Improving Access to Early Intervention Therapy Services in Rural and Remote B.C.

A Report for the Ministry of Children and Family Development

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Executive Summary

Introduction

In British Columbia, the Early Intervention Therapy (EIT) program delivers physiotherapy, occupational therapy, speech-language pathology, and family support services to children from birth to school entry (MCFD, 2009). Prompt EIT is crucial to both individual child development and minimising future costs to society (Goode, Diefendorf & Colgan, 2011). Across rural and remote B.C., access to EIT services is limited due to excessive wait times and challenges in therapist recruitment and retention (Inclusion B.C., 2016).

Research Project

The B.C. Ministry of Children and Family Development and B.C. Association for Child Development and Intervention are mutually interested in improving access to EIT services for children with special needs living in remote and rural communities. The aim of this co-sponsored project was to find possible approaches to improve access to EIT in rural and remote communities in B.C. The research project was conducted through a complementary literature review, cross-jurisdictional scan and key informant interviews.

Findings & Discussion

A range of literature was found to support the use of telehealth, therapist mentoring programs, therapy assistants, a transdisciplinary service model and specialised professional education programs to improve access to EIT services in rural and remote communities. Furthermore, all approaches were found to improve access to EIT services in a number of case studies. Whilst the universal implementation of these approaches is cautioned due to the unique characteristics of rural and remote communities, a number of recommendations were proposed to improve access to EIT services in B.C.

Recommendations

1. Conduct a pilot study to evaluate the use of a transdisciplinary EIT service model.

2. Expand the Northern and Rural Cohort program at the University of British Columbia.

3. Increase access to mentoring programs for therapists.

4. Increase the number of qualified therapy assistants in rural and remote communities.

5. Conduct a pilot study to test the practical application of telehealth EIT services.
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Introduction

Early Intervention Therapy in B.C.

In British Columbia, the Early Intervention Therapy program aims to maximise the development and growth of children who have, or are at risk for, developmental delay and/or disability. Early Intervention Therapy delivers physiotherapy, occupational therapy, speech-language pathology, and family support services to children from birth to school entry. These services include referral, assessment, service planning, therapeutic intervention, consultation, transition planning and family support. Early Intervention Therapy services are provided within home and community settings such as child development centres and preschools (MCFD, 2009).

Early Intervention Therapy is an important service for children who have, or are at risk for, developmental delay and/or disability. In these populations, early identification and intervention have been found to increase long term health, wellbeing and academic outcomes (Bailey et al., 2005). Furthermore, at a societal level, for every $1 spent on early intervention services, almost $10 is saved in future costs to society (BCACDI, 2015).

In British Columbia, the Early Intervention Therapy program is provided by agencies contracted through the Ministry of Children and Family Development (MCFD). In some areas, these agencies are health authorities (Therriault-Finke, 2015). Agencies providing Early Intervention Therapy have some independence in the delivery of therapy services to their community, however must meet contract and professional practice guidelines, for example, those of the College of Occupational Therapists of British Columbia (MCFD, 2009).

Rural and Remote Context

In Canada there is no universal definition of ‘rural’ or ‘remote’, however generally descriptions include characteristics such as population density and size, socio-economic variables and access to services (Roots, Brown, Bainbridge, & Li, 2012). Based on these characteristics, 14% of the population in B.C. are considered to live in rural areas (Statistics Canada, 2011). Although living in a rural or remote location can positively influence some aspects of wellbeing, such as having a strong sense of community, in some rural and remote communities access to health care is hindered. This may be due to a number of factors such as fewer health care providers, long travelling distances, geographic remoteness and extreme
weather conditions (BC Ministry of Health, 2015). Consequently, residents of rural and remote communities in B.C. have been found to experience higher rates of disability in addition to a number of other health inequalities (R. Roots et al., 2012). Furthermore, the B.C. Child and Youth Health Report recently found ‘significant geographic disparities evident for 39 out of 51 indicators [of child health in B.C.,] with Northern Health and rural and remote HSDAs being identified as the health authority and HSDAs most in need’ (B.C. Ministry of Health, 2016).

**Rural and Remote Early Intervention Therapy**

Early Intervention Therapy is one aspect of child health in B.C. which has been found to have geographic disparities in access to services. There is a longstanding shortage of occupational therapists, physiotherapists and speech-language pathologists in rural B.C. (R. Roots et al., 2012). For example, despite 14% of the B.C. population living in rural areas, less than 4% of B.C.’s occupational therapists work in rural communities (Canadian Institute for Health Information, 2011). Similarly, 7% of B.C.’s population lives in the Northern Health region, however only 3.3% of B.C.’s physiotherapists practice there (Wright Allen, 2016). The low availability of therapists in rural and remote B.C. has had a major impact on access to Early Intervention Therapy, with waitlists of seven months or more for Early Intervention Therapy services commonly experienced (BCACDI, 2015).

