

Using a Socioecological Approach to Explore the Integration of Exercise Physiologists into
Primary Healthcare Teams in Newfoundland and Labrador, Canada

By

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A Thesis submitted in partial fulfillment of the requirements for the degree of
Master of Science in Kinesiology—Psychology of Exercise, Sport and Recreation

School of Human Kinetics and Recreation
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October 2019

St. John's

Newfoundland and Labrador

Abstract

Limited research has explored the integration of Clinical Exercise Physiologists (CEPs) into primary healthcare in Canada. As part of a clinical exercise referral program at Memorial University, graduate students recognized as CEPs participated in four month placements at local family medicine clinics. This thesis aims to explore the experiences of CEPs and physicians during the integration of CEPs into healthcare teams and identify challenges and opportunities that could impact broader implementation of this referral program. In this qualitative study, four CEPs and five physicians participated in semi-structured individual interviews designed to explore their experiences with the referral program using a Socio-Ecological Model. Four main themes emerged from the data: (1) CEP-led advocacy for exercise referral in healthcare, (2) gaps in training and regulation of CEPs, (3) unclear role for exercise professionals within healthcare, and (4) policy and organizational changes to improve exercise referral. The findings of this study provide an understanding of the current challenges and opportunities of integrating CEPs into a primary healthcare team, and will help to guide efforts to expand multidisciplinary healthcare in Newfoundland and Labrador.

Key Words: *exercise referral and consultation, health promotion, preventive medicine*

Acknowledgements

I began my university career at Memorial in 2011 as a biochemistry student with a desire to pursue a career in medicine. At the time, I chose to pursue a science degree in biochemistry as it seemed to be the most common path into the medical field. Partway through my second year in the program, however, I came to realize that the most common path wasn't necessarily the best path for me. My longstanding passion for sport and exercise made kinesiology a natural fit; thus, I switched programs into the School of HKR, completely unsure of what to expect or where my education would lead me. What I discovered was a faculty filled with wonderful professors and staff who are dedicated not only to their respective research and teaching careers, but to going above and beyond what is expected of them to help their students realize their own passions and career aspirations as well. Each and every professor in the program made a positive contribution to my undergraduate and graduate school experiences at Memorial. I also feel grateful to have had so many great interactions and conversations with the various staff members who make important contributions to the HKR programs on a daily basis. Additionally, I was very lucky to have had the opportunity to complete two work terms with the athletic department through the School of HKR; these placements enabled me to learn valuable lessons and create friendships that I will carry with me for the rest of my career. Over the past 6 years, my experiences in the kinesiology program have enabled me to become a stronger student and researcher, while also helping me appreciate the important role exercise science can have in promoting a healthier society and a more effective healthcare system. These experiences in HKR enabled me to make many great friends as well. Although there are far too many to name, I appreciate the impact each of these individuals had on my time in the program as well as the many lessons I will take from them moving forward.

I owe special thanks to my research committee members, Drs. Duane Button and Erin Cameron, who have provided valuable feedback and support over the course of my graduate studies. Duane was an excellent teacher and mentor as I worked towards my Clinical Exercise Physiologist (CEP) designation, practiced as a CEP in a local family medicine clinic, and started medical school while trying to juggle my research responsibilities as well. Erin moved to Ontario to take on a position at the Northern Ontario School of Medicine partway through my graduate program, but she has remained a very valuable member of my research team and has offered important guidance and support over these past 3 years. I am particularly grateful to Erin for the important role she played in co-supervising my undergraduate honours research and for encouraging me (and providing me with the opportunity) to pursue research related to a topic about which I'm passionate. Finally, I'd like to thank Dr. Anne-Marie Sullivan for agreeing to review my thesis and offering valuable feedback related to qualitative research methodology and analysis.

I would also like to extend a huge thank-you to Dr. Erin McGowan, my supervisor during my master's program and one of my co-supervisors for my undergraduate honours research. I am very grateful for the many of hours of hard work you have put into guiding, reading, and editing my work in recent years, despite the many responsibilities you hold as a researcher, teacher, and mother. I have a great appreciation for the high standards to which you hold your work and that of your students, and I am confident that you have helped me grow into a much stronger student, researcher, and professional over the course of these past 3 to 4 years. You have been incredibly supportive of my academic and research endeavours, and you demonstrated great patience as I put my research on hold to pursue my dreams as a medical student. Thank-you for the guidance and support, and for allowing me the freedom to develop research projects that will serve as an

important stepping stone for the work I hope to achieve as a medical professional in the years to come.

Last, but certainly not least, I would like to say thank-you to my family for the tremendous guidance and support they have offered over the years. My parents have always emphasized the importance of a good education but, more importantly, they have always expressed a desire to show support for whatever my ambitious goals and dreams might entail. They pushed me to give my best effort at whatever I was doing, whether it was on the ice (or the field), in the classroom, or in the community engaging in extracurricular activities. Additionally, they have always encouraged me to push forward through any difficulties that may have presented themselves along the way. Above all else, I should thank my parents for serving as strong examples of the many qualities I hope to emulate as I move forward in my career and my life in general.

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Chapter One: Introduction

1.1 Health and Exercise

Historically, the World Health Organization (WHO) has described health as a state of “complete physical, mental and social well-being and not merely the absence of disease or infirmity [physical or mental weakness]” (World Health Organization, 1946). This definition highlights the complexity of health and suggests that the absence of disease is not sufficient to be considered healthy. Although the definition of health has been the subject of much debate in recent decades, researchers emphasize that the conceptualization proposed by the WHO in 1946 has never truly been adapted in the field of public health. Huber et al. (2011) propose framing health as a combination of the aforementioned physical, mental, and social domains, however, they also suggest that the WHO must place more focus on the ability of individuals to adapt to challenges and manage their own health through daily lifestyle choices. This ideology lends support to the concept of preventive medicine, in addition to the traditional or ‘reactive’ practices most common in our healthcare systems (Huber et al., 2011). More specifically, it encourages the widespread implementation of preventive health strategies, such as physical activity (PA) counseling and prescription within the scope of personalized care (Buford & Pahor, 2012).

According to Dr. Robert Sallis—founding Task Force Chair of the Exercise is Medicine® initiative—genetics, environment, and behavior are three major factors that influence an individual’s health and longevity. Although great strides have been made in reducing environmental factors for disease, he suggests not nearly enough has been done in mainstream medicine to target behavioural factors, such as physical inactivity (Sallis, 2011). Extensive research has been performed regarding the effectiveness of PA and exercise in the prevention and treatment of chronic diseases, such as cardiovascular disease, diabetes, and cancer (e.g.,

Durstine, Gordon, Wang, & Luo, 2013). In fact, evidence suggests that the health benefits of PA are often equivalent or superior to those associated with traditional pharmaceutical treatments (Naci & Ioannidis, 2013). Nevertheless, statistics show that the majority of Canada's population are inactive or sedentary (Janssen, 2012), meaning that they are not active enough to reap the health benefits. In addition to the negative health effects associated with chronic disease development, there is a growing economic burden associated with physical inactivity. Thus, it should be no surprise that leading experts in the field of *Exercise is Medicine* support the conclusion that physical inactivity is one of the most important public health problems of the 21st century (Blair, 2009). Moving forward, innovative efforts aimed at PA promotion and chronic disease prevention, such as the *Exercise is Medicine* movement, are of utmost importance.

1.2 Chronic Disease Risk Reduction

Chronic diseases are long-term conditions that cannot be cured but can be effectively managed through medication and/or other therapies, including PA and proper nutrition (Department of Health, 2010). Examples of chronic diseases include cancer, coronary heart disease, chronic respiratory diseases, diabetes, and stroke. Together these conditions account for more than 70% of all deaths worldwide, while also placing a heavy burden on national healthcare budgets, employee productivity, and economies (Schmidt, 2016). Not only are chronic diseases the most prevalent and costly conditions of modern society, but they also represent the most preventable of all health conditions. PA has been identified in the literature as being effective in the prevention of chronic disease (Centers for Disease Control and Prevention, 2012). Currently, the Canadian Society for Exercise Physiology (CSEP) recommends that an individual should participate in 150 minutes per week of moderate-to-vigorous PA (MVPA) to receive optimal

health benefits (Canadian Society for Exercise Physiology, 2014). Moderate PA can include brisk walking, cleaning (i.e., vacuuming or raking leaves), or bike riding for pleasure, while vigorous PA refers to more intense activities, such as jogging, swimming laps, or competitive team sport participation (Colley et al., 2011). Several high-level systematic reviews have identified risk reductions of 25–50% or more in most major chronic diseases for individuals who meet the recommended 150 minutes per week of MVPA (Pedersen & Saltin, 2015; D. E. Warburton, Charlesworth, Ivey, Nettlefold, & Bredin, 2010). Although the target of 150 minutes of MVPA per week may seem unrealistic for sedentary individuals, it has been shown that significant benefits are associated with even small amounts of PA. This is a very important consideration for PA promotion initiatives, particularly within healthcare. The biggest positive change in health risk is in going from an inactive lifestyle to somewhat active (i.e., 75–90 minutes of MVPA week), resulting in a 15% reduction in mortality risk (Thornton et al., 2016). Additionally, evidence suggests that epidemiological links exist between increased PA levels and a reduction in risk factors for obesity, metabolic diseases, psychosocial problems, certain forms of cancer, and various other disorders (Schmidt, 2016; Shields & Tremblay, 2008).

