2023; Duun et al. 2022). Telehealth should meet the needs and priorities of the Indigenous communities it serves; to do so, it is important to prioritize engagement and relationship-building (Leader et al. 2023). The goal should be to work together to build a system that meets the unique need of the community.

Leader et al. states:

> *Implementing successful telehealth programmes goes beyond inclusion and towards supporting Indigenous successful telehealth programmes goes beyond inclusion and towards supporting Indigenous self-determination in health. This is achieved through decision-making and guidance in relation to community capacity and infrastructure and ensuring that processes are community-driven, culturally responsive, driven by Indigenous knowledge, and considers community realities (Leader et al. 2023, 220).*

The Extension for Community Health Outcomes+ (ECHO+) telehealth model provides important considerations for utilizing telehealth to support health care in Indigenous communities (Dunn et al. 2022). The ECHO+ telehealth model integrated Two-Eyed Seeing and the Five R's (respect, relevance, reciprocity, responsibility and relationship) (Dunn et al. 2022, 116). Additionally, to

prioritize relationship building and collaboration, the ECHO+ telehealth model was "highly adaptable based on available community resources and priorities" (Dunn et al. 2022, 117).

When working with Indigenous communities, it is important to build relationships and prioritize collaboration. Building relationships allow for telehealth models that acknowledge the unique needs of each community and provide space for the OCAP (ownership, control, access, and possession) principles (Dunn et al. 2022, 118).

Access to Specialists

Literature Prior to the COVID-19 Pandemic

Research on the potential of telehealth for increasing access to specialists is not an emerging topic. While literature prior to 2019 does inform the landscape of telehealth after the COVID-19 pandemic, it also provides the opportunity to examine if there has been changes in the challenges and delivery of telehealth. Three scholarly articles explain the challenges and opportunities of telehealth prior to the pandemic (Davis, Howard, and Brockway 2001; Witmans et al. 2008; Shivji et al. 2011).

Davis et al. evaluated the feasibility and acceptability of telehealth rheumatology consultations (Davis, Howard, and Brockway 2001, 1910). Acknowledging the concentration of services in Edmonton and Calgary, the study was completed in High Prairie, where patients typically must drive 4-hours one-way to Edmonton to receive care (Davis, Howard, and Brockway 2001, 1910). Telehealth delivery was through multi-disciplinary consult with the referring physician (family physician), consultant (rheumatologist), and patient (Davis, Howard, and Brockway 2001, 1911). During the appointment, the referring physician sent real-time patient data such as radiographs to the consultant for discussion. The study found that patients were satisfied with the telehealth, and

without the service only 13 out of the 52 patients would have bothered with a consult (Davis, Howard, and Brockway 2001, 1911). Despite optimistic findings, the researchers called for research on "reliability and accuracy of telehealth consults versus traditional consults" (Davis, Howard, and Brockway 2001, 1913).

In 2008, Witmans et al., published an article regarding pediatric sleep services via Telehealth in Alberta (Witmans et al. 2008). They wanted to address the issue that "families in geographically isolated areas, with limited access to specialty services such as pediatric sleep medicine, are at increased risk for unmet treatment need" (Witmans et al. 2008, 207-208). Their telehealth service delivery model was a series of questionnaires followed by a telehealth appointment with a pediatrician, nurse and psychologist if needed to develop an individual treatment plan (Witmans et al. 2008, 211). After the telehealth appointment, families were provided follow-up with a psychologist. The study found that "the telehealth service delivery model was also useful as an initial consultation during which the coordination of multiple face-to-face services and diagnostic testing could be arranged" (Witmans et al. 2008, 212). Rather than multiple trips, specialists and clinical investigations were arranged over 2 to 3 days (Witmans et al. 2008, 216). Challenges encountered were the technological issues such as poor connection and uncertainty of telehealth (Witmans et al. 2008, 215). Advantages were that it allowed for multidisciplinary team approach, increased access to specialists, and saved families travel and associated costs (Witmans et al. 2008, 216-217).

In 2011, another telehealth article was released on pediatric surgical services through the "Pediatric TeleSurgery" project in Alberta (Shivji et al. 2011, 532). The project "used specialized pediatric surgery services including: General Surgery, Neurosurgery, Orthopedics, Plastic Surgery, Chronic Pain Clinic, and Urology" (Shivji et al. 2011, 524). Technology used was a portable camcorder

that was able to zoom and capture images with ensured security through firewall, embedded encryption, password and authentication. The study reported that, both patients and clinicians had high satisfaction rates; "patients; families and clinicians felt that they were able to get to appointments more quickly via telehealth" (Shivji et al. 2011, 525). In addition to quicker appointments, telehealth appointments reduced travel time and expenses. When examining the demographics of the patients, 97 per cent lived more than 200 km away and 77 per cent lived more than 400 km away from the Stollery Children's Hospital (Shivji et al. 2011, 523). Due to distance, 51 per cent of patients reported a cost saving between $101 to $500 for travel and 48 per cent reported a cost between $500 to $700; these numbers did not account for "lost wages, accommodations and food" (Shivji et al. 2011, 525). Arguably a more impactful figure was that 4 percent of patients would not have been able see a specialist due to costs. Despite the benefits, challenges were also identified: need for better remote technology that can be used by a local physician, billing codes not allowing for telehealth, out-province telehealth licensure expenses, and telehealth disrupting flow of clinics (Shivji et al. 2011, 526). Considering these challenges, the author recommended that telehealth be used when no hands-on components are required to build rapport and provide pre-operative education, schedule telehealth appointments back-to-back, and work with local physicians to perform pre-surgical testing. Notably, the authors suggested that working with local physicians had potential to address the isolation rural physicians experience. Lastly, they recommended specialists to utilize telehealth services to manage workloads.

The three studies found that telehealth increases access to specialist care. Patients in rural communities should not have the weight the benefits of seeing a specialist against travel costs. Interestingly, the specialist location issue has not changed since the 2001 study (Davis, Howard, and Brockway 2001). The challenges of technology such as privacy and access still exist today.

However, many of the costs have changed; there has been massive advancements in technology over the last decade. As a result, there is a need for future studies to re-examine the cost savings of telehealth for the health care system.

Literature Published from 2019 Onwards

In all the articles reviewed, researchers found that telehealth to be convenient for patients. This is consistent with a scoping review addressing eHealth in Australia and Canada; LeBalanc et al. found that "90.1 [per cent] of articles reported that eHealth interventions were largely positive" (LeBlanc et al. 2020, 2). Lu et al. examined patient experiences from specialist's neuroscience and psychiatric clinics in Calgary during the second wave of the COVID-19 pandemic (Lu et al. 2023). Patients in the study reported reduction in wait times, shorter appointments, reduced financial costs, and not having to spend energy in getting to an appointment (Lu et al. 2023, 527-531). A feasibility study for utilizing virtual visits for people receiving maintenance hemodialysis also found that it was convenient to see a nephrologist from home, saving both time and money (Lunney et al. 2021, 5). Dahiya et al. also found a positive response from both gastroenterologists and patients in their surveys with 84.8 per cent of patient reporting that they would use virtual care again (Dahiya et al. 2023, 46).