Several factors have been found to reduce access to Early Intervention Therapy services in rural and remote B.C. communities. From the client’s side, families are deterred by long wait lists in addition to the costs and distances required to travel to meet therapists (B.C. Ministry of Health, 2007; Chan, 2009). From the service provider’s side, recruitment and retention of therapists is hampered by factors such as lack of full time employment, professional isolation, long travelling distances, frozen funding despite rising operational costs and limited professional education and practicum experiences in rural and remote communities (Family Support Institute of B.C., 2016).

Prompt Early Intervention Therapy services are crucial to maximising the development of children with developmental disorders or delays. Furthermore, two main principles of the Canada Health Act are accessibility and universality (Government of Canada, 1984). To meet these principles and ensure equitable chances for all children in B.C., it must be a priority to ensure that all children have prompt access to Early Intervention Therapy services irrespective of their location in B.C.
Research Project

The B.C. Ministry of Children and Family Development and B.C. Association for Child Development and Intervention are both interested in improving access to Early Intervention Therapy services for children with special needs living in remote and rural communities. The Ministry of Children and Family Development (MCFD) is the governmental ministry responsible for the provision of Early Intervention Therapy in B.C. The B.C. Association for Child Development and Intervention (BCACDI) is a provincial association of over thirty agencies that provide child development and intervention services to children with special needs. The aim of this co-sponsored project was to find possible approaches to improve access to Early Intervention Therapy in rural and remote communities in B.C. As such, the following research questions were asked:

1) What does the literature say is most effective in improving access to Early Intervention Therapy services in rural, remote and difficult to serve communities?

2) What are other jurisdictions doing with respect to improving access to Early Intervention Therapy services in rural, remote and difficult to serve communities and what has been their experience?

Methods

This research project was conducted through a complementary literature review, cross-jurisdictional scan and key informant interviews.

Literature Review

A literature review was conducted on grey and published literature accessed through academic databases hosted by the University of Victoria, the University of Victoria’s Summon 2.0 database searcher (which includes Ebsco Host, ProQuest, Rural and Remote Health Database) and Google Scholar. The review was conducted with combinations of keywords, most often including ‘Early Intervention Therapy’ OR ‘pediatric speech-language pathology’ OR ‘pediatric occupational therapy’ OR ‘pediatric physiotherapy’ AND ‘rural’ OR ‘remote’. Several pieces of additional literature were shared by key informants. Whilst every effort was made to ensure a comprehensive search of literature, there is potential for literature to have been missed.
Cross-Jurisdictional Scan

A scan of rural and remote early pediatric speech, physical and occupational therapy programs in Canada, the United States and Australia was conducted. This scan utilised Google searches, key informant information and websites such as Therapy B.C. agency contact information, Find Support B.C. and the Specialised Services for Children and Youth database.

Key Informant Interviews

Interviews were conducted with key informants through telephone, emails and in-person meetings. Key informants included directors of child development centres, faculty of the University of British Columbia, experienced Early Intervention Therapy therapists and private teletherapy providers.

Findings

Throughout the literature review, jurisdictional scan and key informant interviews, five approaches to improve access to Early Intervention Therapy in rural and remote communities were repeatedly highlighted. Whilst it must be acknowledged that there are certainly other initiatives that may improve access to Early Intervention Therapy in rural and remote communities, due to time constraints the scope of this report will focus on these five main approaches. It is also important to note that each rural and remote community is unique (Brook, Hobbs, Neumann-fuhr, Riordan, & Paterson, 2015). Thus, to ensure success, any initiative aimed at improving access to Early Intervention Therapy services needs to focus on the needs of the community in question. The aim and rationale behind mentoring, telehealth, the use of therapy assistants, a transdisciplinary service model and specialised professional education, in addition to methods of implementation and case studies will be discussed.
TELEHEALTH

“TinyEYE [...] have allowed our school to bring consistent services into our rural area for students who need severe interventions.' (TinyEye, 2017)

Definition and Rationale

Telehealth is the use of information and communication technologies such as video and audio to deliver health-related services when the provider and client are in different physical locations (World Federation of Occupational Therapists, 2014). Telehealth can be delivered to any community with internet and computer connections. It can also be described as teletherapy, telemedicine or telepractice (Canadian Agency for Drugs and Technologies in Health, 2015). According to the World Report on Disabilities, telehealth has been found to provide “similar or better clinical outcomes when compared to conventional interventions” (World Health Organization & World Bank, 2011). Furthermore, telehealth has been found to reduce referral wait times, prevent unnecessary travel and ensure therapist recruitment, three major concerns of healthcare provision in rural and remote communities (Canadian Association of Occupational Therapists, 2011).