1.3 Physical Activity Rates

Despite the numerous health benefits associated with regular PA, statistics show that the majority of Canadians are physically inactive. In 2009, 52.5% of Canadian adults self-reported that they engage in at least 150 minutes of MVPA per week (Colley et al., 2011). However, in the 2007 to 2009 Canadian Health Measures Survey (CHMS), which used accelerometers to collect objective measures of PA for a nationally representative sample, it was found that only 15% of Canadians met the recommended guidelines of 150 minutes per week of MVPA, accumulated in bouts of at least 10 minutes (Colley et al., 2011). Most recently, Statistics Canada

accelerometer data from 2014 to 2015 demonstrated that 39% of Canadians accumulate enough PA per week to meet the recommendations offered by the national PA guidelines. Recent changes to exercise guidelines have suggested that individuals can accumulate MVPA in bouts of any duration, whereas the literature had previously suggested that any MVPA should last at least 10 minutes in duration in order to offer health benefits to the participant. The data from the most recent CHMS are reflective of these changes (Colley, Butler, Garriguet, Prince, & Roberts, 2018). Although it may appear that Canadians have increased their PA substantially over the past decade, this trend can largely be attributed to differences in measuring how the percentage of individuals meeting the PA guidelines is calculated. It has become increasingly clear that activity in bouts of less than 10 minutes can also be beneficial to one's health (Colley et al., 2018). Despite the innumerable benefits associated with participation in regular PA, it is evident that most Canadians are still not active enough to obtain these health benefits.

1.4 Physical Activity Counselling in Healthcare

It has been suggested in the literature that family physicians are in an ideal position to educate patients on the benefits of regular PA, and to counsel them on how to increase activity levels (Haennel & Lemire, 2002). This has been suggested because physicians see their patients regularly, and can easily monitor the progress of PA implementation and provide guidance as required. Sallis (2011) suggests that history demonstrates physicians can be very effective in promoting behaviour change among their patients. Physicians convince patients to undertake therapy that is far more time consuming and dangerous than exercise on a daily basis. In the literature, numerous PA promotion initiatives in primary care have been found to be effective (Orrow, Kinmonth, Sanderson, & Sutton, 2012; Van Sluijs et al., 2005). Unfortunately though, statistics regarding recent PA counselling habits in healthcare present cause for concern. Despite

the important role healthcare professionals could play in PA promotion, it has been reported that family physicians in the United States (U.S.) spend just one-and-a-half to three minutes providing health education and counselling during a typical patient visit (Meriwether, Lee, Lafleur, & Wiseman, 2008). The literature highlights inadequate levels of PA counselling among primary care physicians in Canada as well. A recent study investigating the PA assessment and counselling habits of primary care providers in family medicine groups from Quebec showed that the rates of assessment and counselling in the province were low, even though most of the patients were inactive. Overall, 51.9% of patients had their PA level assessed over the course of the 18-month period during which the study was conducted, while only 21.6% received PA counselling from at least one primary care provider (Baillot et al., 2018). Evidently, there are a number of barriers contributing to poor PA counselling behaviours among physicians within our healthcare systems.

1.5 Physical Activity Counselling Education

A number of barriers to physician PA counselling have been highlighted in the literature, including limited time, reimbursement problems, lack of practical tools, and insufficient knowledge, skills, and confidence (Eakin, Smith, & Bauman, 2005; Meriwether et al., 2008). Among these barriers, lack of education is consistently identified as a primary obstacle for many physicians with regard to PA counselling in clinical settings (van Dam, van der Horst, van den Borne, Ryckman, & Crebolder, 2003). In fact, medical students themselves have recognized the need for broader training in PA counseling within medical education. Although 94% of Canadian medical students perceive competence to prescribe PA to patients as either moderately important or important to their future practice, only 16% feel capable of doing so upon graduation (Vallance, Wylie, & Macdonald, 2009). Similar trends were reported by Solmundson, Koehle,

and McKenzie (2016), who administered a cross-sectional survey to family medicine residents at the University of British Columbia to assess exercise prescription knowledge, competence, attitudes/beliefs, and current practices. The majority of participants (95.6%) reported exercise prescription as being important to their future practice, despite having low knowledge of the Canadian PA Guidelines and low self-reported competence prescribing exercise. Only 14.9% perceived their training in exercise prescription to be adequate, with 91.0% expressing a desire for more education on the subject matter (Solmundson, Koehle, & McKenzie, 2016). In response to the growing body of literature regarding the importance of lifestyle counselling, the Canadian Senate released a report in 2016 recommending Health Canada engage provinces and territories to improve doctors' training on diet and exercise, and encourage doctors to give patients prescriptions for exercise. The report emphasized that empowering physicians to incorporate healthy, active lifestyle promotion into their patient interactions should begin with early exposure during their medical studies (Ogilvie & Eggleton, 2016). Although this important issue has garnered the attention of the Canadian government, significant gaps in physician training with regard to PA counselling highlight the need for an interdisciplinary approach to PA counselling within our healthcare system.

Due to the significant barriers facing physicians (and future physicians) with regard to PA counselling and exercise prescription, it has been suggested that exercise professionals, such as Clinical Exercise Physiologists (CEPs), can play an important role in the healthcare system. In fact, a recent commentary published in the *Canadian Family Physician* highlighted the value that referral to qualified exercise professionals could offer in helping to increase the chances of primary care patients realizing a long-term commitment to exercise and PA (Jattan & Kvern, 2018). Although limited research has focused on the effectiveness of incorporating CEPs into

primary healthcare teams, the literature proposes that exercise professionals could play an important role in an integrated approach to PA promotion (Thornton et al., 2016). The primary role of exercise professionals, including CEPs, is to ensure safety and adaptation of exercise-based activities to the ability level of patients. In Canada, CEPs require formal education that enables them to provide exercise supervision, counselling and lifestyle education to apparently healthy individuals and/or populations with medical conditions or functional limitations (Thornton et al., 2016). Due to the high physical inactivity and chronic disease rates in this country, it is likely that the integration of CEPs into healthcare systems across Canada would have a tremendous impact on the fields of medicine and public health. Evidently, physicians are ill-prepared to offer adequate exercise counselling for disease prevention, treatment, and management, highlighting the need for exercise professional integration into primary healthcare teams.

1.6 Rationale

Due to the growing burden imposed on the Canadian healthcare system by rising chronic disease rates, and the potential for lifestyle interventions, such as PA and exercise, to improve outcomes related to population health and healthcare economics, there is a need for more research investigating the integration of exercise professionals into multidisciplinary healthcare teams. A large proportion of the Canadian population is impacted by chronic diseases that could be prevented or effectively managed through regular PA. Due to the lack of training physicians receive on exercise counselling and prescription, the research team decided to investigate the experiences of CEPs and physicians during the integration of CEPs into healthcare teams, as well as identify challenges and opportunities experienced during this integration. To the best of the research team's knowledge, this study was the first to qualitatively investigate the integration of

CEPs into primary healthcare teams in Canada. As increased emphasis is placed on multidisciplinary practice, it becomes important to understand the experiences of those involved in primary healthcare. Thus, this study was designed with the intention of contributing to a growing body of *Exercise is Medicine* literature, and highlighting the experiences of CEPs and healthcare professionals involved in an exercise referral program at the primary care level.

1.7 Research Purpose and Objectives

Although it has been suggested that CEPs can play an important role in an integrated, multidisciplinary approach to PA promotion, limited research has focused on the effectiveness of incorporating exercise professionals into primary healthcare teams, particularly within Canada. The objectives of this thesis were to: (1) explore the experiences of CEPs and physicians during the integration of the CEP into the primary healthcare; and (2) identify the challenges and opportunities encountered by the CEPs and physicians that could potentially impact future exercise referral schemes. As a CEP, an aspiring physician (and current medical student) with an interest in chronic disease prevention, and a graduate student with experience conducting *Exercise is Medicine* research, I felt as though I would be uniquely positioned to conduct this research project. Furthermore, I felt as though I would be uniquely positioned to ensure effective knowledge translation following the completion of this study in order to strengthen the relationship between exercise scientists and medical practitioners in my home province, in hopes of developing more effective strategies for chronic disease prevention and management, and the promotion of PA.

1.8 Study Significance

In recent years, graduate students from the Master of Science in Kinesiology program at Memorial University have had the opportunity to participate in clinical placements as CEPs in

family medicine clinics in St. John's, Newfoundland and Labrador. These placements were supervised by faculty from both the School of Human Kinetics and Recreation and the Faculty of Medicine at the university. Over the course of the past three years, a total of five students participated in 10-14 week placements at two separate Faculty of Medicine clinics. Each of these students worked closely with family medicine physicians who referred patients/clients to them for consultations. The setup for the referral system between physicians and CEPs varied from placement to placement as CEPs worked with different physicians, and different resources (i.e., office space and equipment) may have been available depending on the time of year. In general, the CEPs interviewed for this study were present in clinic for two full days and one half day per week. These exercise professionals generally interacted with patients in a standard clinic room, although one of the CEPs noted that they were able to utilize additional office space to create an 'exercise' space to demonstrate and practice exercises with patients. The CEPs generally interacted with other healthcare professionals in the 'team room' at the medical clinic, which contained computers that enabled access to relevant patient health information. The workload for the CEPs in clinic varied between each placement, although each individual noted that they were involved in patient care for a variety of clinical issues ranging from primary prevention of illness to management of patients (both children and adults) with a number of complex comorbidities. This physician-CEP referral system presented a unique research opportunity, as CEPs and kinesiologists generally do not have a role within the healthcare system in Newfoundland and Labrador. The CEPs provided free services to patients/clients during their primary healthcare placements, and the placement experience counted as course credit towards their master's degree requirements. This project served as an opportunity to evaluate the effectiveness of this physician-CEP exercise referral scheme, which was similar to those being piloted in various

Canadian cities with the support of *Exercise is Medicine (EIM) Canada* and CSEP. The primary goal of the EIM movement has been to make PA assessment and exercise prescription a standard part of disease prevention and treatment practices within healthcare (Sallis, 2015). Thus, the results of this research will add to a growing body of EIM literature suggesting that the implementation of exercise professionals into primary healthcare teams would be an effective way to address the public health issues related to high physical inactivity and chronic disease rates.