Other benefits of telehealth are that it allows for family centered care and shared decision making from a multidisciplinary team (Bailey et al. 2022). Bailey et al. investigated family perceptions of the Telehealth Rounding and Consultation for Kids (TRaC-K) model pilot between Alberta Children's Hospital and the Medicine Hat Regional Hospital: "The TRaC-K uses a mobile audiovisual platform to connect regional and tertiary pediatricians and multidisciplinary clinicians caring for admitted children form Southeaster Alberta" (Bailey et al. 2022, 79).

In the literature, challenges to telehealth were also identified: technical issues, patient perceptions of telehealth, and the lack of rapport between physicians and patients (Dahiya et al. 2023; Olteanu et al. 2022; Lunney et al. 2021). In addition to patients not having access to technology, Lu et al. reported issues of lagging and disconnecting (Lu et al. 2023, 528). Lunney et al. found IT infrastructure issues with computers not having built in webcams and microphones along with the issue of devices having to be owned by AHS (Lunney et al. 2021, 5). In terms of patient physician relationships, Lu et al. found that patients were less likely to give personal information over the phone; patients also felt that the appointments were too short (Lu et al. 2023, 529-530).

One study found that ConsultDerm provided a solution to the shortage of dermatologists in Alberta (Olteanu et al. 2022, 477). ConsultDerm is a web-based teleconsultation service that connects physicians and nurse practitioner to consult board-certified dermatologist; the platform allowed dermatologists to supplement their in-person practices (Olteanu et al. 2022, 478). The average time to see a dermatologist was 5.2 days rather than 10 weeks (Olteanu et al. 2022, 579). Examining the service, researchers recommended "creating formalized training video for referring physicians" and providing incentives for physicians to take and send good photos, potentially through the addition of new billing codes (Olteanu et al. 2022, 483).

In regards to physician-to-physician consultation, one of the services offered in Alberta is eConsult (Li and Wong 2021). EConsult connects primary care health care providers with a specialist for non-urgent questions. eConsult has been found to be timely while also decreasing the number of specialist appointments needed. However, the study found that 49% of participants "did not know if their family doctor had obtained from a specialist to support their care" (Li and Wong 2021, 77). Concerns from the patient were the security and privacy of information, communication, and time

demands. Therefore, the research calls for strategies "to address their concerns about security of transferred information, miscommunication and delayed responses" (Li and Wong 2021, 81).

The Importance of Technology

A clear theme throughout the literature is the importance of technology. Technology is the facilitator of telehealth. However, it is also a source of many challenges: lack of access to appropriate technology, lack of connectivity, and ensuring privacy (Lu et al. 2023; Olteanu et al. 2022; Lunney et al. 2021; Shivji et al. 2011). As well, challenges arise regarding access to appropriate technology and uptake by the public (Canadian Institute for Health Information 2023, 32). The need for user-friendly technology is also important considering Alberta's aging population (Canadian Institute for Health Information 2023, 28)

The 2022 Leger COVID-19 Tracking Survey found that some of the reasons for not utilizing virtual care were the following: concerns about privacy, not-being aware that it was an option, in-person visits allowing them to include caregivers, not being user-friendly, not having access to reliable and fast internet connection, not having the computer skills, physical barriers that prevents the use of virtual care, and not having access to a device (Canada Health Infoway 2022, 16).

The challenges of technology are not limited to patients. For telehealth to work, physicians must also feel comfortable in delivering services virtually. The Information and Communications Technology Council reported on the physician skills gap stating that "83% of Alberta respondents felt they had 'the knowledge and skills to use virtual care platforms to provide care,' but only 66% agreed that 'virtual care enables [them] to provide quality care for [their] patients'" (Legere et al. 2024, 32). They also reported that the number one challenge for physicians was virtually examining patients as they "did not feel that post-secondary programs were currently training practitioners in the distinct skills required for virtual care" (Legere et al. 2024, 32) It is important

for physicians to understand privacy and security policies. One good source for policy in this area is the First Nations Information Governance Centre (FNIGC), which "guide[s] people working with First Nations health data on principles of data-sovereignty and population-level data privacy" (Legere et al. 2024, 39). Regarding the challenges of technology, Lunney et al. found the need for "easy to use and functional" technology, and that "video visit adoption in practices requires significant change management and ongoing guidance, training, troubleshooting, and support, that accounts for the unique aspects of each practice setting" (Lunney et al. 2021, 2).

Jurisdictional Analysis

A jurisdictional analysis was conducted looking at what other provinces were offering in terms of telehealth and the guidelines provided by the Colleges. A jurisdictional analysis allows not only for comparison but learning. Alberta may be able to look to other provinces to guide the delivery of telehealth in Alberta.

Standard of Practices, Practice Standards, Professional Standards, and Policies

Although the documents containing the standards for virtual care are similar, there are some notable differences from the CPSA's Virtual Care Standard of Practice (College of Physicians and Surgeons of Alberta 2022). Below are some examples:

The College of Physicians and Surgeons of British Columbia's Practice Standard outlines the prescription of opioid medications, opioid agonist treatment (OAT), psychotropic medication, and document for the authorization of cannabis (College of Physicians and Surgeons of British Columbia 2023). The CPSA's Standard of Practice only provides specific guidelines for opioids and other controlled medication (College of Physicians and Surgeons in Alberta 2022).

Saskatchewan's policy includes a section for referral to specialists. It states that the referral expectations are that "if an assessment of the patient's presentation requires a physical examination before the referral, the referring physician must ensure that one is undertaken unless doing so would unduly delay care. It is unacceptable to defer such a physical assessment to the specialist unless agreed to in advance by the consulting specialist" (College of Physicians and Surgeons of Saskatchewan 2023, 5). BC, Manitoba, Newfoundland and Labrador, and New Brunswick also include provisions for referring patients to specialists (College of Physicians and Surgeons of British Columbia 2023; College of Physicians and Surgeons of Manitoba 2022; College of Physicians and Surgeons of Newfoundland and Labrador 2023; College of Physicians and Surgeons of New Brunswick 2022). The CPSA's Standard of Practice does not outline referring requirements for specialist care (College of Physicians and Surgeons of Alberta 2022)

Manitoba's Standard of Practice for Virtual Medicine states that "it is not an acceptable standard of care to solely practice virtual medicine. A blended care model balance in-person and virtual medicine is required if providing virtual medicine" (College of Physicians and Surgeons of Manitoba 2022, 2).

> *Virtual Medicine that do not meet the Standard are: virtual medicine-based businesses that do not offer timely in-person appointment by the same physician (within 24-48 hours), physicians not offering in-person appointment, including during a pandemic, unless advised by a health authority to not see patients in person, physicians restricting in-person visits with patients or having very linted in-person appointments inappropriate or without rationale (College of Physicians and Surgeons of Manitoba 2022, 2).*

Although not exhaustive, the examples above are to demonstrate the complexity of regulating virtual care. One notable mention is that many of the Colleges acknowledges the potential for virtual care to bridge gaps in healthcare (College of Physicians and Surgeons of British Columbia 2023; College of Physicians and Surgeons of Saskatchewan 2023; College of Physicians and

Surgeons of Newfoundland and Labrador 2023). However, they also acknowledge that it is not a replacement, but a complement to in-person care. As space develops, there are still challenges and regulatory requirements to be addressed.

Notable Programs/Projects

This section looks at the delivery of telehealth in other provinces and territories. Although each province has different deliveries of telehealth, this provides an opportunity to learn from and leverage successes.

Saskatchewan offers in-person locations for patients to join their Telehealth appointment (eHealth Saskatchewan, n.d.-a). Locations are classified as either First Nations site, Saskatchewan Health Authority site, or both.