Telehealth is a rapidly growing service model around the world (Canadian Agency for Drugs and Technologies in Health, 2015). From 2012 to 2014, the number of telehealth sessions within Canada increased 46% (Canada's Health Informatics Association, 2015). Telehealth has been successfully used to deliver healthcare to rural and remote communities in a range of health fields, from cardiology to psychiatrics (Canadian Agency for Drugs and Technologies in Health, 2015). Across all provinces and territories of Canada physiotherapy, occupational therapy and speech-language pathology have been successfully provided through telehealth (Canada's Health Informatics Association, 2015). Furthermore, telehealth therapy provision has been supported by Speech-Language & Audiology Canada, the American Physical Therapy Association and the Canadian Association of Occupational Therapists (American Physical Therapy Association, 2012; Canadian Association of Occupational Therapists, 2011; Speech Language & Audiology Canada, 2015).

In the pediatric field, there is a dearth of literature on telehealth physiotherapy and occupational therapy. This is likely due to the more hands-on nature of physiotherapy and occupational therapy practice (Zylstra, 2013). Pilot studies with children have indicated positive results and it is likely that this field will see greater research evidence in the near future (Kelso, Fiechtl, Olsen, & Rule, 2009). Thus, whilst pediatric physiotherapy and
occupational therapy telehealth is a possibility, this report will focus on the use of telehealth in pediatric speech-language pathology.

In both preschool and school aged children, telehealth speech-language pathology has been found to have similar efficacy as face-to-face assessment and treatment (Edwards, Stredler-Brown & Todd, 2012; Lewis et al., 2008; McCullough, 2001). Furthermore, effective diagnosis and treatment by telehealth has been found across a range of speech and language disorders, including language disorders, cognitive disorders, articulation disorders and voice disorders (Crutchley, Dudley, & Campbell, 2010; Towey, 2012; Waite et al., 2010). In relation to cost-effectiveness, telehealth pediatric speech-language pathology has also been found to increase direct therapy time from 68% to 85% due to reduced traveling times (TinyEYE, n.d-a). Furthermore, parents and children have expressed satisfaction in the telehealth therapy services (Grogan-Johnson, Alvares, Rowan, & Creaghead, 2010).

**Telehealth in Action**

Most pediatric speech-language pathology teletherapy in North America occurs through contracted independent telehealth providers such as TinyEYE or DotCom Therapy (DotCom Therapy, 2017; TinyEye, 2017). These providers connect communities with qualified therapists who suit the needs of the child clients. Therapy is delivered on a regular schedule over the internet using a computer, headset and webcam. To ensure successful therapy sessions, the computer requires a speed of at least 3 GHz, with at least 3 GB of RAM. The internet connection should have a minimum of 1000 kbps (1.0 Mbps) for both upload and download bandwidth (TinyEye, n.d-b). Therapists provide therapy activities for individuals or groups of children through online software (Figure 1). This software may be tailored to meet the client’s needs, such as those of an aboriginal culture (R. Lockwood, personal communication, March 2nd, 2017). Telehealth therapists may also provide assessments, written progress reports, home practice activities and attend meetings with parents and other health or education professionals as required. For children, a therapy ‘helper’ or ‘assistant’ is often present during therapy sessions. These adults may set up the computer for the child, assist with clerical work such as parental consent, give reminders to focus and for the youngest children move the webcam to keep up with their active bodies. A brief online training session arranged by the service provider provides all the training required for assistants. In some communities, these therapy helpers may be educational assistants or even parents (TinyEYE, n.d-a). The Province of B.C. Health Authorities has
published telehealth clinical guidelines which provide a more detailed overview of important topics in telehealth provision in B.C., such as duty of care, ethics, privacy and documentation (Province of B.C. Health Authorities, 2014)

Figure 1: Telehealth speech-language pathology software for children (TinyEye, 2017).

Case Studies

In B.C., telehealth speech-language pathology has been most widely provided to school aged children through school-based therapy. The Nechako Lakes School District, has used the telehealth provider TinyEYE to provide speech-language pathology to students for over ten years. The Nechako Lakes School District has found this service delivery model to be successful in ensuring regular, cost effective therapy services in the face of long term local speech-language pathologist shortages. Furthermore, the Nechako Lakes School District has observed noticeable improvement in the speech of students, especially those with articulation disorders (C. McKay, personal communication, February 22nd, 2017).