1.9 Thesis Format

This thesis is written using a manuscript-style format that is organized into five chapters (introduction, literature review, methodology, manuscript, and conclusion), with full references and appendices included at the end of the document. Although this thesis has been formatted according to the Publication Manual of the American Psychological Association (6th edition), the manuscript has been formatted using the Vancouver Style Reference Guide in preparation for submission to the *Canadian Journal of Public Health*. An additional reference list, specific to the manuscript and formatted according to the Vancouver Style guidelines, has been included at the end of Chapter 4 in preparation for journal submission.

Chapter Two: Literature Review

2.1 Background

The World Health Organization (WHO) describes health as a state of “complete physical, mental and social wellbeing and not merely the absence of disease or infirmity [physical or mental weakness]”(World Health Organization, 1946). This definition highlights the complexity of health, emphasizing that the absence of disease is not necessarily reflective of one’s physical, mental, and social wellbeing. Despite calls for expansion of the healthcare system beyond disease-based care, it has been suggested that our current medical model is designed to favour traditional reactionary practices over the preventive healthcare measures needed to improve national chronic disease rates (Canadian Centre for Policy Alternatives, 2007; Martin et al., 2018). Within the literature, the term “chronic disease” is used to refer to a long-term condition that cannot be cured but that can be effectively managed through medication and/or other therapies, including PA and proper nutrition (Department of Health, 2010). The number of Canadians living with chronic disease continues to increase due to the aging and growth of the country’s population, and the fact that people are living longer with disease due to advances in treatment and management. Currently, one in three Canadian adults (33.7%) lives with at least one of the following chronic diseases: cardiovascular disease; cancer; chronic respiratory disease; diabetes; mood and/or anxiety disorders (Branchard et al., 2018). The rate of premature mortality (i.e., the probability of dying between the ages 30 and 69) due to a major chronic disease is 10.2%, with chronic conditions accounting for more than 70% of all deaths worldwide (Branchard et al, 2018; Schmidt, 2016). Evidently, chronic diseases continue to impose a major burden on our healthcare systems, despite representing the most preventable of all health

conditions (Bauer, Briss, Goodman, & Bowman, 2014; Blair, 2009; Farley, Dalal, Mostashari, & Frieden, 2010).

It has been suggested in the literature that many of the major chronic diseases afflicting Canadians could be largely prevented by tackling a few common risk factors, such as smoking, harmful use of alcohol, unhealthy eating, and physical inactivity (Branchard et al., 2018). Physical inactivity is frequently cited as one of the major lifestyle-related risk factors for chronic disease. In recent years, extensive research has been performed regarding the effectiveness of PA and exercise in the prevention and treatment of chronic disease. Evidence suggests that the health benefits of PA are often equivalent or superior to those associated with traditional pharmaceutical treatments (Naci & Ioannidis, 2013). Despite the many benefits associated with regular PA, statistics show that the majority of Canada's population are inactive or sedentary (Janssen, 2012). In addition to the detrimental health effects associated with chronic disease development, there is a growing economic burden associated with physical inactivity. Accordingly, it has been suggested that mainstream medicine must do more to target behaviours contributing to chronic disease, such as physical inactivity, by expanding healthcare services to include trained professionals with expertise in exercise and lifestyle counselling (Sallis, 2011).

2.2 Physical Activity and Chronic Disease Risk Reduction

PA is one of the primary healthy lifestyle behaviours identified in the literature as being effective in the prevention of chronic diseases (Liu et al., 2016). Caspersen, Powell, and Christenson (1985) define PA as any bodily movement produced by skeletal muscles that results in energy expenditure. It is suggested in the literature that PA in daily life can be categorized into conditioning, household, occupational, sport, or other activities. Although the term 'exercise' is often used synonymously with PA in social contexts, Van Roie et al. (2010) propose that the

distinction between the two terms is very important when considering health-related literature. Exercise is a subset of PA that is planned, structured, and repetitive, and is performed for the purpose of improving or maintaining one's physical fitness (Caspersen, Powell, & Christenson, 1985). Although PA can generally be performed with minimal equipment and cost, it has been suggested that a number of barriers exist that limit the implementation possibilities and potential public health impact of formal exercise programs (Van Roie et al., 2010). In considering the distinction between exercise and PA, the Canadian Society for Exercise Physiology (CSEP) has recommended that an individual should participate in 150 minutes per week of moderate-to-vigorous PA (MVPA) to receive optimal health benefits (Canadian Society for Exercise Physiology, 2014). Moderate PA could include brisk walking, cleaning (i.e., vacuuming or raking leaves), or bike riding for pleasure, while vigorous PA refers to more intense activities such as jogging, swimming laps, or competitive team sport participation (Colley et al., 2011).

Several high-level systematic reviews have identified risk reductions of 25–50% or more in most major chronic diseases for individuals who meet the recommended 150 minutes per week of MVPA (Pedersen & Saltin, 2015; D. E. Warburton et al., 2010). Although the target of 150 minutes of MVPA per week may seem unrealistic for sedentary individuals, it has been shown that health benefits are associated with smaller amounts of PA (Piercy et al., 2018). Every 10-minute period of MVPA accumulated per day leads to approximately a 10% relative risk reduction in mortality, up to a 32–44% relative risk reduction at 150 minutes of MVPA per week. The dose–response effect appears to plateau at a 50–60% reduction in chronic disease risk at three to five times the weekly guidelines (i.e., 750 minutes per week), and there is no evidence of decreased mortality at higher levels of PA in generally healthy individuals (Thornton et al., 2016). Recent changes have been made to the PA guidelines in the US to reflect evolving

research regarding the minimum duration for bouts of PA to offer health benefits. The 2018 guidelines recognize that any bout of PA can contribute to positive health adaptations, regardless of length. In fact, incorporating brief, sporadic bouts of moderate and high intensity incidental PA offers numerous practical and health advantages to the general public (Stamatakis et al., 2019). This is a very important consideration for PA promotion initiatives, particularly within healthcare as medical professionals seek to elicit behaviour change among their patient population. Additionally, it should be noted that the biggest positive change in health risk is in going from an inactive lifestyle to somewhat active (i.e., 75–90 minutes of MVPA week), resulting in a 15% reduction in mortality risk. Simply reducing sedentary behaviour—and replacing it with PA—will lead to short- and long-term health benefits for Canadians as prolonged sedentary time is considered to be a major predictor of adverse health outcomes in adults (Thornton et al., 2016).

The relationship between PA levels and chronic disease has been investigated extensively in the literature. For example, one study analyzing structured interventions combining PA and modest weight loss found a reduction in the risk of developing type 2 diabetes by up to 58% in high-risk populations (Diabetes Prevention Program Research Group, 2002). PA is consistently shown to be an effective treatment option in the management of type 2 diabetes, however, it has been indicated that only 39% of type 2 diabetics report meeting the recommended PA guidelines compared to 58% of healthy, undiagnosed adults (Colberg et al., 2010). Additional evidence suggests that epidemiological links exist between increased PA levels and a reduction in risk factors for obesity, metabolic diseases, psychosocial problems, certain forms of cancer, and various other disorders (Schmidt, 2016; Shields & Tremblay, 2008). In considering that there are health benefits associated with even small amounts of PA, one might question why the majority

of Canadians are physically inactive. It is important to recognize that PA is a complex health behaviour.

2.3 Physical Activity Rates in Canada

The results of a study by Colley et al. (2011) illustrate a clear discrepancy between the levels of subjective (i.e., self-reported) and objective (i.e., measured) PA levels of Canadians. Prior to the advent of the Canadian Health Measures Survey (CHMS), national trends in the PA behaviour of Canadians were derived from self-report surveys. In 2009, 52.5% of Canadian adults reported that they obtain at least 150 minutes of MVPA per week (Colley et al., 2011). However, the 2007 to 2009 CHMS used accelerometers to collect the first-time sequenced objective measures of PA for a nationally representative sample. The initial CHMS found that only 15% of Canadians meet the recommended weekly guidelines for MVPA. Evidently, the accelerometer data illustrated that many Canadians are less active than they believe, highlighting a trend of very low PA levels within the general population (Colley et al., 2011). Most recently, Statistics Canada accelerometer data from the 2014-2015 CHMS demonstrated that 39% of Canadians accumulate enough PA per week to meet the recommendations offered by national PA guidelines. Recent changes to exercise guidelines have suggested that individuals can accumulate MVPA in bouts of any duration, whereas the literature had previously stated that any bout of MVPA should last at least 10 minutes in order to offer health benefits. Although it appears that Canadians have increased their PA substantially over the past decade, this trend can largely be attributed to recent changes in how PA is measured and reported (Colley et al., 2018). Despite the innumerable benefits associated with participation in regular PA, it is evident that most Canadians are still not active enough to obtain these positive health effects.