Yukon offers a list of clinics that offer virtual health appointments (Government of Yukon, n.d.). The list of clinics includes referred care, pediatric, general surgery, orthopedic, obstetrics and gynecology.

Manitoba has the MBTelehealth program, established in 2001 (Province of Manitoba 2016). The goal for the program is to "provide Manitobans with access to health services through the use of technologies to overcome the barriers of distance, time, and expense" (MBTelehealth, n.d.-a). One of the services offered is MBTelehealth Videoconferencing in which a secure room is offered to patients (MBTelehealth, n.d.-b). Another is the Catalogue of Specialized Services (CSS) which allows one to search specialized services offered. In a 2016 provincial news release, Minister Blady was quoted stating, "adding more sites means less travel for patients, more access to medical specialists and even better health-care services closer to home" and "last year alone, more than 18,000 patient appointments occurred with a specialist through Telehealth, resulting in an

estimated saving of more than $5 million in travel-associated costs" (Province of Manitoba 2016). The same article reported that "more than 500 clinical specialists from 60 specialty areas provide services through the 158 current operational sites established across the province" (Province of Manitoba 2016). MBTelehealth does much more than just provide services. They provide leadership on telehealth usage in the province; they enforce guidelines, ensure best practices, identify concerns, and identify new areas for telehealth usage (MBTelehealth, n.d.-a).

In the Canadian Institute for Health Information's (CIHI's) report, The Expansion of Virtual Care in Canada: New Data and Information, found that Newfoundland and Labrador took special consideration of their aging population when developing virtual care services (Canadian Institute for Health Information 2023, 28). The report states "the province is supporting digital health equity by expanding the availability of user-friendly technological solutions that are accessible and functional regardless of a patient's ability to connect to the internet" (Canadian Institute for Health Information 202, 28).

Looking to other provinces provides opportunity to be inspired and learn from their successes. Although not done in this paper, there may be opportunity to utilize Alberta's Virtual Care Evaluation Framework to determine potential opportunity for Alberta to leverage data from other provinces (Alberta Health Services, n.d.-b).

Case Study: Using Telehealth to Facilitate Autism Diagnosis

This case study aims to explore the potential for telehealth in increasing access to an ASD diagnosis. The case study will provide insights into the importance of a diagnosis and look at how telehealth is able to increase access to assessments for children in rural and Indigenous communities. While this paper focuses on increasing access to specialists through telehealth, the case study also acknowledges that ASD diagnosis can also be completed by psychologists.

Autism Spectrum Disorder (ASD)

According to the Public Health Agency of Canada, "autism spectrum disorder (ASD) is a neurodevelopmental disorder that can include impairments in speech, non-verbal communication, and social interactions combined with restricted and repetitive behaviors, interests or activities" (Public Health Agency of Canada 2022, 3). While these are the diagnostic features, it is important to note that manifestation can differ between individuals. Also, individuals with ASD often have one of more comorbid conditions including "psychiatric, neurological, gastrointestinal and sleep disorders" (Public Health Agency of Canada 2018, 2).

In Alberta, the crude prevalence of ASD among children and youth aged 1 to 17 years is one in fifty (Public Health Agency of Canada 2022, 6). The Public Health Agency of Canada has found 53.7 percent of children and youth were diagnosed with ASD before the age of five in Canada (Public Health Agency of Canada 2022, 1).

Typically, ASD is diagnosed by a developmental pediatrician or pediatric psychiatrist (Autism Calgary, n.d.). However, Autism Calgary notes that a letter of diagnosis is given "only if the doctor feels they have the experience and expertise to do so" (Autism Calgary, n.d.). While ASD diagnosis through a developmental pediatrician or pediatric psychiatrist is publicly funded, there is the option of receiving a private diagnosis through a registered psychologist.

The Importance of a Diagnosis

The Partnership Model – Building Relationships

This section will use the partnership model to look at the importance of a child or youth having access to an ASD diagnosis. The partnership model was developed to acknowledge the increasing role of "active involvement and self-care actions of individuals and families in maintaining health and preventing diseases" (Courtney et al. 1996, 177).[7] Countney et al., states that "a partnership approach is also important to professionals working with underserved, vulnerable, and/or minority populations" (Courtney et al. 1996, 177). Professionals under the partnership model work as a partner in improving health and well-being (Courtney et al. 1996, 179). It is a shift from the professional model where the focus is on the diagnosis and the role of the professional.

The partnership model provides an opportunity to look at ASD diagnosis under the lens of relationships (Courtney et al. 1996, 179). ASD is not just a diagnosis from a healthcare professional. It often results from a relationship between professional, client, family and the community. The partnership model also emphasizes the professional's responsibility to respect the individual and cultural differences (Courtney et al. 1996, 179)

Early Diagnosis

One of the biggest benefits to early diagnosis is the access to support and programs it opens for children and their families (Dawson 2008). Research suggests that early intervention "can result in substantial improvements in language, cognitive, social, and adaptive functioning, holding the potential to promote positive long-term outcomes, mitigate lifespan disability, reduce society costs, and improve personal wellbeing and productivity of individuals with ASD and their

[7] Preventing disease is not the correct terminology when speaking about individuals with ASD.

families" (Vivanti, Bottema-Beutel, and Turner-Brown 2020, 1). Access to support and programs positively impacts the individual, family and community.

On an individual level, accessing supports can encourage the development of communication, social and movements skills (Okoye et al. 2023, 2). Due to neural plasticity, the earlier the intervention the better the outcomes (Okoye et al. 2023,6). On a societal and community level, research suggests that early intervention results in savings in publicly provided health care and special education services (Okoye et al. 2023, 3).

While research suggests that early diagnosis has many benefits, it is important to acknowledge that receiving a diagnosis from a qualified professional to minimize risks of overdiagnosis and overtreatment (Okoye et al. 2023, 3). Screening tools have high false positive rates for ASD, thus highlighting the need for efficient and timely referrals.

Supporting Both Children and Parents

Using a scoping review, Makino et al., found that while parents report a wide range of emotions to a diagnosis, the most common reaction is relief knowing that their child's behaviour was not their fault (Makino et al. 2021, 275). Research also suggests that parents who receive an early diagnosis report lower levels of stress and anxiety (Okoye et al. 2023, 3).

Access to Supports and Services

In Alberta, a diagnosis opens access to support and services such as Program Unit Funding (PUF), the Severe Disability Fund (SDF) and Family Supports for Children with Disabilities (FSCD) (Government of Alberta n.d.-f; Government of Alberta 2024). PUF and SDF are managed by the Ministry of Education, while FSCD is managed by the Ministry of Senior, Community, and Social Services. The definition for child differs between these two departments. Therefore, the language

in this section may differ depending on the ministry responsible. The Ministry of Education defines individuals under the age of 6 as children. Individuals who are required to be in school are considered students (Government of Alberta 2024, 214-215). The Ministry of Senior, Community, and Social Services considers anyone under the age of 18 as a child (Government of Alberta, n.d.-f).

Program Unit Funding

For the Ministry of Education, a diagnosis allows schools to access Program Unit Funding (PUF), which is provided "for children with a severe disability or severe language delay who require additional support beyond that offered in a regular ECS program" (Government of Alberta 2024, 112).[8] PUF is also offered "for children with a moderate language delay who require additional supports beyond that offered in a regular Kindergarten program" (Government of Alberta 2024, 58).