Although it has not yet been put into practice in B.C., TinyEYE also provides therapy services to preschool aged children in the USA. For example, the Sweetwater County Child Development Center has used TinyEYE to provide speech-language pathology to children aged 3 and up for a number of years. The coordinator of these services found that 80-90% of children in the program had success with telehealth, and it was only those children with the most complex needs who found it more challenging. Furthermore, the Sweetwater County Child Development Centre found that the consistent therapy provision and interactive activities ensured that ‘very good’ relationships are formed between the therapists and children (S. Sweeney, personal communication, March 7th, 2017). TinyEYE also provides pediatric occupational teletherapy services, however this therapy is not currently in use in B.C. (TinyEye, 2017).
Limitations

It must be noted that the use of telehealth to provide Early Intervention Therapy may have a number of limitations. As telehealth is a recent field of therapy, there is a dearth of evidence of its efficacy for occupational therapy and physiotherapy in young children (Kelso et al., 2009). Consequently, there are few telehealth service providers for pediatric occupational therapy and physiotherapy. Although there is evidence across the literature to support telehealth speech-language pathology, to date no studies have assessed the impact of early-intervention speech telehealth in B.C. Finally, telehealth Early Intervention Therapy may not suit the needs of all B.C. communities or children, especially children with the most complex needs and communities with poor internet connection (K. Davies, personal communication, February 10\textsuperscript{th}, 2017; S. Sweeney, personal communication, March 7\textsuperscript{th}, 2017). The implementation of a pilot study would provide important information regarding the practical application and success of telehealth early intervention speech-language pathology in rural and remote B.C.

Conclusion

For remote or rural communities in B.C. experiencing challenges recruiting speech-language pathologists for long or short term positions, telehealth speech-language pathology may provide a cost effective, reliable, alternative approach to therapy provision.

MENTORING

‘The electronic mentoring […] decreased the sense of being overwhelmed and second guessing.’ (Gordon & Stewart, 2009)

Definition and Rationale

Professional isolation has been found to be a major factor contributing to the poor recruitment and retention of therapists in rural and remote communities (Kalisch et al., 2005; Roots & Li, 2013). The informal mentoring of less experienced therapists is a spontaneous aspect of professional development that occurs in collaborative therapy environments. However, in small and rural communities informal mentoring is often unfeasible due to small therapist workforces, sole charge positions and large caseloads (Mills & Millseed, 2002). To fill this gap in professional development for therapists in rural and remote communities,
formal mentoring programs have been developed. These mentorship programmes have been found to facilitate professional development, motivation, self-confidence and perception of clinical support (Harrison & Hong, 2004; Milner & Bossers, 2004). Furthermore, formal mentorship programs for therapists in rural and remote communities have been found to improve therapist retention rates (Sambunjak, Straus, & Marusic, 2006).

**Mentoring in Action**

Mentoring is the advice, guidance and support of an experienced therapist, a mentor, to a less experienced colleague. Mentoring may be provided internally or through an external provider in a face-to-face or eMentoring format, depending on the needs of the therapists and the resources of the community. Electronic ‘eMentoring’ is especially relevant to therapists practicing in remote or rural areas where there are few or no local colleagues for support. Depending on the needs and preferences of participants, eMentoring may occur through email, phone or videoconferencing (Moran et al., 2014). Several factors have been found to increase the sustainability, participation rates and satisfaction of eMentoring programs. These include external coordination, flexible delivery timing, adequate connection speeds and technology orientation (Arora et al., 2010; Brownlee et al., 2010; Gagnon & Minguet, 2008).

**Case Studies**

In an external mentoring approach, the Sunny Hill Health Centre eMentoring project has been running across B.C. since 2009. This project is overseen by a mentor coordinator who facilitates online training for mentors in areas such as reflective learning, establishing electronic relationships and the use of technology. After being matched with a mentee, the mentor and mentee then meet weekly using an online video conferencing program and if appropriate, conduct case conferences monthly. This program has provided mentoring to occupational therapists, physiotherapists and speech-language pathologists. Positive initial results have been cited to date, although no official program evaluation data has been published (Gordon & Stewart, 2009). The success of this program has been limited due to low awareness of the program throughout the province and associated costs (K. Davies, personal communication, February 10th, 2017). Despite these limitations, a similar structured mentorship program will soon by implemented by the Faculty of Medicine at University of British Columbia for new physiotherapy graduates (J. Lowcock, personal communication, February 28th, 2017).
Through a less formal internal mentoring program, the Buckley Valley Child Development Centre has recently experienced success in improving therapist recruitment and retention rates. As a larger child development centre practicing in rural and remote B.C., the Buckley Valley Child Development Centre is able to internally connect new and experienced therapists to provide mentoring opportunities. The mentors and mentees communicate frequently in person or by skype and work together on individual goals to ensure that new therapists do not feel overwhelmed, even if they are in a sole charge position (K. Bassett, personal communication, February 21st, 2017).