2.4 The Economic Burden of Physical Inactivity in Canada

In addition to the well-established health benefits associated with increasing national PA rates, it should be recognized that physical inactivity has a major impact on the Canadian economy as well. A study by Katzmarzyk and Janssen (2004) was the first to summarize evidence linking PA to chronic disease in order to provide an estimate of the direct, indirect, and total healthcare expenditures that can be attributed to physical inactivity and sedentary behaviour in Canada. The risks of disease associated with inactivity and obesity were determined using a meta-analysis of existing research and applied to the healthcare costs of these diseases in Canada (Katzmarzyk & Janssen, 2004). Statistical estimates were created for direct and indirect healthcare expenditures, including the value of economic output lost to injury, injury-related work disabilities, and/or premature deaths. The total economic burden of physical inactivity was \$5.3 billion, representing 2.6% of Canada's total healthcare costs in the year 2001 (Katzmarzyk & Janssen, 2004). In 2012, Janssen published additional research aiming to update the statistics in the previous report on the costs of physical inactivity. He explained that the associated healthcare costs increased considerably over the course of the decade between the two studies, and that the results of the previous study were based in part on an inaccurate estimate of the overall physical inactivity level of Canadians (Janssen, 2012). The 2001 study assumed that only 53% of the population should be considered physically inactive, whereas further research suggested 85% of Canadian adults do not meet the nation's recommended activity guidelines (Colley et al., 2011; Janssen, 2012). The total healthcare cost of physical inactivity in Canada was estimated to be \$6.8 billion in the year 2009, representing 3.7% of the country's overall healthcare costs (Janssen, 2012). In recent years, health researchers have gained a much better understanding of the widespread impact physical inactivity has on healthcare spending related to

chronic disease. It has been shown that the economic burden of physical inactivity, and related health concerns, continues to increase rapidly. According to Krueger et al. (2014), these PA-related costs now total approximately \$29 billion per year. They propose that simply increasing PA rates in Canada by one percent per year could save approximately \$2.1 billion annually. Evidently, there are many reasons as to why it is important to address the major barriers to PA contributing to such low participation rates in Canada. If this significant public health concern is not properly addressed, there will be serious implications with regard to healthcare spending and the incidence of chronic disease in this country in the years to come (Krueger, Turner, Krueger, & Ready, 2014).

2.5 Barriers to Physical Activity

According to the literature, many barriers exist for the general population with regard to PA uptake and adherence. Among working mothers and fathers, for example, commonly cited barriers to PA include family responsibilities, lack of support, scheduling constraints, and work commitments (Mailey, Huberty, Dinkel, & McAuley, 2014). Additionally, lack of involvement in PA has been linked to factors such as: health status (e.g., chronic health problems and pain); environmental factors (e.g. accessibility to exercise facilities, neighbourhood safety, and weather); psychological issues (e.g., self-commitment issues, negative perception of exercise and outcomes); and demographics (e.g. education level and age; Justine, Azizan, Hassan, Salleh, & Manaf, 2015). In focusing on the individual or intrapersonal factors affecting PA or exercise behaviour, individuals generally highlight time and motivation as their primary barriers to PA. However, a lack of knowledge regarding how to engage in regular PA is a very important consideration as well. It should be noted that monetary concerns regarding the cost of exercise

facilities/programs and tiredness/fatigue are other individual barriers that commonly appear in the literature (Joseph et al., 2015)

Although the most commonly reported approaches to PA promotion internationally are interventions that focus on individual attitude and behavior change, it is important to consider that PA participation is a complex behavior also impacted by a number of social and economic factors (Ball, Carver, Downing, Jackson, & O'Rourke, 2015). In fact, it has been illustrated that participation in both PA and sedentary behavior follows a social gradient. Individuals who are more advantaged are more likely to be regularly physically active, less sedentary, and less likely to experience adverse health outcomes associated with inactivity than those who are less advantaged (Ball et al., 2015). Typically, those with higher education levels, higher incomes, and higher status occupations are more likely to experience the positive health effects associated with regular PA. Associations have also been found to exist between PA participation and geography, gender, and ethnic background. Although the causes of such social inequities (and their associations with physical inactivity) are not completely understood, it is important to note that the factors impacting PA behaviours are not just individual or interpersonal in nature.

2.6 Physical Activity Counselling Among Healthcare Professionals

It has been suggested in the literature that family physicians are in an ideal position to educate patients on the benefits of regular PA and to counsel them on how to increase activity levels (Haennel & Lemire, 2002). In 2015, 85.1 percent of Canadians reported that they have a regular medical doctor (Statistics Canada, 2014). Given that primary care physicians see their patients on a regular basis, they could potentially play an important role in monitoring the progress of PA implementation and providing guidance as required (Baillot et al., 2018).

History demonstrates that physicians can be very effective in promoting behaviour change among their patients (Sallis, 2011). When trying to increase the PA levels of patients/clients, healthcare professionals must consider the numerous barriers contributing to the high rates of inactivity within our population. Among these barriers to PA, the most common reason cited by patients for not participating in regular PA is a perceived lack of time. It is of utmost importance that physicians and other healthcare practitioners help patients/clients break down barriers to PA, which begins with educating them on the ways in which PA can be incorporated into one's everyday life (Sallis, 2015). Unfortunately, it has been reported that just 12.9% of Canadian adults are aware of this country's PA guidelines (Pfaeffli Dale et al., 2016). Evidently, healthcare professionals must do a better job of educating patients/clients on the recommended PA guidelines, as well as the potential health benefits associated with regular activity.

First of all, patients/clients should understand that although 150 minutes per week of MVPA is the goal for optimal health benefits, any amount of PA is good for an individual's health and it is important to focus on gradually progressing from an inactive lifestyle to one featuring regular PA. Furthermore, it is important to educate patients/clients that PA can be accumulated in small bouts dispersed throughout one's daily routine, and that equivalent health benefits can be obtained in less time when exercising at higher intensities (Piercy et al., 2018; U.S. Department Of Health And Human Services, 1996). One of the most important points for physicians to emphasize in their clinical interactions with patients is that there is no amount of PA or exercise that does not have an impact on health, and they should take advantage of every opportunity they can to engage in PA. This can include modifying one's daily routine to incorporate more movement, which might simply involve parking their car further away from work or taking the stairs rather than the elevator. These simple lifestyle modifications can make a

difference to the health of a patient. Starting slow with one to two days per week when beginning PA and gradually trying to increase the duration (and/or frequency) of activity should be a key consideration for clinicians when performing PA counselling/prescription (Sallis, 2015). Furthermore, experts in the field of *Exercise is Medicine* suggest that walking should be considered the default PA prescription in healthcare settings. It has been reported in the literature that walking is the most common form of adult PA and that it generally has good long-term adherence. It is also deemed to be an accessible form of PA for people of all ages and fitness levels, while having a low cost and minimal equipment requirements (Sallis, 2015).

Although there is a need for more evidence regarding the long-term health effects of PA promotion intervention in primary care, the literature shows that promotion of PA to sedentary adults recruited at the primary care level can produce statistically significant increases in PA levels (Orrow et al., 2012). For example, a review of randomized control trials featuring PA promotion programs by Orrow et al. (2012) found significant increases in self-reported PA levels in sedentary adults following a 12-month PA intervention recommended by a healthcare professional. In 13 trials presenting self-reported PA, small to medium positive intervention effects relating to increased PA levels were observed at 12-months. Additionally, Van Sluijs et al. (2005) suggest the PA counselling practices of physicians is likely to increase during counselling intervention research due in large part to the Hawthorne effect. In other words, physicians will provide PA counselling on a more regular basis due to their participation in a study related to PA counselling practices. In general, statistics regarding PA counselling in healthcare present cause for concern. It has been shown that among physicians who attempt to discuss exercise (and/or diet) with their patients, the average discussion lasts only 90 seconds (Bardach & Schoenberg, 2014). Despite the important role healthcare professionals could play in

promoting PA to patients, the literature highlights inadequate levels of PA counselling within primary care settings in Canada. A recent study investigating the PA assessment and counselling habits of primary care providers in family medicine groups from Quebec showed that the rates of assessment and counselling in the province were low, even though most of the patients were inactive. Overall, 51.9% of patients had their PA level assessed over the course of the 18-month period during which the study was conducted, while only 21.6% received PA counselling from at least one primary care provider (Baillot et al., 2018). Evidently, there are a number of barriers contributing to poor PA counselling behaviours among physicians within our healthcare systems.

2.7 Physical Activity Counselling Education

Although a number of barriers to physician PA counselling have been highlighted in the literature, lack of education on the topic is consistently identified as a primary obstacle for many physicians in their clinical encounters with patients (Eakin et al., 2005; Meriwether et al., 2008; van Dam et al., 2003). In the past, although the majority (i.e., 64%) of US medical school Deans believed that medical education should provide future doctors with the skills and knowledge to provide effective PA counseling, just 24% percent believed that their students were well prepared to counsel patients on PA after graduation (Connaughton, Weiler, & Connaughton, 2001). According to the literature, medical students themselves recognize the need for broader training in PA counseling. Although 94% of Canadian medical students perceive competence to prescribe PA to patients as either moderately important or important to their future practice, only 16% feel capable of doing so upon graduation (Vallance et al., 2009). Similar trends were reported by Solmundson, Koehle, and McKenzie (2016), who administered a cross-sectional survey to family medicine residents at the University of British Columbia to assess exercise prescription knowledge, competence, attitudes/beliefs, current practices, personal PA levels, and

perspectives of training. The majority (95.6%) of participants reported exercise prescription as being important to their future practice, despite having low knowledge of the Canadian PA Guidelines and low self-reported competence prescribing exercise as prevention, while rating themselves ‘somewhat incompetent’ prescribing exercise to patients with chronic disease. Furthermore, the residents believed that PA is integral to their patients’ health and sedentary behaviour is harmful, and felt a responsibility to discuss PA with patients. Finally, only 14.9% perceived their training in exercise prescription to be adequate, with 91% expressing a desire for more education on the subject matter (Solmundson et al., 2016). In response to a growing body of literature regarding the importance of lifestyle counselling, the Canadian Senate released a report in 2016 recommending Health Canada engage provinces and territories to improve doctors’ training on diet and exercise and encourage doctors to give patients prescriptions for exercise. The report emphasized that empowering physicians to incorporate healthy, active lifestyle promotion into their patient interactions should begin with early exposure during their medical studies (Ogilvie & Eggleton, 2016). Although this important issue has garnered the attention of the Canadian government, the significant gaps in physician training with regard to PA counselling highlight the need for an interdisciplinary approach to PA counselling within our healthcare system.