One important reason that of young children need to have access to a diagnosis is that Alberta does not having mandatory pre-Kindergarten and Kindergarten (Clark, Seel, and Clark 2009, 9). Because pre-Kindergarten and Kindergarten is not mandatory, programs "are able to refuse children with disabilities if they do not have the resources to assess and identify the disabilities or to supply classroom assistants" (Clark, Seel, and Clark 2009, 9). Therefore, the access to a diagnosis is important as it opens the door for ECS programming for children with disabilities.

[8] Early Childhood Services (ECS) "refers to education programming for children before they enter Grade 1" (Government of Alberta, n.d.-b). ECS includes both pre-kindergarten and kindergarten programming. "Children diagnosed with a mild, moderate, severe disability, or a language delay that is moderate or severe may start pre-Kindergarten at 2 years 8 months as of August 31" (Government of Alberta, n.d.-b). "Kindergarten is the year prior to Grade 1" and is accessible for all children (Government of Alberta, n.d.-b).

Children with an ASD are typically assigned code 44 by school authorities. Code 44 is for "ECS child/student with a severe physical, medical, or neurological disability" (Government of Alberta 2022, 13). The following are the requirements, outlined in the Special Education Coding Criteria, for school authorities, accredited funded private schools, and private ECS operators to code a child/student as 44 (Government of Alberta 2022):

- *has a medical diagnosis by a qualified professional of a physical disability, specific neurological disorder or medical condition that severely impacts the ECS child's/student's ability to function and learn in an educational environment (note: some physical or medical disabilities have little or no impact upon the ECS child's/student's ability to function in the learning environment) (13);*
- *requires extensive adult assistance and modifications to the educational environment to support their learning (13); and*
- *diagnoses could include autism spectrum disorder, FASD/alcohol-related neurodevelopmental disorder (ARND), Tourette syndrome, cerebral palsy, brain injury, cancer, selective mutism, social (pragmatic) communication disorder, that severely impacts the ECS child's/student's ability to function and learn in an educational environment (Government of Alberta 2022, 13-14).*

However, while "a clinical diagnosis by a registered psychologist or medical professional specializing in the field of these disorders is required" but for PUF a clinical diagnosis alone may not be sufficient (Government of Alberta 2022, 13). School authorities need to provide documentation "Indicating the quality, nature, frequency, and severity of the impact of the disability/disorder within the educational environment" (Government of Alberta 2022, 13-14). While a clinical diagnosis is not the only documentation needed to receive PUF, it plays a crucial role in accessing funding.

Severe Disability Grant

The Severe Disability Grant provides funding for students in grades 1 to 12 (Government of Alberta 2024, 111). It is only applicable to accredited funded private schools, including designated special education private schools. Similar to PUF, the Severe Disability Grant utilizes the coding

requirements from the Special Education Coding Criteria (Government of Alberta 2024). Accredited funded private schools are also able to decline registration based on not being able to support a child with a disability (Clark, Seel, and Clark 2009, 9). Therefore, assessment and diagnosis open doors to private schools which may consider accepting a child with a disability who is able to receive government funding.

Family Support for Children with Disabilities

FSCD supports the families of children with disabilities to access publicly funded supports and services (Government of Alberta n.d.-c). Support and services may include help with clothing and footwear relating to a child's disability, counselling, childcare , respite services, aides, medication and prescribed diets (Government of Alberta n.d.-f). In order to be eligible for FSCD, a child must meet the following criteria (Government of Alberta, n.d.-e)*:*

- *under 18 years;*
- *Canadian citizen or permanent resident;*
- *reside in Alberta;*
- *Medical documentation must be provided confirming the child has a disability or is awaiting a diagnosis; and,*
- *The diagnosis for a disability or health condition must be chronic, a developmental, physical, sensory, mental, or neurological condition or impairment, health condition that impacts their daily living activities such as eating, grooming, walking, interacting with others, playing and problem solving (Government of Alberta, n.d.-e).*

<u>Persons with Developmental Disabilities (PDD) program</u>

The PDD programs provide adults with development disabilities support so that they are able to live independently (Tran 2024). In Alberta, there is even greater importance for accessing a diagnosis before the age of 18 because of the eligibility criteria for PDD is that one must have a diagnosis of a developmental disability before the age of 18 (Tran 2024). As a result, those who are unable to receive a diagnosis before the age of 18 are ineligible for PDD. The system favors

those who are able to receive a diagnosis, which may mean added costs (e.g., travel, time, accommodations, private assessments).

Challenges for Autism Diagnosis

Rural and Remote Communities

The Canadian Autism Spectrum Disorder Alliance, in their 2014 National Autism Needs Assessment Survey report, called for "targeted outreach to address the unique issues of Canada's northern communities" (Young et al. 2019, 1144; Weiss et al. 2014, 7). Antezana et al., has found that rural communities face challenges regarding ASD diagnosis (Antezana et al. 2017). There are several reasons: geographic distance from specialists, lack of services in community, and hesitancy of guardians compared to urban areas, including greater costs and time associated. Additionally, there may be transportation limitations such as road conditions, unpredictable weather, and lack of public transit (Young et al. 2019, 1144).

Regarding the geographic distance from specialists, qualified professionals tend to concentrate in urban areas (Davis, Howard, and Brockway 2001). A search on the College of Physician and Surgeons of Alberta (CPSA) indicates that Alberta has seven active developmental pediatricians as of July 31, 2024. There are three developmental pediatricians in Edmonton and four in Calgary. There are 41 child and adolescent psychiatrists in Alberta, and of those, only one physician is in a rural community. Notably, the community was not in Alberta, but Bedford, Nova Scotia. Below is a list of physician locations:

TABLE 4. Locations of the 41 child and adolescent psychiatrists listed on the CPSA Physician Directory

Location	Number of Specialists
Edmonton, Alberta	12
Calgary, Alberta	23

St. Albert, Alberta	1
Red Deer, Alberta	1
Leduc, Alberta	1
Sherwood Park, Alberta	1
London, Ontario	1
Bedford, Nova Scotia	1
Total	41

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).

Indigenous Communities

There is very little Canadian research on autism in Indigenous communities (Bruno et al. 2023, 1). When discussing the prevalence of autism in Indigenous communities, it is important to be aware of the continued impacts of colonial policies (Bruno et al. 2023, 2). Bruno et al. point out that the *Indian Act of 1876* "stipulates that the federal health minister has overarching power over 'mentally incompetent Indians', which could be extrapolated even today to include Autistic Indigenous people" (Bruno et al. 2023, 2; Bartlett 1978). Indigenous communities also face jurisdictional challenges. The Federal government has jurisdiction over First Nation reservations while the provincial government is responsible for health care and disability services (Bruno et al. 2023). Therefore, there are conflicts between each level of government about the responsibility of delivering services, which leads to gaps in the system (Bruno et al. 2023). Researchers also found that there was literature on "inequitable access to services and funding" (Bruno et al. 2023, 6). A challenge for telehealth is the geographic isolation and limited Wi-Fi service experienced by many Indigenous communities in Alberta (Hambly and Rajabiun 2021).