Limitations

It must be noted that there is a dearth of literature evaluating the efficacy of mentoring programs of rural and remote therapists in B.C. Furthermore, mentoring programs may be limited by technology and funding constraints, as well as mentor availability due to case load size (K. Davies, personal communication, February 10th, 2017). Increasing awareness of pre-existing external mentorship programs would enable agencies with limited resources to access mentoring opportunities. Furthermore, the development of materials or professional development courses for employers would aid the effective facilitation of internal mentoring programs.

Conclusion

The professional support provided through both face-to-face and eMentoring programs has been found to increase therapist retention rates in rural and remote communities. These positive results have been found in external formal mentoring programs, as well as within agency informal programs. For rural and remote communities who are experiencing low therapist retention rates, mentoring programs may be an effective approach to improving access to Early Intervention Therapy services.
THERAPY ASSISTANTS

‘Adding a TA position to the program has been very beneficial and I would recommend this to other rural programs.’ (J. McAdam, personal communication, February 14th, 2017).

Definition and Rationale

Therapy assistants provide therapy services under the direction of qualified therapists. They may be used to supplement, enhance and/or extend Early Intervention Therapy services to children in rural and remote communities (Yukon Child Development Centre, 2015). As therapy assistants generally work at a lower wage than therapists, employing therapy assistants has been found to increase therapy provision in a cost-effective manner (American Occupational Therapy Association, 2007; B.C.’s Pediatric Therapists, 2007). In Ontario, the use of therapy assistants was found to increase the number of children receiving speech-language pathology services within 10 days of referral from 24% to 48%. Furthermore, child goal attainment was found to increase 10% (Deloitte, 2013). In remote communities where therapists are sole-charge, therapists have reported feeling less isolated when working with a therapy assistant. In addition, locally employed therapy assistants can provide guidance as to how best meet the needs of children in that community (Humphreys et al., 2008).

Therapy Assistants in Action

Under the direct or indirect supervision of a therapist, therapy assistants can complete many therapy related tasks such as paperwork and continuity of intervention. Therapy assistants cannot conduct assessments, intervention planning or interpretation of referrals (B.C.’s Pediatric Therapists, 2007a). Therapy assistants may be formally or informally trained. Accredited therapy assistant training programs are offered in four educational institutions across B.C. and all courses include pediatric content. On average formal therapy assistant training takes around two years to complete (OTAPTA, 2013). Some Early Intervention Therapy providers in B.C. employ therapy assistants or therapy ‘aides’ who have not had formal training. These therapy assistants are trained internally (B.C.’s Pediatric Therapists, 2007a). Early intervention service providers must adhere to guidelines published by the College of Occupational Therapists of British Columbia, Canadian Physiotherapy Association, and Speech-Language Audiology Canada when employing therapy assistants (B.C.’s Pediatric Therapists, 2007b). For further information on the use of pediatric therapist assistants in B.C., TherapyB.C. provides several helpful documents on their website (TherapyB.C., n.d.).
Case Studies

Kootenay Kids Society provides early intervention physiotherapy and occupational therapy. For the past nine months Kootenay Kids Society have incorporated a therapy assistant into their service model. The Kootenay Kids Society has found this move to be ‘very beneficial’ in increasing the reach of their therapists in a community with high caseloads. Although it appears counter intuitive, by reducing therapist hours to pay for the therapy assistant, the therapists are now able to spend more time on direct therapy, especially with high need cases and in communities that require travel. The therapy assistant completes paperwork for the therapists, in addition to providing therapy to lower needs children and regular intervention for children in communities which require the most travel. The Kootenay Kids Society would ‘recommend this to other rural programs’ to improve access to Early Intervention Therapy services (J. McAdam, personal communication, February 14th, 2017).

The Yukon Child Development Centre has also had a positive experience using therapy assistants to improve access to Early Intervention Therapy services. The Yukon Child Development Centre provides Early Intervention Therapy to remote communities which therapists are only able to visit once every one or two months due to long travelling distances. To ensure consistent therapy between therapist visits, the Yukon Child Development Centre has hired local therapy assistants within the remote communities to provide therapist directed therapy to the children between visits. These local therapists also help facilitate a good relationship between the community and the Yukon Child Development Centre. To ensure recruitment and retention of therapy assistants, the Yukon Child Development Centre recruits the most skilled local worker they can find and then provides internal training online and through workshops in Whitehorse. The therapy assistants also communicate weekly with their supervising therapists (A. Squair, personal communication, February 13th, 2017).