Due to the significant barriers facing physicians (and future physicians) with regard to PA counselling and exercise prescription, it has recently been suggested that Clinical Exercise Physiologists (CEPs)—formerly known as Certified Exercise Physiologists—can play an important role in the healthcare system. Thus far, limited research has focused on the effectiveness and sustainability of incorporating CEPs into primary healthcare teams (and, similarly, on the integration of registered kinesiologists into healthcare teams in Ontario).

Nevertheless, the literature proposes that exercise professionals could play an important role in an integrated approach to PA promotion (Thornton et al., 2016). In Canada, CEPs receive formal education that enables them to provide exercise supervision, counselling, and lifestyle education to apparently healthy individuals and/or populations with medical conditions or functional limitations (Thornton et al., 2016). Due to the high physical inactivity and chronic disease rates in this country, it is likely that the integration of CEPs into healthcare systems across Canada would have a tremendous impact on the fields of medicine and public health. Referral to a qualified exercise professional is most highly indicated for patients with conditions that have a high risk of morbidity and mortality associated with lack of PA (e.g., cardiovascular disease and type 2 diabetes), as well as populations that have difficulty engaging in regular PA due to low motivation or safety concerns (e.g., patients with cancer or pulmonary disease). In many patients with chronic disease, exercise programs are most effective when supervised. Evidently, exercise professionals provide a service to patients that is outside the scope of a physician's training, as they are trained to ensure safety and accountability for maximal treatment efficacy (Colberg et al., 2010). It should be noted that the role of exercise professionals through physician referral of patients must be carefully considered so as to not create an additional burden of treatment that would raise barriers to integration of daily PA, such as extra costs or difficulty accessing the service. Avoiding these types of obstacles is of particular concern for lower socioeconomic groups, and medical professionals should be aware that those most at risk of disease are often the least able to afford appropriate treatment when additional costs are associated (Thornton et al., 2016)

2.8 Examples of Physical Activity Promotion in Primary Care

Research by Orrow et al. (2012) examined whether PA promotion intervention trials based in primary care would show sustained effects on PA or fitness in sedentary adults. Results of the study showed that the promotion of PA to sedentary adults recruited in primary care settings significantly increased their self-reported PA levels measured one year later (Orrow et al., 2012). Similar improvements in self-reported PA levels were reported by Fortier et al. (2011) in a study that offered PA counselling services from a certified exercise professional to previously inactive Canadians recruited through primary care medical clinics. Although that particular study did not produce long-term increases in PA following the intervention, it did result in changes in health outcomes such as body fat percentage and total fat mass. Thus far, limited research has investigated the effect of PA counselling interventions beyond one-year post intervention in Canada. Additionally, there is a need for more studies that employ measurement of PA levels using accelerometry post-intervention, as discrepancies have been noted between self-reported and measured PA levels in the participant populations (Fortier et al., 2011). In a sweeping review of the literature investigating clinical PA interventions, Hillsdon et al. (2014) found that PA interventions have a positive moderate sized effect on increasing self-reported PA and measured cardio-respiratory fitness, at least in the short to mid-term. Additionally, their results suggested that “a mixture of professional PA guidance and self-direction plus on-going professional support generally leads to more consistent effect estimates, although the long-term effectiveness of these interventions is not established as the majority of studies stopped after 12-months” (Hillsdon, Foster, Thorogood, & Kaur, 2014, p. 16).

Although further research involving long-term follow up of PA and health outcomes is needed, the literature demonstrates the potential utility of exercise counselling services offered

through primary care clinics. As previously discussed, the idea of incorporating exercise prescription into the healthcare system has become increasingly popular in Canada and the US in recent years (Sallis, 2011). The Government of New Zealand has employed a ‘Green Prescription’ (or exercise prescription) system since 1998 in which health professionals, particularly physicians, provide written advice to patients to increase their PA levels and refer them to exercise professionals. The program encourages general practitioners to target several conditions associated with physical inactivity, and has been used by over 80% of family physicians in the country (Hamlin, Yule, Elliot, Stoner, & Kathiravel, 2016; New Zealand Ministry of Health, 2017). The Green Prescriptions encourage patients to manage their own conditions by becoming physically active and improving nutrition. Currently, there are eighteen PA or exercise providers – including regional sport trusts and public health organizations – contracted within the country to deliver the initiative to referred patients and families, who receive assistance from government funding (New Zealand Ministry of Health, 2017). A research study by Elley, Kerse, Arroll, Swinburn, and Ashton (2004) assessed the effectiveness and cost-effectiveness of the Green Prescription PA intervention in primary care among less-active adults. Results indicated that the Green Prescription intervention is an effective method of increasing PA and improving overall health, without any evidence of adverse effects. The intervention was found to be more cost-effective than other governmental PA interventions reported in the literature, and it has been considered likely to reduce overall costs associated with long-term health outcomes (Elley, Kerse, Arroll, Swinburn, & Ashton, 2004). A recent study by Hamlin et al. (2016) reported on the long-term benefits experienced by patients who completed the Green Prescription PA program after referral from their primary care clinic. Each individual who participated in the three month program received detailed PA prescriptions, a team-based

structure for PA promotion and healthy lifestyle activity promotion, assistance with overcoming barriers to PA, and supplementary educational materials. Patients who had fulfilled their Green Prescription two to three years ago reported an additional 64 minutes of total PA engagement in the week prior, compared to the non-adherence group. Additionally, when asked to compare current PA levels to PA levels prior to participating in the Green Prescription program, 42% of participants in the adherence group reported increased PA levels compared to 29% in the non-adherence group. Participants in the adherence group were also less likely to be sedentary than the non-adherence group and more likely to achieve the current PA guidelines of at least 150 min of PA per week. Finally, almost half (48.4%) of the adherence participants reported improved health benefits over the past two years, compared to 28.5% of the non-adherence participants (Hamlin et al., 2016). A current goal for members of the *Exercise is Medicine* movement is to encourage the adoption of exercise prescription (involving referral to exercise professionals) by physicians within the Canadian healthcare system, and to promote open conversation regarding PA with patients in clinical settings (Frémont, Fortier, & Frankovich, 2014). The New Zealand Green Prescription model provides an excellent case study for *Exercise is Medicine* in Canada, however there are a number of barriers that must be considered.

2.9 Important Considerations for Exercise Referral Schemes

In the New Zealand exercise prescription model, a Green Prescription lasts for a 3-month period, during which time the patient receives a monthly phone call from a trained PA specialist referred to as a 'patient support counsellor'. The specialist helps the individual set realistic goals for PA and helps identify solutions for participants regarding their primary barriers to PA (Croteau, Schofield, & McLean, 2006). Despite the potential for PA counselling in general practice in New Zealand, research shows that New Zealand general practitioners (GPs) prescribe

PA at half the rate of their counterparts in countries such as Australia and the US. Statistics show that just 13% of New Zealand adults reported receiving PA advice from their GP in the previous 12-months, while three percent reported receiving a Green Prescription within the same time frame (Patel, Schofield, Kolt, & Keogh, 2011). Although the Green Prescription system might seem efficient in theory, it is evident that issues exist which have prevented the exercise referral scheme from operating as efficiently as possible. The primary barrier to exercise prescription identified by GPs in New Zealand is the time constraints associated with patient consultations. The GPs suggest that there is little to no time for PA counselling, or administering a Green Prescription, when meeting with a patient that presents multiple problems or conditions. Some GPs report delegating more time consuming tasks (such as choosing a specific PA for the patient) to the PA specialist (Patel et al., 2011). The majority of patients considered adherent to the Green Prescription report being either satisfied (30%) or very satisfied (48%) with their experience in the program, a number have made suggestions for improvements related to more telephone support from PA professionals and an increased awareness and willingness to prescribe the program from general practitioners (GPs). Thus far, only GPs and nurses associated with GPs in primary care clinics can refer to the Green Prescription program, which researchers have highlighted as a limitation (Hamlin et al., 2016).

In comparison to the New Zealand initiative, Canadian pilot programs for exercise referral schemes appear to provide much more autonomy to the exercise professional. It is understood that the CEP is the expert on PA counselling, and therefore they determine the type of exercise (in consultation with the client) as well as the duration, frequency, and intensity of training (Thornton et al., 2016). Unfortunately, limited research has been performed with regard to the role of CEPs in healthcare in Canada. Nonetheless, one could expect that exercise referral

in Canada would result in benefits similar to those observed in New Zealand for patients with pre-existing conditions and weight-related issues, as well as currently healthy but sedentary individuals at risk for future health problems due to their inactive lifestyle (Patel et al., 2011).

A number of important issues must be considered when developing a primary care exercise referral scheme for the Canadian healthcare system. For example, confusion and uncertainty about the role of exercise professionals and their scope of practice was identified in the literature as a primary weakness when considering the integration of registered kinesiologists¹ into primary healthcare in Ontario. Respondents to a survey assessing perspectives on the regulation of kinesiologists among other health professionals indicated that there was a lack of public knowledge and professional awareness about the educational background, level of knowledge, and practical skills kinesiologists have acquired through their academic training (Braniff, Montelpare, & McPherson, 2012). The respondents suggested that this lack of understanding of kinesiology as a profession may lead to reduced utilization by other regulated health professionals, thereby reducing opportunities for collaboration between kinesiologists and other health service providers (Braniff et al., 2012). The province of Ontario has worked to improve awareness of and trust in the kinesiology profession in recent years, formally establishing it as a regulated profession under the provincial *Regulated Health Professions Act* in 2013. The College of Kinesiologists of Ontario is the only one of its kind in Canada, serving as a legislated body that regulates the kinesiology profession (Prevost, Kpazai, & Attiklé, 2015). Although differences exist between the *Registered Kinesiologist* designation

¹ Due to a scarcity of research on CEPs in healthcare, this section discusses research focusing on the integration of kinesiology as an allied health profession in Ontario (Braniff, Montelpare, & McPherson, 2012). Although CSEP recognizes CEPs as the exercise professionals best-suited to work with individuals dealing with chronic disease, it appears that the term 'kinesiologist' is sometimes used to reference exercise professionals serving this role within healthcare. Overall, there appears to be a lack of consistency within the literature.

and the CEP certification in terms of scope of practice, healthcare professionals in Ontario have suggested that provincial regulation of kinesiology allows for better integration into multidisciplinary healthcare teams. Furthermore, it has been suggested that provincial regulation increases career viability for kinesiologists and patient care outcomes (Braniff et al., 2012).