Need for Culturally Sensitive Diagnosis

Stoll, Bergamo, and Rossetti explored ASD assessments from a "culturally sensitive lens" (Stoll, Bergamo, and Rossetti 2021). Research suggests that children from diverse cultural backgrounds, are less likely to be diagnosed with ASD due to differences in cultures. Soto et al. found a need to

adapt screening tools for different cultural and linguistic settings in the following ways by using "culturally relevant indicators of ASD" and "changed working to avoid interpretations because of cultural norms related to non-verbal and social communication" (Soto et al. 2015, 659).

Based on the need for culturally sensitive diagnosis, there may be benefits for families to connect with a physician that speaks the language spoken at home. For example, Bruno et al. found culturally informed definitions of autism (Bruno et al. 2023, 6). Therefore, there may be benefits for those in Indigenous communities to receive a diagnosis from a development pediatrician or child and youth psychiatrist who understand the culturally informed definitions.

Of the seven active developmental pediatricians listed on the CPSA physician directory not one of them listed a language other than English. Of the forty-one child and adolescent psychiatrists, fifteen physicians spoke a language other than English.

Table 5. Child and Adolescent Psychiatrists who speak a language other than English (a physician may speak more than one language)

Language	Number of Specialists
Cantonese	1
Chinese	1
Igbo	2
French	4
Hindi	2
Punjabi	1
Korean	1
Russian	1
Ukrainian	2
Spanish	2
Arabic	1
Italian	1
Afrikaans	1
German	1

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).

Connectivity in Rural and Remote Communities and Indigenous Communities

A key component of telehealth is ability to access high-speed Internet access. While telehealth included can include phone calls, videoconferencing is increasing in use (Canada Health Infoway 2024, 12). In a systemic review, Caffery et al., found equal or better outcomes for consultations delivered by videoconference (Caffery, Farjian, and Smith 2016). Videoconferencing has the advantage of the physician being able to see the patient during the appointment. Regarding access to high-speed Internet, rural and remote areas lag urban counterparts (Office of the Auditor General of Canada 2023, iii and 7). The Government of Alberta reports that "67 percent of rural Albertans and 80% of Indigenous communities do not have access to reliable high-speed internet at federal target speeds" (Government of Alberta, n.d.-a).

Potential for Telehealth

Literature examining the feasibility of utilizing telehealth to diagnose ASD for children suggests that there is a positive correlation between telehealth and in-person diagnosis (Sutherland, Trembath, and Roberts 2018). Additionally, Alfuraydan et al. found that telehealth methods to not only lower costs, but the time to diagnosis; researchers also found that telehealth assessments were more accurate when used with those with more severe autism. (Alfuraydan et al. 2020). Liu and Ma found that telehealth can offer many benefits to ASD screening, assessment, and diagnosis; it allows rapid screening, assessment, and diagnosis, improves the standardization of ASD, and saves time (Liu and Ma 2022). To note, Matthews et al. found that for children with more subtle presentations of ASD, telehealth may not be the appropriate method of diagnosis (Matthews et al. 2021).

Recommendations

Although the focus of this paper is increasing specialist access in rural and remote communities, it equally important to provide targeted and broad recommendations. Improving telehealth delivery will strengthen its impact on rural communities. Recommendations will utilize the case study to describe the potential to increase ASD diagnosis for children in Alberta.

As well, it important to ensure that the recommendations include the interests of a variety of stakeholders. Within the main goal of increase specialist access in rural and remote communities, there is also the opportunity to utilize telehealth to support physicians and protect their interests.

Create an Alberta Telehealth Program

Although telehealth research began long before the pandemic, it is still an area with massive growth potential. Alberta could benefit from a program that provides clear leadership in the province regarding telehealth delivery. This initiative could potentially be modelled off the MBTelehealth, Manitoba's telehealth program. Within the program, there are local sites for video conferencing sessions, virtual visiting tools and software, eConsult services, and the Catalogue of Specialized Services (MBTelehealth, n.d.-b). Having a provincial government leader in telehealth for the province not only facilitates cohesive program service delivery but allows for monitoring and identification of concerns and improvements (MBTelehealth, n.d.-a). It could also allow responsibility of data-collection to continue to improve telehealth delivery in the province.

Two important components of the MBTelehealth program that regarding impact increasing access to specialists are it and its eConsult platform and its Catalogue of Specialists Offering Service through Telehealth (MBTelehealth, n.d.-b). The following are specific recommendations and considerations for Alberta regarding these two services.

Encourage the Expansion of Alberta Netcare eReferral eConsult

eReferral eConsult connects primary care physicians or nurse practitioners to a specialist for non-urgent questions (Alberta Netcare, n.d.). In Alberta, this means waiting five days rather potentially weeks to see a specialist (Alberta Netcare 2024). There are benefits to this system: it reduces the number of patients waiting to see a specialist and allows for more accurate identification of patients who need referrals (The Ottawa Hospital, n.d.; Olteanu et al. 2022). By increasing the utilization and number of specialists available for eConsult, this can reduce the backlog of specialist wait times while also ensuring timely health care delivery.

For children waiting to see a developmental pediatrician or child and youth psychiatrist, the eReferral eConsult system may result in faster access to supports and services. The consulting specialist may confirm the primary care providers initial screening child: a child needs referral or a child does not need referral. For parents, the second opinion from a specialist may offer peace of mind if both physicians determine a child does not need a referral. For the health system, this may reduce the number of children on the waitlist. The ability to receive second opinion before a referral is important because research shows that ASD diagnosis for toddlers have a high rate of false-positives (Okoye et al., 2023, 3; Dereu et al. 2012).

Create a Catalogue of Specialists Offering Services through Telehealth

This recommendation is inspired by MBTelehealth and Yukon's list of physicians who offer virtual health appointments (MBTelehealth, n.d.-b; Government of Yukon, n.d.). Having a catalogue of specialists offering virtual health appointments could be an important source of data. For primary care physicians, it may mean referring a rural patient to a physician who does offer virtual appointments. For patients, it may offer an opportunity to request a specialist who offers

virtual appointments. For government, it may mean the opportunity to collect data, and this data may inform offer solutions to long wait times. Perhaps, there is opportunity to develop a network where specialists with last-minute time availability can take advantage of virtual appointments and thereby see more patients.

Families in rural or Indigenous communities looking to receive a diagnosis for their child may prefer an in-person or telehealth assessment based on family circumstances. This choice could allow families to consider the costs and time associated with travelling to see a specialist. Families should not have to base their child's heath care decisions on being able to afford these travel and time costs. An ASD diagnosis opens the door for services and supports for families. Without the option of telehealth, the system only benefits those who are able to afford the costs of accessing a diagnosis. Therefore, having a clear list of specialists who offer telehealth services could give them more agency over their health care and reduce inequities to care.

Encourage Specialists in Urban Locations to Allocate a Percentage of Their Time to Rural and Remote Communities Through Telehealth

The 2015 Rural Health Services Review Final Report in Alberta described the gratitude felt in rural communities when specialists were able to provide services in their home communities, even a few days per month (Rural Health Services Review Committee 2015, 14-16). Offering specialist services in rural communities reduced "thousands of trips annually by patients already stressed by illness, the financial burden of travel costs, and the prospects of driving in city traffic" (Rural Health Services Review Committee, 2015, 15).