Limitations

It must be noted that the use of therapy assistants to supplement, enhance and extend Early Intervention Therapy services to children in rural and remote communities may require additional or redirection of funding (A. Squair, personal communication, February 13th, 2017; J. McAdam, personal communication, February 14th, 2017). Furthermore, some agencies have reported difficulties in recruiting qualified therapy assistants and limited resources for within agency training due to high caseloads (Child Development Centre St. John, n.d.;
Goodale et al., 2007). Implementing an accredited therapy assistant education program in a more rural location in B.C, such as the University of Northern British Columbia, or an online training course is likely to increase the number of qualified therapy assistants available to practice in rural and remote B.C. (Goodale et al., 2007).

**Conclusion**

For Early Intervention Therapy providers who are experiencing difficulties providing regular therapy services and meeting the needs of large caseloads, the use of therapy assistants may provide a cost-effective method of increasing access to therapy services.

**TRANSDISCIPLINARY SERVICE MODEL**

*With increased effectiveness in the use of limited resources, more children will have access to therapy services’* (Davidson et al., 2010).

**Definition and Rationale**

Across B.C., a team approach is commonly used for Early Intervention Therapy service provision. Based on the needs of the community and child, multidisciplinary, interdisciplinary and transdisciplinary approaches may be used to coordinate the services of therapists from occupational therapy, physiotherapy and speech-language pathology disciplines (MCFD, 2009). In a multidisciplinary service, model therapists work independently to assess, plan and deliver interventions. Information is not necessarily frequently or formally shared between team members. In an interdisciplinary service model, therapists interact to assess and plan for a client. Therapists then deliver intervention independently, however may share and discuss results with team members. In a transdisciplinary service model, therapists collaborate to assess, plan, deliver and evaluate interventions. Generally, one therapist, the ‘primary provider’ interacts with the child and delivers the assessments and intervention (Americal Psychological Association, 2010). Team based therapy approaches such as these have been recommended across the health care profession as they have been found to provide greater healthcare effectiveness and efficiency by integrating previously duplicative services (Enderby, 2002).

Recently, a transdisciplinary service model has been highlighted as the most effective method of Early Intervention Therapy provision, however its use is still limited in B.C.
Using a transdisciplinary service model of Early Intervention Therapy has been found to reduce waitlist times, increase caseload capacity, increase the efficient use of limited resources and increase direct therapy time (Bell, Corfield, Davies, & Richardson, 2010). Furthermore, a transdisciplinary service model provides additional support and opportunities for mentorship for newly qualified therapists or those new to the rural and remote location. These benefits suggest that moving to a transdisciplinary service model may improve access to Early Intervention Therapy in rural and remote communities in B.C. (Davidson et al., 2010).

**Transdisciplinary Service Model in Action**

A transdisciplinary service model may be used when a child requires early intervention from more than one discipline. To conduct this approach, the child’s therapy team meet regularly to develop comprehensive assessments, service plans and evaluations and to review progress and consult. In addition to these meetings, computer based systems may be used to quickly share notes and the progress of children between therapists. Within the therapy team, one therapist is allocated to be the child’s ‘primary therapist’. This therapist works with the child on the cross-disciplinary goals and acts as the family’s contact therapist. The ‘primary therapist’ is chosen according to the child’s current primary needs and goals. Other team therapists may join visits to provide specialist skills as required. A service coordinator may also be incorporated into the service model to coordinate contact between the family and therapists if required. This service model is overviewed in Figure 2. Detailed information regarding the potential to implement a transdisciplinary service model for Early Intervention Therapy in B.C. can be found in ‘A Proposal for a Transdisciplinary Approach to Pediatric Therapy in British Columbia’. This report also overviews factors that contribute to successful transdisciplinary service model implementation such as strong leadership, clearly defined roles and responsibilities, appropriate training and support (Davidson et al., 2010).
Figure 2: Primary Therapist Transdisciplinary Service Model (Davidson et al., 2010).

Case Studies

Due to long traveling distances, some of the communities serviced by the Yukon Child Development Centre are only able to be visited by therapists once every one or two months. To improve access to Early Intervention Therapy in these communities, the Yukon Child Development Centre uses a transdisciplinary service model. The Yukon Child Development Centre provides this transdisciplinary outreach by assigning a primary therapist to each remote community. These therapists provide the primary therapy however, frequently meet in a team with other therapists to brainstorm and share information. As required, the other team therapists may travel to the community in a team with the primary therapists. For example, in Carmacks, Yukon a physiotherapist is assigned as the community’s primary therapist, however due to a high number of children with sensory needs in the community, during the next visit the occupational therapist team member will also visit the community. The Yukon Child Development Centre ensured that staff would be able to effectively follow a transdisciplinary service model by conducting within agency training sessions and ensuring
that new staff work with all disciplines within their first few months in the agency (A. Squair, personal communication, February 13\textsuperscript{th}, 2017).