Thus far, a lack of research exists assessing the effectiveness of integrating Registered Kinesiologists in Ontario into healthcare settings such as cardiac rehabilitation centres, long-term care, hospital environments, and primary healthcare clinics (Prevost, Kpazai, & Attiklé, 2015). Nevertheless, as kinesiology moves through its transition into a regulated health profession, with the opportunity to charge for services directly through various insurance systems, there should be opportunities for increased visibility and service delivery in the province. Currently, kinesiology services are not covered by the Ontario Health Insurance Plan. However, the College of Kinesiologists of Ontario states that kinesiology services are covered under some extended private health plans, and out-of-pocket kinesiology expenses may be submitted for reimbursement on annual tax returns (College of Kinesiologists of Ontario, 2020). Evidently, insurance coverage will also be an important consideration for any exercise referral program involving CEPs in the future. As leaders in the *Exercise is Medicine* field emphasize the value of incorporating exercise prescription into the Canadian healthcare system, we must consider not only the opportunities presented by the programs implemented in countries such as New Zealand, but the challenges that exist as well.

Chapter Three: Methodology and Methods

3.1 Theoretical Framework

For this qualitative description study, the Socio-Ecological Model (SEM) was used as the theoretical perspective to shape the generation of our semi-structured interview guide and facilitate data generation and analysis. The SEM is a systems model developed by Bronfenbrenner (1979), which aims to explain health-related problems through the analysis of a multidimensional cause as opposed to the single cause explanations offered by many traditional theories. The SEM allows health researchers to investigate the interaction between, and interdependence of, factors within and across all levels of a health system (Kumar et al., 2014). Contrary to most health behaviour theories, which focus predominantly on variables at the intrapersonal level related to attitudes, the SEM suggests that individual behaviour is shaped by factors at multiple levels, including organizational, community, and policy levels, in addition to intrapersonal (individual) and interpersonal levels (McLeroy, Bibeau, Steckler, & Glanz, 1988). The various levels of the SEM are illustrated in Figure 1.

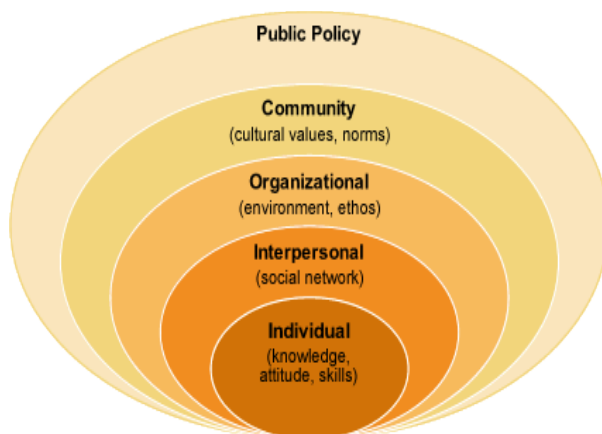


Figure 1. The Socio-Ecological Model, adapted from *Toward an experimental ecology of human development* by Bronfenbrenner (Bronfenbrenner, 1977).

Factors influencing behaviour at the intrapersonal level include individual characteristics, such as attitudes, beliefs, knowledge, personality traits, and skills (Robinson, 2008). The interpersonal level builds on the intrapersonal level and focuses on social interactions between the individual of interest and primary supports groups that influence social identity and role definition in a given environment or system (Robinson, 2008). Next, the organizational level of the SEM is related to rules, regulation, policies, and informal structures, which may constrain or promote recommended behaviours, such as PA counselling and exercise prescription (Robinson, 2008). In considering the community level of the SEM, one must focus on the resources and participation of community-level institutions that can help facilitate a particular behaviour change (Robinson, 2008). Finally, the public policy level of the SEM relates to local, provincial, and federal policies and laws that regulate or support healthy actions and practices for disease prevention, control, and management, such as PA counseling and promotion (Robinson, 2008). It is important to acknowledge that within a given system there will be interaction between various levels of the SEM, however, not all levels of influence may be apparent or relevant to the phenomenon being studied. The SEM has been commonly used in the literature to explain interactions between different levels of the healthcare system with regard to health promotion practices, thus it should help provide insight into the challenges and opportunities impacting exercise referral schemes in this particular study (Robinson, 2008).

In studying the integration of CEPs into primary healthcare, the research team designed questions that aimed to investigate primarily the intrapersonal, interpersonal, and organizational levels of influence within the SEM. However, it should be noted that the research design sought to elicit open, unrestricted discussion from the participants that could potentially highlight factors related to all levels of the model. In this particular study, the intrapersonal level of the

SEM related to personal traits influencing the PA counselling practices of the CEP. A number of interpersonal factors were also likely to influence counselling practices, as CEPs working in a primary healthcare environment could be influenced by family, friends, fellow healthcare professionals (e.g., family physicians), and patients within their care. In examining the organizational level of the SEM, it was important to consider that the healthcare system or academic medical institution under which CEPs and other healthcare professionals were working could present unique systemic barriers or facilitators to PA counselling. Furthermore, community level sources of communication and support influencing CEP behaviours within healthcare could include community center PA programs, recreation committees, and community leadership groups within a given region. Finally, there could have been potential influences at the policy level if, for example, participants identified government policy regarding the regulation of exercise professionals within healthcare as a barrier to PA counselling and exercise prescription.

3.2 Methodology and Procedures

3.2.1 Qualitative Description. Qualitative description research design is a methodology considered particularly effective when the research team is seeking to discover and/or understand a phenomenon, a process, or the perspectives of a group of individuals. Research studies utilizing a qualitative description methodology focus on representing the characteristics of qualitative research rather than concentrating on culture as does ethnography, lived experiences as in phenomenology, or the creation of theory as is the case in grounded theory research (Caelli, Ray, & Mill, 2003; Merriam, 1998). Instead, qualitative description research seeks to provide a rich description of participants' experiences using easily understood language (Sullivan-Bolyai, Bova, & Harper, 2005). In this particular study, a qualitative description approach offered the research team the opportunity to gather rich descriptions of a phenomenon about which little was

known: the integration of exercise professionals (i.e., CEPs) into primary healthcare teams in NL. The research team aimed to produce this rich description by collecting and reporting on research data in a way that was reflective of the viewpoints expressed by study participants. As per best practices outlined in qualitative research literature, the researchers intended to utilize the descriptions offered by participants to enhance understanding of the phenomenon being studied, while recognizing that the knowledge gained should influence any future interventions developed using a similar design (Sullivan-Bolyai et al., 2005). In the qualitative research literature, qualitative description has been identified as a relevant and effective methodology for investigating phenomenon related to particular healthcare professions (Bradshaw, Atkinson, & Doody, 2017; Kim, Sefcik, & Bradway, 2018).

3.2.2 Positionality. Creswell (2007) suggests that a researcher must position him or herself with respect to the research being conducted, recognizing that it is not possible to completely remove one's personal biases when interpreting the data and the phenomenon or case of interest. With regard to this study, I considered myself to be uniquely positioned to conduct this particular research due to my own personal experiences as a CEP, a former kinesiology student, and a medical student, with the desire to become a primary care physician. My experience working as a CEP, which was reflected upon in a case report (see Appendices), allowed me to develop an understanding of the issues facing exercise professionals working within healthcare settings. On the other hand, my medical school training and shadowing experiences thus far have enabled me to better appreciate the training of our current (and future) physicians, as well as the nature of their daily interactions with patients. Our research team worked together to minimize any potential personal biases when designing interview questions

for study participants, facilitating the semi-structured interview process, and conducting data analysis using the interview transcripts.

3.2.3 Data Collection. For this qualitative study, four kinesiology graduate students from Memorial University, each of whom had previously completed a practicum as a CEP in a local family medicine clinic, were invited to participate. In total, five students completed a practicum as a CEP through this exercise referral program, with one being the primary investigator of this study. One female CEP and three male CEPs took part in the study, with these participants ranging in age from 22 to 26 years old. These individuals were identified, and their email addresses obtained, from a contact list developed by the former supervisor of the practicum program from the Faculty of Medicine at the host institution. Family physicians (and family medicine residents) who worked directly with the CEPs on the primary healthcare teams were also invited to participate, with five of the twelve individuals recruited for the study choosing to take part and discuss their experiences. Among the physicians who chose not to partake in the study, no reasoning was provided regarding their decisions not to participate. The physicians who took part in the study ranged in age from approximately 40 to 65 years old, and it should be noted that one of these individuals was a resident at the time of their participation in the referral program (although their residency was completed prior to the time of their interview). The group consisted of two females and three males, and each of these physicians reported at least 3-4 months of experience working with a CEP in their respective medical practice. Description of participants utilizing the demographic information recorded has purposefully been kept vague to protect their anonymity. The clinical coordinator for the Family Medicine Family Practice Unit at the host institution provided the principal investigator with a list of family physicians and other healthcare professionals who supervised or worked directly with the CEPs during their

placements. Initially, the primary investigator reached out to a broader range of healthcare professionals from the medical clinic – including pharmacists and nurses – however, it was determined that only the physicians had interacted with the CEPs frequently enough to discuss their experiences in depth.