Taking inspiration from the concept of rotating specialists in communities, perhaps there is an opportunity for specialists to allocate a certain percentage of their time to seeing patients in rural

and remote communities through telehealth. Perhaps this would incentive patients to prioritize preventative care and asking for referrals without the fear of costs associated with travelling. A pilot project, where developmental pediatricians and/or child and youth psychiatrists commit a certain percentage of their practice to communicating with a rural or Indigenous community would provide insightful data: Are there more referrals from primary care providers? If offered a choice, do families prefer in-person and telehealth assessments? How impactful is the financial burden of in-person assessments?

A secondary benefit to physicians offering telehealth can be the potential to reduce burnout. Physician burnout is one of the challenges for physician retention (Hodkinson et al. 2022). In Alberta, the rate of physician burnout is 48.6 per cent. Research suggests that telehealth could reduce physician burnout (Goodfellow 2002). Reasons include providing physicians with flexibility in terms of hours and ability to work from home (Vaidya 2023). A study looking at the effects of flexible scheduling and virtual visits found that while telehealth itself does not reduce burnout, it reduces contributors of burnout such as workload control and perceived job stress (Sullivan et al. 2022). Additionally, telemedicine can potentially reduce administrative burdens.

Despite telehealth having the potential to reduce burnout, Lawrence et al. found that that during the pandemic, physicians who devoted a higher proportion of their clinic time to health had higher levels of electronic health record based after-work hours. This could be due to perceptions of never-ending work and concerns about documentation and IT systems (Vaidya 2023). If encouraging physicians to offer telehealth, it would be important to invest in the development of systems that ease the burdens of documentation. Therefore, it is important to prioritize the development of health technology talent in Alberta and fund health technology innovation (Legere et al. 2024).

Encourage Specialists and Clinics to Offer Telehealth with Expanded Hours

At Digital Health Today and Tomorrow honouring Dr. Mamoru 'Mo' Watanabe hosted by the W21C Research and Innovation Centre at the University of Calgary, the "Health Everywhere" program was announced (Obrien Institute for Public Health 2024). During the Health Everywhere panel discussion, one of the points mentioned was the potential for telehealth to cater to the specific needs of farmers, specifically regarding the number of hours farmers' work. During peak seasons, Alberta employees almost 56,700 domestic workers (Canadian Agriculture Human Resource Council 2024).

The employment standards are different for individuals working in agriculture. For one, "family members, volunteers, and farm and ranch workers on small farms are exempt from all employment standards" (Government of Alberta, n.d.-d). For farms that are not categorized as small, employees "are exempt from rules around daily and weekly hours of work" (Government of Alberta, n.d.-d). Additionally, they are exempt from overtime requirements and rules around breaks during shifts.

Delivering health care to farmers is important. Cherry et al., investigated the relationship between pesticide use and asthma in Alberta Grain Farmers and found that "lifetime exposure to phenoxy herbicides were associated with an increased risk of asthma" (Cherry et al. 2018). Research also suggests that farmers experience higher levels of stress, anxiety and depression (Jones-Bitton et al. 2020; Cole and Bondy, 2020). Telehealth offers an opportunity for flexible health care delivery for those working on farms.

In the discourse of farmers, it is important to recognize the number of foreign farmers in Alberta. According to the Canadian Federation of Agriculture, there are approximate 60,000 temporary foreign farm workers in Canada. In Alberta, there are appropriately 2,600 foreign workers

contributing to five per cent of the provinces' agricultural workforce (Canadian Agricultural Human Resource Council 2024). These foreign farm workers work long hours, face language barriers and have a lack of transportation – all barriers to receiving healthcare (Rutherford 2024). Pysklywec et al. through their experience at the Occupational Health Clinics for Ontario Workers, found that 35, 13, and 6 per cent of concerns were due to musculoskeletal, ocular and skin issues; they also found that workers attended due to the translators and the absence of insurance requirements (Pysklywec et al. 2011, 1040). Telehealth could offer appropriate opportunity for these workers to receive health care by providing hours outside of their working hours, connecting with physicians who speak their native language while also reducing the need for travel.

Expanded hours acknowledge the working hours of individuals. Regarding the case study some families may not have the ability and financial resources to have a guardian take time off work. Specialists offering hours beyond the traditional 9 to 5 offers families a choice and provides equitable access to care not based on financial ability.

Work with Local Clinics to Offer Safe Spaces and Technology

While telehealth is a powerful tool to increase access to health care, there are limitations regarding access to the service and ability to connect with healthcare providers in safe spaces (Sheperis and Smith 2021). One of the challenges for accessing telehealth is the availability of high-speed internet. 67 per cent of rural Albertans do not have access to internet at federal target speeds (Government of Alberta, n.d.-a). This number is greater in Indigenous communities, where it is 80 per cent. A second challenge is the availability of technology. Data regarding the number of Canadians or Albertans who did not have access to an appropriate device could not be found. However, one cannot assume that everyone in Alberta has access to a digital device, especially one with videoconferencing hardware.

There may be individuals who do have the access to internet and hardware but do does not have the skills to use either. For example, a study looking at barriers to video-based telehealth among homebound older adults found many patients did not participate due to lack of support with technology (Kalicki et al. 2021)

Patient owned device focused telehealth strategy creates a gap where individuals with the highest need for care are excluded (Hoffman 2022; Chang et al. 2021). To acknowledge these gaps, policies must look to strategies that would minimize these barriers. One potential solution could be to work with local clinics to provide the space and technology. There may be opportunity to look at what the Governments of Saskatchewan and Manitoba have been doing (eHealth Saskatchewan, n.d.-a; MBTelehealth, n.d.-b). Both provinces offer local Telehealth sites.

There is added benefit in that these clinics may be equipped with technology superior to that of phones and laptops. Some of the studies in the literature reviewed used equipment that allowed for better examination of the patient through functions like zoom (Shivji et al. 2011, 524).

Regarding the children seeking an autism diagnosis, there may be benefits of offering a telehealth space outside of the family home. Some examples may be that families may not feel comfortable using the space at home, they may have other children at home, and it provides opportunity to examine a child in a new surrounding.

Invest in Telehealth Education for Physicians

As telehealth becomes more common, it is just as important to train the next generation of healthcare providers as it is to expand the system. Literature suggests that telehealth education is a major gap and a barrier to scaling up telehealth (Cruz-Panesso, Tanoubi, and Drolet 2023). Educating physicians is also important considering the potential medico-legal risks to telehealth

(Wade, Eliott, and Hiller 2012; Lee, Tong, and Lai 2021; Tong 2019). Physician should be able respond to emergent situations such as a patient not feeling safe in their space or experience a medial emergency. The Alberta Virtual Care Working Group has identified "virtual care training and education, for provider, clinic staff, patients and family members as insufficient" (Alberta Virtual Care Working Group 2021, 22)

The Alberta Medical Association has a virtual care page where it provides information on how to start utilizing visual care and the billings codes (Alberta Medical Association, n.d.-b). However, it does not address challenges to specific disciplines. For example, what assessment can be completed with the same standard of care by developmental physicians? The extent of telehealth training at Alberta's medical schools and residency programs are not known.[9] However, for the uptake of telehealth, it is important to train physicians who are confidence in its effectiveness. Thus, universities and medical organizations should consider investing in more telehealth education.

Invest in Telehealth Research

While the COVID-19 pandemic accelerated the growth of telehealth, and subsequently telehealth research, there should be continued investments into telehealth for the growth to continue. Continued investment is even more important as the Albert Virtual Care Working Group identified that the pandemic "accelerated the adoption of virtual care too rapidly and the system was not ready" (Alberta Virtual Care Working Group 2021, 22).