The North Island Early Intervention Program in B.C. has also conducted an informal transdisciplinary approach in the past. As this program could only afford a speech-language pathologist and an occupational therapist, physiotherapists from Sunny Hill Health Centre would teleconference with the primary therapists to assist with the assessment and treatment of developmental issues that was beyond the scope of their practice. This transdisciplinary service model was successful in ensuring access to all early intervention services until a local physiotherapist could be employed (K. Davies, personal communication, February 10\textsuperscript{th}, 2017).

\textbf{Limitations}

In order for a transdisciplinary service approach to be successfully implemented, appropriate training must be implemented at all levels of therapy provision, from executive directors to therapists (Davidson et al., 2010). The B.C. Competency Framework for Interprofessional Collaboration and the National Interprofessional Competency Framework provide good starting blocks for interprofessional education and are beginning to be implemented in professional therapist training programs across B.C. (Canadian Interprofessional Health Collaborative, 2010; Interprofessional Network of B.C., 2008). There is also the potential for transdisciplinary focused education to occur within agency professional development sessions and during professional development courses. It must be noted that the Early Intervention Therapy provision model in B.C. is multifaceted and the implementation of a pilot study would provide crucial initial data on the success of implementing a transdisciplinary service approach across rural and remote B.C.

\textbf{Conclusion}

As suggested by growing evidence and support from the Physiotherapy Association of British Columbia, the British Columbia Society of Occupational Therapists, and the British Columbia Association of Speech/Language Pathologists and Audiologists, a transdisciplinary service approach has the potential to greatly improve access to Early Intervention Therapy in rural and remote communities across B.C.
PROFESSIONAL EDUCATION PROGRAMS

‘Northern and Rural Cohort graduates are more widely distributed within B.C., and more are practicing in rural or remote communities.’ (Roots, 2016).

Definition and Rationale

Participation in professional education programs with a focus on rural learning and placements has been found to increase the probability of post-graduation practice in remote or rural communities. These results have been found across occupational therapy, physiotherapy and speech-language pathology professionals (Winn, Chisholm, Hummelbrunner, Tryssenaar, & Kandler, 2015). Furthermore, the length of time learning or on placement in rural locations has been found to further increase the likelihood of future practice in these locations. Finally, therapists who are from a remote or rural community are 3.3 times more likely to work in remote or rural communities after graduation from professional training programs (Winn et al., 2015). These factors indicate the importance of both encouraging those from rural and remote communities into professional therapist training programs and providing professional education programs with a focus on rural learning and placements. Both initiatives have been found to improve recruitment and retention of therapists in rural and remote communities, consequently increasing access to Early Intervention Therapy services.

Professional Education Programs in Action

Since 2011, the Master of Physiotherapy program at the University of British Columbia has run a Northern and Rural Cohort (NRC) in partnership with the University of Northern British Columbia (University of British Columbia, n.d-a). The aim of this government funded program is to improve physiotherapist recruitment and retention in rural and remote B.C. This program is run within the regular Master of Physiotherapy program at the University of British Columbia. During the NRC program, students completed four of their six clinical placements in rural and remote communities. The travel and accommodation for two of these placements are funded by the Ministry of Advanced Education. Furthermore, to amplify ties with northern and rural communities and increase length of time in rural B.C., students in the NRC program complete one academic block at the University of Northern British Columbia in Prince George through videoconferencing technology. Admission to the NRC program is weighted to prioritise the admittance of students from northern or rural B.C. The NRC has experienced success in improving physiotherapist recruitment and retention in
rural and remote B.C (R. Roots, personal communication, February 10\textsuperscript{th}, 2017). In the 2014 graduating NRC, 47% of students were practicing in rural communities post-graduation and this increased to 50% for the 2015 graduating cohort (Figure 3). Furthermore, 26/28 students responded that the NRC ‘confirmed or encouraged them to go into rural practice’ (Roots, 2016).

Figure 3: Employment location of regular vs. NRC Master of Physiotherapy graduates at the University of British Columbia (Roots, 2016).