The approach to participant recruitment utilized in this study was consistent with the purposeful sampling technique commonly used in qualitative research for the identification and selection of information-rich cases. This sampling technique involves identifying and selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a particular phenomenon of interest (Palinkas et al., 2015). While quantitative research requires sample sizes that are sufficiently large to produce statistically significant results and precise quantitative estimates, smaller samples are used in qualitative research. This is due to the fact that general aim of sampling in qualitative research is to acquire information that is useful for understanding the complexity, depth, or context surrounding a particular situation or phenomenon (Gentles, Charles, Ploeg, & McKibbin, 2015). In reviewing discussions of sample size in the qualitative research literature, there was typically no mention of “theoretical saturation”—widely recognized as a guide or indicator that sufficient data collection has occurred—outside of the grounded theory methodology. Instead, the literature highlights flexible sample size estimates suggested by authors from various research traditions/methodologies (Gentles, Charles, Ploeg, & McKibbin, 2015). Recommended sample sizes varied for the qualitative description methodology employed in this study, although typically authors have suggested between 5 and 25 interview participants, with more specific suggestions such as “around 10-12 participants” also highlighted in the literature (Creswell, 2007; Gentles, Charles, Ploeg, & McKibbin, 2015). Participants for this research study were recruited via email and

each individual who agreed to participate was sent the informed consent form via email the day before their scheduled interview. On the day of the interview, participants were given additional time to review the consent form and ask questions to the principal investigator regarding study protocol before providing their consent.

The semi-structured individual interviews ranged from 25 to 45 minutes in duration, and were designed to explore participant experiences with regard to the placement of CEPs in family medicine clinics. During the interviews, an interview guide containing semi-structured, open-ended questions was used to ensure consistency throughout the data collection process. Separate interview guides – each designed to explore the various levels of the SEM – were used to lead interviews with the CEPs and physicians, respectively. According to the literature, the primary purpose of interview guide was to enable researchers to explore the experiences of participants more systematically and comprehensively, while keeping the interview focused (i.e., primary research objectives). The questions included in the interview guides included core question(s) and associated questions related to the central ideas of the study, and its theoretical framework (i.e., the SEM), as per best practices outlined in the qualitative research literature (Jamshed, 2014). The interviews conducted with the CEPs and physicians took place from May-June 2017, and were audio-recorded and subsequently transcribed verbatim.

3.3 Data Analysis

For the transcribed interviews, key themes were identified using Lichtman's three Cs approach (i.e., coding, categorizing, concepts) to thematic analysis, which is content-driven, and considered to be suitable for descriptive studies. The Lichtman approach involves studying data to extract codes, develop categories, and create broader concepts or themes that illustrate the main ideas represented (Lichtman, 2010). Thematic analysis should be performed in a systematic

fashion and guided by a theoretical framework in order to most effectively identify themes or patterns of cultural meaning that reflect the relationships existing within the data (Mills, Durepos, & Wiebe, 2010). In this study, the thematic analysis process was informed by the SEM, which impacted the themes that were selected from the 91 pages of research data produced by transcription of the individual interviews. The computer-assisted qualitative analysis research software ATLAS.ti was used to help in the construction of codes and organization of data into categories and subsequently concepts or themes. Although the first round of coding is generally performed on the printed copies of interview transcripts, the research team chose to utilize the computer software for the entirety of the coding and categorization process to better facilitate the sharing of results with one of our research team members located outside the province. The first step in the analysis involved performing an initial coding of the data to help identify the main ideas expressed by the participants in the study. In the second step of the analysis process, the initial codes were revisited and modified to ensure they accurately represented the ideas expressed by the participants. Additionally, this deeper analysis allowed the principal investigator to edit or eliminate certain codes that were redundant, and add codes for important ideas that may have been overlooked in the first round of analysis. In total, the coding process resulted in the development of 121 codes, which were then grouped into categories. The third step of the data analysis process focused on drafting an initial list of categories that grouped the existing codes in an organized manner. This process was repeated twice based on feedback provided to the principal investigator by his qualitative research supervisor. The codes were subsequently grouped into 16 categories. The final stage of the analysis process involved refining the category list to highlight the major concepts (or themes) represented by the data. This process was also repeated twice based on feedback offered by one of the principal investigator's

supervisors, resulting in a list of 5 major concepts that best reflected the data collected from the individual interviews.

3.4 Trustworthiness

In the context of qualitative research, many terms and procedures have been developed to establish the reliability and validity of research studies. Lincoln and Guba (1985) suggest that the trustworthiness of a study is an important consideration when evaluating the quality of the research. In fact, it is said that providing or developing methods of trustworthiness in qualitative research ensures rigidity within the work. One of the most important factors that contributes to the trustworthiness of a research project is credibility (Pandey & Patnaik, 2014). Credibility, which is similar to internal validity in quantitative work, is confidence in the “truth” of one’s findings. A number of techniques exist for establishing credibility, including triangulation. Triangulation centers on the belief that if two or more sources of data, theoretical frameworks, types of data collected, or researchers produce the same conclusions, then that conclusion is more credible (Tracy, 2010). Triangulation of sources was used by the research team as we examined the data provided by participants with different points of view on the main topics of discussion to help us better understand the rich and comprehensive nature of the ideas being put forward. The research team also employed analyst triangulation, which uses multiple analysts (i.e., researchers) to review findings in order to highlight any “blind spots” or biases associated with interpretive analysis. This process enables the primary investigator to better understand and appreciate multiple different ways of seeing the data so as to ensure that the main ideas expressed by participants are accurately conveyed in the results of the study (Pandey & Patnaik, 2014). Finally, the researchers performed member checking, which involved soliciting the participants’ views of the credibility of the findings and interpretations (Creswell, 2007). This

technique involved taking the data (i.e., transcripts) back to the participants so that they could judge the accuracy and credibility of the account. According to Lincoln and Guba (1985), member checking is the most critical triangulation technique for establishing credibility in a qualitative research study.

Dependability, which shows that findings are consistent and could be repeated, is another factor contributing to trustworthiness in a qualitative research study (Pandey & Patnaik, 2014). The research design was subjected to rigorous review by members of the research team and it was presented to other researchers at the host institution for feedback prior to the commencement of data collection. The methodology/methods were developed over the course of several months with input from all members of the research team, and the primary investigator conducted a thorough investigation into qualitative research design and frameworks before deciding on the appropriate methodology. The code-recode strategy was also employed to enhance the dependability of the study. This procedure involves the researcher coding the same data twice, with a period of time in between each coding. The results from the two codings are compared to see if they are the same or different; since the coding results were in agreement, this enhanced the dependability of the research design and helped the research team gain a deeper understanding of data patterns existing in the interview transcripts (Anney, 2015).

Finally, confirmability – which refers to the degree to which the results of a study could be confirmed by another researcher – is a factor that contributes to the trustworthiness of a study. If a study possesses confirmability, it suggests that the interpretation of the findings are clearly derived from the data and study design, and not due to the characteristics and preferences of the researcher (Pandey & Patnaik, 2014; Shenton, 2004). According to the literature, the confirmability of qualitative research is achieved through such methods as triangulation and

audit trails (Pandey & Patnaik, 2014). In addition to the methods of triangulation utilized in this study, the researchers kept a detailed record of the steps taken from the start of the research project to the data analysis process and reporting of findings. Additionally, the research team kept all raw data, process/methodological notes, and research instrument development information collected over the course of the study.

3.5 Storage of Data

Raw data files (i.e., audio recordings and transcripts) from the interviews were stored on an external storage device in a locked filing cabinet in the office of the primary investigator's supervisor at the host institution. Only electronic copies of the data files were kept following completion of the study, although paper copies of notes regarding research design and methodology were saved and stored at this location as well. Only the principal investigator and his supervisor had direct access to this data, although the other members of the research team will be able to gain access upon request if needed. All data will be stored for five years, as per Memorial University's policy on Integrity in Scholarly Research.

3.6 Knowledge Translation

To the best of my knowledge, this study was the first to qualitatively investigate the integration of CEPs into primary healthcare teams in Canada. Due to the increased emphasis placed on interprofessional collaboration in today's healthcare system, this research study will make an important contribution to a growing body of Exercise is Medicine literature as it highlights important considerations for the integration of CEPs into primary healthcare settings. The research team considers this study to be particularly unique since it provides insight from both CEPs and primary care physicians regarding their experiences participating in this exercise referral scheme. Moving forward, the research team intends to utilize the results of this study to

promote more effective interprofessional collaboration within the Newfoundland and Labrador healthcare system. Evidently, the SEM provides a valuable framework for influencing PA counselling practices within healthcare, as one must consider individual, interpersonal, organizational, community, and policy-level factors influencing exercise and lifestyle-related healthcare service delivery.

In the short term, the research team intends to use the results of this study to develop a report highlighting the experiences of those involved in the CEP exercise referral program and their perceptions of its effectiveness, and disseminate the report across the province of Newfoundland and Labrador. The report will discuss both facilitators and barriers for exercise prescription in the primary healthcare setting, and build a case for re-launching this free exercise counselling service in order to perform additional research that could inform the potential integration of CEPs into healthcare teams across the province. Furthermore, the research team hopes to use the results of this study to help start a conversation with local policy makers regarding the potential population health benefits associated with funding innovative lifestyle-based counselling programs that aim to improve chronic disease rates and health outcomes in our province. Evidently, there are a number of barriers to the integration (and effective use) of exercise professionals in our provincial healthcare system. Nevertheless, the research team intends to use the results of this study as a tool to effectively engage in constructive dialogue with individuals who can help with the development of improved PA counselling services in Newfoundland and Labrador in the years to come.

Chapter Four: Manuscript

Title: Exploring the Integration of Exercise Physiologists into Primary Healthcare Teams in Newfoundland and Labrador.