[9] A future area of research could be the examination of telehealth curriculums in the provincial medical and residency programs.

To note, Aberta has been investing into telehealth. For one, it has a Virtual Care Action Plan with a $15,908,369.00 funding from Health Canada; Canada Health Infoway also contributed two million dollars to support virtual care delivery (Health Canada 2022). Alberta Innovates have been playing a key role in the province in accelerating digital health technologies (Alberta Innovates, n.d.)

Investments should address the perceived barriers to optimal virtual care delivery identified by the Alberta Virtual Care Working Group: need for provincial-level vision, limited patient involvement, limited evaluation tool, need to increase access to technology, licensure and policy impediments, and improving communication so that there is bidirectional communication between providers and patients (Alberta Virtual Care Working Group, 2021, 20-22). Additionally, literature indicates the importance of understanding the viability of using certain types of assessments through telehealth (Hatef et al. 2024; Jabbarpour et al. 2021; Matthews et al. 2021; Connolly et al. 2022); therefore, research surrounding telehealth, and the effectiveness/accuracy of diagnosis should be encouraged.

The use of AI is increasing in telehealth (Kuziemsky et al. 2019). For example, AI has the potential to aid in diagnosis. Additionally, there could be the addition of an AI translator (Burrell 2023). An AI translator could increase access and optimize telehealth for culturally sensitive diagnosis. Therefore, there should be investments looking at the potential for AI.

Lastly, one of the criticisms of telehealth is the storage and usage of one's data and ensuring privacy (Lu et al. 2023; Lee, Tong, and Lai 2021; Wade, Eliott, and Hiller 2012). Alberta Health Services lists Zoom as a platform where a virtual visit may occur (Alberta Health Services, n.d.-b). Zoom is a company based out of the United States and its data is most likely stored in the US

(Lam 2020, 1). Pursuant to the *Patriot Act*, U.S. federal agencies may access all data located in the United States with a court order (Lam 2020, 1). Due to the highly sensitive nature of personal health data, data privacy and the platforms used for virtual visits must be carefully considered. There may be opportunity for Alberta to develop and promote a platform – a one stop-shop for all healthcare providers. For example, Saskatchewan has developed the Saskatchewan Virtual Visit Program (eHealth Saskatchewan, n.d.-a). It is "a single provincial video conferring solution designed specially for healthcare providers and patients" (eHealth Saskatchewan, n.d.-b).

Change the Requirements for an Out-of-Province Physician to Provide Virtual Care in Alberta

Each province and territory are responsible for the registration of physicians, so the requirements may differ province to province. These differences complicate virtual care.

In Alberta, an out-of-province physician may provide virtual care to a patient located in Alberta by registration with the CPSA in the Telemedicine Register (College of Physicians and Surgeons of Alberta 2022). However, the CPSA outlines certain circumstances in which a out-of-province physician could provide virtual care without registration: care not available in Alberta, continuity of care, or for emergency where no other option is available. These three circumstances are identical Ontario's requirements (College of Physicians and Surgeons of Ontario 2022).

In British Columbia, there are no provincial licensing requirements for an out-of-province physician; they only require a license from the jurisdiction in which they are located in. The only requirement is that the physician must have a relationship within the province to deliver in-person care if needed (College of Physician and Surgeons of British Columbia 2023).

Considering the importance of a culturally sensitive diagnosis, as discussed above CPSA ought to change the circumstance in which they allow an out-of-province physician. CPSA could allow out-of-province physicians who speak a certain language to treat patients who request a physician who speaks a certain language. Additionally, the CPSA could allow Indigenous out-of-province physicians to treat patients in Alberta.

Conclusion

Telehealth is not a replacement for in-person health care and physicians still need to follow appropriate standards of care. However, it is a tool to ensure equitable access to health care for all Albertans regardless of where they live. It provides individuals with more agency in their health by offering patients a choice between virtual and in-person appointments when appropriate to do so. Rather than patients meeting the physician, it is the physician meeting the patient wherever they are.

For those in rural and remote communities, it means less travelling, time, and costs. Not having to travel alleviates the risks of unpredictable weather and arranging transformation for those without access to reliable transportation. As well, it also allows for the hours to be catered to professions with long hours such as farmers. However, the benefits of telehealth are not only for those in rural and remote communities. Telehealth can support those with limited mobility in accessing care, for those with limited time, and those who do not have access to transportation.

For the health care system, it provides opportunity to reduce specialist backlogs and provide equitable care throughout the province. Additionally, telehealth can reduce costs by decreasing the number of in-person specialist visits, decreasing the number of emergency-visits, and potentially decreasing future health care costs due to increased preventative care.

For children with disabilities, telehealth can help ensure that children and their families get access to a diagnosis, which is a gateway to publicly funded disability supports and services. Children, regardless of where they live, deserve equitable access to diagnosis, and thus, programs and services. Families located in rural and Indigenous communities should not have to bear the costs of travelling for a diagnosis. As Dunn et al. states “forcing individuals from remote communities to travel to urban centers for diagnosis and treatment amplifies the inequity” (Dunn et al. 2022).

Although the Ministry of Health would be responsible for the overall direction of telehealth in the province for the recommended changes to occur, ministries across government must work in tangent with each other. For example, Ministry of Health would have to work with Ministry of Advanced Education regarding physician education. They would also have to work with the Ministries of Technology and Innovation, Service Alberta and Red Tape Reduction, and Jobs Economy and Trade to expand and encourage health technology talent and accelerate innovation. The Ministry of Indigenous Relations would play an important role in engaging with Indigenous communities. Additionally, the Ministries of Children and Family Service, Education, Seniors, Community and Social Services would have interest in expanding diagnosis for children with autism.

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Appendix A

Data Extraction

Step 1: On August 5, 2024, a list of all active specialists in Alberta was downloaded from the CPSA's physician direction and was converted to a PDF file.

Name	Location	Practice Discipline	Gender	Languages

Step 2: Using the find and replace function, the following specialties were replaced by a "1". Physicians with only numbers in their practice discipline were deleted. This was to filter out all the physicians who were only working in a primary care capacity or only able to practice with supervision.

Family Medicine
Family Medicine (Addiction Medicine)
Family Medicine (Care of the Ederly)
Family Medicine (Emergency Medicine)
Family Medicine (Enhanced Surgical Skills)
Family Medicine (Family Practice Anesthesia)
Family Medicine (Obstetrical Surgical Skills)
Family Medicine (Palliative Care)
Family Medicine (Sport and Exercise Medicine)
General Practice
CAC (Addition Medicine)
CAC (Care of Elderly)
CAC (Emergency Medicine)
CAC (Enahnced Surgical Skills)
CAC (Family Practice Anesthesia)
CAC (Obstetrical Surgical Skills)
CAC (Palliative Care)
CAC (Sport and Exercise Medicine)
Physician Assistant - Supervised Practice Only
Supervised Practice Only
Psychiatry - Supervised Practice Only

Step 3: To extract the cities, the first step was to extract the text before the first comma. The second step was to extract the last word of the first extraction. Due to the formatting of the converted PDF, some physicians had letters of number before the city name. For example:

XXXX XX St NW Calgary, Alberta, Canada XXX XXX Phone:XXX-XXX-XXX	XXXX XX St NW Calgary	NW Calgary

Step 4: A pivot table was created using the last word of the location which gave all the unique locations. From the unique locations the COUNTIF function was used to determine the number of physicians working at each location.