With regards to speech-language pathology and occupational therapy professional education programs in B.C., few rural and remote specific education opportunities exist. This is in part due to a lack of funding (R. Roots, personal communication, February 10\textsuperscript{th}, 2017). In B.C., the only recognised speech-language pathology program is the Master of Science in Speech-Language Pathology provided by the University of British Columbia. This program does not provide any specific education on working in remote and rural communities, however students do have the opportunity to complete a clinical placement in a remote or rural community (L. Avery, personal communication, February 10\textsuperscript{th}, 2017). Similarly, the only professional occupational therapy program in B.C. is the Master of Occupational Therapy program at the University of British Columbia. Students in this program have the chance to conduct their clinical placement in a remote or rural setting but are not provided with any specialised education or financial incentive (University of British Columbia, n.d-b).

Case Studies

Ontario has also experienced a shortage of physiotherapists, occupational therapists and speech-language pathologists in rural and remote communities. In response to this,
McMaster University, Lakehead University and the Northern Ontario School of Medicine developed the remote and rural practice focused Northern Studies Stream and Rehabilitation Studies programs. These programs provide academic and clinical education for occupational therapy, physiotherapy and speech-language pathology students with a focus on rural and remote learning and practice. An evaluation of eight years of graduates of this program found that completion strongly increased rates of post-graduation practice in remote and rural areas for all therapy domains (Winn et al., 2015).

**Limitations**

Whilst the NRC has had considerable success in increasing the recruitment of new graduates in rural and remote communities in B.C., there is the possibility for this impact to be amplified by increasing the proportion of time NRC students spend in rural and remote communities for all aspects of their degree. For example, this could occur through further academic blocks being hosted by the University of Northern British Columbia. Furthermore, the success of the NRC program in improving access to Early Intervention Therapy services in rural and remote B.C. is limited by the lack of funding for similar programs in occupational therapy and speech-language pathology (R. Roots, personal communication, February 10th, 2017).

**Conclusion**

Extending the NRC program at the University of British Columbia and implementing similar programs for occupational therapy and speech-language pathology students have a great potential to increase therapist retention and recruitment, consequently improving access to Early Intervention Therapy services in rural and remote B.C.
**Discussion**

Prompt Early Intervention Therapy is essential to both maximising individual child development and minimising future costs to society (Goode, Diefendorf & Colgan, 2011). Across Early Intervention Therapy services in rural and remote B.C. there are excessive wait times and challenges in therapist recruitment and retention (Inclusion B.C, 2016). A literature review, jurisdictional scan and a number of key informant interviews highlighted five main approaches which have the potential to improve access to early intervention services in rural and remote B.C. A range of literature provides evaluated academic justification for the use of telehealth, therapist mentoring programs, therapy assistants, a transdisciplinary service model and specialised professional education programs to improve access to Early Intervention Therapy services in rural and remote communities. Furthermore, a jurisdictional scan and key informant interviews present case studies in which each approach has been used successfully to facilitate Early Intervention Therapy services. For all approaches, it is important to consider that there are a number of potential limitations to implementation and a current dearth of literature evaluating their success and cost-effectiveness in rural and remote B.C. Furthermore, the scope of this project did not encompass the use of such approaches in Indigenous communities in B.C. As a high proportion of the population in rural and remote B.C. is Indigenous, this is a very important avenue of future research (Therriault-Finke, 2015).
Recommendations

The following recommendations have been identified across the literature and jurisdictions as approaches which may improve access to Early Intervention Therapy services in remote and rural communities. It must be acknowledged that it is important to recognise the unique needs and challenges of each community to ensure the successful implementation of approaches (Brook et al., 2015).

1. Conduct a pilot study to evaluate the use of a transdisciplinary therapy service model for Early Intervention Therapy services in rural and remote B.C.
   - Identify the supports required for successful implementation.
   - Evaluate outcomes in child progress, caseload management and cost-effectiveness.

2. Expand the Northern and Rural Cohort program at the University of British Columbia.
   - Increase the length of time spent in rural and remote communities for both academic and practice blocks.
   - Pilot similar cohorts in the occupational therapy and speech-language pathology degree programs.

3. Increase access to mentoring programs for therapists.
   - Develop professional development materials and/or courses to guide employers in the implementation of internal mentoring programs.
   - Increase awareness of external mentorship programs available, such as the eMentoring program at Sunny Hill Health Centre.

4. Increase the number of qualified therapy assistants in rural and remote communities.
   - Investigate the implementation of an online or rurally located therapy assistant training program in B.C, such as at the University of Northern British Columbia.

5. Conduct a pilot study to test the practical application of telehealth early intervention speech-language pathology in rural and remote B.C.
   - Identify potential barriers and the supports required for practical implementation.
   - Evaluate outcomes in cost-effectiveness and child progress.
References


Child Development Center of Fort St John. (n.d.). *Therapist Assistant Practice Profile Project.* Fort St John, B.C: Canada.