Step 5: Using the list of unique locations and number of physicians, the unique locations were converted to single city names one-by-one. After converting all the unique locations into cities, a pivot table based on location and number of physicians. On a separate column, cities were categorized as urban or rural based on the List of Urban and Rural Communities from the 2016 Census (Government of Alberta, n.d.-g). For locations out-of-province, the province name was listed. For locations out of the country, the country name was listed.

Table 6. Location of active specialists listed on the CPSA Physician Directory

Location	Number of Specialists	Urban/Rural/Out-Province or Country
Abbotsford	2	British Columbia
Airdrie	11	Urban
Ajax	1	Ontario
Alberni	1	British Columbia
Antonio	1	United States
Austin	1	United States
Banff	3	Rural
Barrhead	2	Rural
Bedford	1	Nova Scotia
Bench Trail	1	British Columbia
Bethesda	1	United States
Blairmore	2	Rural
Bloomfield Hills	1	United States
Bonnyville	3	Rural
Boston	2	United States
Bowden	1	Rural
Bragg Creek	1	Rural

Brampton	1	Ontario
Brandon	1	Manitoba
Brooks	1	Rural
Burin	1	Newfoundland and Labrador
Burlington	1	Ontario
Burnaby	2	British Columbia
Calgary	2877	Urban
Campbell River	2	British Columbia
Camrose	18	Rural
Canmore	26	Rural
Carbonear	1	Newfoundland and Labrador
Carstairs	1	Rural
Catharines	1	Ontario
Charles Town	1	United States
Chatham	3	Ontario
Chestermere	1	Rural
Chilliwack	1	British Columbia
Cincinnati	1	United States
City	1	United States
Claresholm	6	Rural
Cleveland	1	United States
Cochrane	6	Urban
Cold Lake	4	Rural
Cranbrook	3	British Columbia
Dallas	1	United States
Devon	1	Rural
Dhabi	3	United Arab Emirates
Dieppe	1	New Brunswick
Drayton Valley	1	Rural
Drumheller	4	Rural
Dryden	1	Ontario
Edmonton	2548	Urban
Encinitas	1	United States
Fernie	1	British Columbia
Foothills	6	Rural
Fort McMurray	42	Urban
Fort Saskatchewan	11	Rural
Gatineau	1	Quebec
George	2	British Columbia
Gloucester	1	Ontario
Grande Prairie	95	Urban
Halifax	3	Nova Scotia
Hamilton	1	New Zealand
Hamilton	7	Ontario
Hammond	1	Ontario

High River	3	Rural
Hinton	13	Rural
Jeddah	1	Saudi Arabia
Kamloops	4	British Columbia
Kelowna	8	British Columbia
Kingston	2	Ontario
Kitchener	1	Ontario
Lacombe	2	Rural
Leduc	22	Urban
Lethbridge	168	Urban
Lloydminster	24	Rural
London	7	Ontario
Los Angeles	1	United States
Makkah	1	Saudi Arabia
Mallorytown	1	Ontario
Markham	1	Ontario
Maskwacis	1	Ermineskin Cree Nation
Medicine Hat	95	Urban
Milton	1	Ontario
Milwaukee	1	United States
Miramichi	1	New Brunswick
Mission	2	British Columbia
Mississauga	5	Ontario
Moncton	2	New Brunswick
Monica	1	United States
Montreal	5	Quebec
Moose Jaw	1	Saskatchewan
Nanaimo	2	British Columbia
New Westminster	3	British Columbia
New York	1	United States
No Data	40	n/a
Oakville	4	Ontario
Okotoks	6	Urban
Olds	1	Rural
Only phone number provided	20	n/a
Orillia	1	Ontario
Oshawa	1	Ontario
Ottawa	4	Ontario
Paget	1	Bermuda
Parkville	1	Australia
Passaic	1	United States
Peace River	2	Rural
Peterborough	1	Ontario
Phoenix	1	United States
Pointe-Claire	1	Quebec

Ponoka	14	Rural
Port Moody	1	British Columbia
Prince Albert	3	Saskatchewan
Quebec	1	Quebec
Red Deer	224	Urban
Red Deer County	2	Rural
Regina	8	Saskatchewan
Renfrey	1	Ontario
Ridge	1	British Columbia
Riyadh	1	Saudi Arabia
Rocky Mountain House	2	Rural
Rocky View County	1	Rural
Saint John	3	New Brunswick
Salmon Arm	1	British Columbia
Saskatoon	9	Saskatchewan
Scarborough	4	Ontario
Seattle	1	United States
Sherwood Park	29	Urban
Singapore	1	Singapore
Spartanburg	1	United States
Spruce Grove	8	Urban
St. Albert	73	Urban
St. John's	2	Newfoundland and Labrador
St. Louis	1	United States
St. Paul	4	Rural
Stoney Plain	2	Rural
Stratford	1	Ontario
Strathmore	6	Rural
Surrey	2	British Columbia
Swift Current	1	Rural
Sylvan Lake	1	Rural
Teltow	1	Germany
Terrace	1	British Columbia
Thornhill	1	Ontario
Thunder Bay	1	Ontario
Timmins	1	Ontario
Toronto	16	Ontario
Vancouver	28	British Columbia
Vermilion	1	Rural
Vernon	1	British Columbia
Victoria	9	British Columbia
Westlock	3	Rural
Wetaskiwin	9	Rural
Weyburn	1	Saskatchewan
White Rock	2	British Columbia

Whitehorse	2	Yukon
Windsor	1	Ontario
Winnipeg	6	Manitoba
Yarker	1	Ontario
Yellowknife	2	Northwest Territories
York	2	Ontario
Grand Total	6691	

Analysis

Table 7. Number of specialists located in rural Alberta, urban Alberta, on a reserve, in a different provinces or territories, and in a different country

Location	Number of Specialists
Australia	1
Bermuda	1
British Columbia	80
Ermineskin Cree Nation	1
Germany	1
Manitoba	7
n/a	60
New Brunswick	7
New Zealand	1
Newfoundland and Labrador	4
Northwest Territories	2
Nova Scotia	4
Ontario	75
Quebec	8
Rural	183
Saskatchewan	22
Saudi Arabia	2
Saudi Arabia	1
Singapore	1
United Arab Emirates	3
United States	21
Urban	6204
Yukon	2
Grand Total	6691

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).

Table 8. Number of specialists located in rural Alberta, urban Alberta, on a reserve, out-of-province and out-of-country

Location	Number of Specialists	Percentage
Urban	6204	92.72
Rural	183	2.74
Ermineskin Cree Nation	1	0.01
Out-of-Province	211	3.15
Out-of-Country	32	0.48
N/A	60	0.90
Grand Total	6691	100

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).

Table 9. Location of specialists with an Alberta address

Location	Number of Specialists	Percentage
Urban	6204	97.12
Rural	183	2.86
Reserve	1	0.02
Total	6388	100.00

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).

Table 10. Location of specialists with an Alberta address with additional data on urban locations

Location	Number of Specialists	Percentage
Edmonton	2548	39.89
Calgary	2877	45.04
Other Urban	779	12.19
Rural	183	2.86
Reserve	1	0.02
Total	6388	100.00

Source: Data was obtained from the CPSA physician directory (College of Physicians and Surgeons of Alberta, n.d.).