Authors: Jared M. Ryan, Erin M. Cameron, Duane C. Button, & Erin L. McGowan

Abstract

Background: Limited research has explored the integration of Clinical Exercise Physiologists (CEPs) into primary healthcare in Canada. As part of a clinical exercise referral program at Memorial University, graduate students recognized as CEPs participated in four month placements at local family medicine clinics.

Objectives: This study aims to explore the experiences of CEPs and physicians during the integration of CEPs into healthcare teams; and identify challenges and opportunities that could impact broader implementation of this referral program.

Methods: In this qualitative study, four CEPs and five physicians participated in semi-structured individual interviews designed to explore their experiences with the referral program and identify important themes using a Socio-Ecological Model.

Results: Four main themes emerged from qualitative data analysis: (1) CEP-led advocacy for exercise referral in healthcare, (2) gaps in training and regulation of CEPs, (3) unclear role for exercise professionals within healthcare, and (4) policy and organizational changes to improve exercise referral.

Conclusion: To improve exercise counselling services, efforts should be made to improve the ability of CEPs to advocate for their role within the healthcare team, address issues related to CEP training and regulation, create a more clearly defined role for CEPs within healthcare, and

improve billing for and coverage of exercise referrals. This study is the first to qualitatively investigate the integration of CEPs into primary healthcare teams in Canada, and will guide efforts to expand multidisciplinary healthcare in Newfoundland and Labrador.

Key Words: exercise referral and consultation, health promotion, preventive medicine

Introduction

Extensive research has demonstrated the effectiveness of physical activity (PA) and exercise in the prevention and treatment of chronic diseases, such as cardiovascular disease, diabetes, and cancer (1). Several high-level systematic reviews have identified risk reductions of 25–50% or more for most major chronic diseases when individuals meet the recommended 150 minutes per week of moderate-to-vigorous PA (2,3). In fact, evidence suggests that the health benefits of PA are often equivalent or superior to those associated with traditional pharmaceutical treatments, and that considerable health benefits can be associated with even small amounts of regular PA (2,4). Despite such overwhelming evidence, the most recent accelerometry data collected by the Canadian Health Measures Survey demonstrated that just 39% of Canadians accumulate enough PA to meet the recommendations offered by national PA guidelines (5).

In recent years, it has been suggested that physicians have an important role to play in PA promotion and chronic disease prevention within their patient populations (6). When trying to increase the PA levels of patients, physicians must consider that there are a number of barriers contributing to the high rates of inactivity. According to the literature, patients commonly cite lack of time, lack of enjoyment, and physical limitations as obstacles to PA participation (6). Although the most commonly reported approaches to PA promotion are interventions focusing on individual attitude and behaviour change, it is important to consider that PA participation is also impacted by a number of social and economic factors (7). Those with higher education levels, higher incomes, and higher status occupations are more likely to be regularly physically active, less sedentary, and less likely to experience adverse health outcomes associated with inactivity than those who are less advantaged (7). Thus, it is important to note that the factors

impacting patients' PA behaviours are not just individual or interpersonal in nature.

Nevertheless, the *Exercise is Medicine* literature highlights the potential for clinical PA counselling as a critical opportunity for eliciting lifestyle change and increasing PA levels (2,6). Despite the important role physicians play as a primary source of health information, the literature highlights inadequate levels of PA counselling among primary care physicians in Canada (8).

A recent study investigating the PA assessment and counselling habits of primary care providers in Quebec showed that only 21.6% of patients reported received PA counseling, even though most of the patients were inactive (8). A lack of education on PA counselling is one of the primary factors believed to be contributing to poor counselling rates among primary care physicians (8). In fact, medical students themselves recognize the need for broader training in PA counseling, as only 16% of Canadian medical students feel capable of prescribing PA upon graduation (9). Time constraints, complex comorbidities, and perceived lack of patient interest are also associated with poor physician PA counselling rates in Canada (2). Due to the barriers associated with physician PA counselling and exercise prescription, it has been suggested that Clinical Exercise Physiologists (CEPs) can play an important role in the healthcare system (2). Family physicians themselves have hypothesized that referral to qualified exercise professionals could help increase the chances of primary care patients realizing a long-term commitment to exercise and PA (10). Thus far, limited research has focused on the effectiveness of incorporating CEPs into healthcare teams, despite the success of clinical exercise prescription and PA promotion initiatives. For example, the *Green Prescription* program in New Zealand has demonstrated cost-effectiveness and population health benefits (11).

Objectives

To the best of the research team's knowledge, this study is the first to qualitatively investigate the integration of CEPs into primary healthcare teams. In recent years, a number of CEPs concurrently completing graduate studies in kinesiology at Memorial University participated in clinical placements at local family medicine clinics associated with their academic institution. Each of these CEPs worked with family medicine physicians who referred patients to them for exercise counselling services. This physician-CEP referral system presented the research team with a unique research opportunity, as CEPs generally do not have a role within healthcare. The objectives were to explore the experiences of CEPs and physicians during the integration of CEPs into healthcare teams; and identify challenges and opportunities that could impact broader implementation of this referral program.

Methodology/Methods

Theoretical Framework

For this qualitative description study, the Socio-Ecological Model (SEM) was used as the theoretical perspective to shape the generation of our semi-structured interview guide and facilitate data generation and analysis. The SEM is a systems model, which aims to explain health-related problems through the analysis of a multidimensional cause. It allows health researchers to investigate the interaction between, and interdependence of, factors within and across all levels of a health system (12). Contrary to most health behaviour theories, which focus predominantly on variables at the intrapersonal level, the SEM suggests that behaviour is shaped by factors at multiple levels, including organizational, community, and policy levels, in addition to intrapersonal (individual) and interpersonal level (13).

This study examined the CEP-physician exercise referral scheme piloted within the Faculty of Medicine at Memorial University.

Positionality

The principal investigator was uniquely positioned to conduct this research study as a CEP, a former kinesiology student, and a medical student with the desire to become a primary care physician. This individual's experience working as a CEP allowed him to develop an understanding of the issues facing exercise professionals working within healthcare settings, while his medical school training enabled him to appreciate the training of current (and future) physicians, as well as the nature of their interactions with patients. The primary investigator discussed his potential biases with the other members of the research team and worked to minimize such biases when designing questions to facilitate the semi-structured individual interviews and conducting data analysis following completion of data collection.

worked with the other members of the research team to minimize his potential biases when designing questions to facilitate the semi-structured interview process and conducting data analysis once data collection was complete.

Participants

Ethical approval was obtained from the host institution ethics committee prior to recruitment of participants (Health Research Ethics Board #: 2017.032). Four CEPs, who had completed a practicum in a local family medicine clinic, were invited and agreed to participate in this research study to discuss their experiences in the exercise referral program.

The CEPs (three males and one female) were between the ages of 23 and 26 years old, with between four months and three years of experience as a CEP at the time of the study.

Additionally, each of the participants had completed a Master of Science in Kinesiology degree

following their undergraduate studies in Kinesiology. Family physicians (and residents) who worked directly with the CEPs on the primary healthcare teams were also invited to participate, with five of the twelve individuals recruited for the study choosing to take part. The physicians ranged in age from approximately 40 to 65, with a wide range of academic backgrounds prior to entering the medical field. Each physician interviewed had at least 3-4 months of experience working with a CEP in their respective medical practice, which was located at one of two academic family medicine clinics in St. John's, NL. All participants were recruited via email and given the opportunity to review the informed consent form and ask questions before agreeing to participate.

Data Collection

The semi-structured individual interviews ranged from 25 to 45 minutes, and were designed to explore participant experiences with the placement of CEPs in family medicine clinics. Interview guides contained semi-structured, open-ended questions to ensure consistency throughout the data collection process. The questions included core questions and associated questions related to the central ideas of the study and its theoretical framework, as per best practice guidelines in qualitative research (14). Separate guides were designed to explore the various levels of the SEM for the CEPs and physicians. The questions aimed to understand the experiences of the CEPs as a member of the primary healthcare team, as well as the experiences of the physicians working with the exercise professionals. Furthermore, the questions were designed to highlight factors influencing the ability of the CEPs to practice effectively as a member of the healthcare team, while seeking to highlight any benefits or issues associated with the addition of the exercise professional to the healthcare team. Interviews, which were conducted by the primary investigator, were audio-recorded and transcribed verbatim. The

interviews with the CEPs were conducted in graduate student office space at the host institution, while interviews with physicians were conducted in private offices at their respective medical clinics.

Data Analysis

Key themes were identified using Lichtman's three Cs approach (i.e., coding, categorizing, concepts) to thematic analysis, which is content-driven and considered to be suitable for descriptive studies. The Lichtman approach involves studying data to extract codes, develop categories, and create broader concepts or themes that illustrate the main ideas represented (15). In this study, the thematic analysis process was informed by the SEM, which impacted the themes selected from the 91 pages of data produced by transcription. ATLAS.ti was used to help in the construction of codes and organization of data into categories and concepts.

The first step of data analysis involved performing an initial coding to identify recurring ideas expressed in the data. These codes were then revisited and modified to ensure they accurately represented the thoughts communicated by participants, resulting in a list of 121 codes. The next step focused on drafting a list of categories that grouped the existing codes in an organized manner. This process was repeated twice based on input from two members of the research team (i.e., JR and EC). The codes were subsequently grouped into 16 categories. The final stage of analysis involved refining the category list to highlight the major concepts. This process was revisited twice, resulting in a final list of 4 major concepts that best reflected the ideas expressed by participants.

Results

This section offers insight into four main themes that emerged from qualitative data analysis: (1) CEP-led advocacy for exercise referral in healthcare, (2) gaps in training and

regulation of CEPs, (3) unclear role for exercise professionals within healthcare, and (4) policy and organizational changes to improve exercise referral. These themes describe the experiences of CEPs and physicians during their participation in the exercise referral program, as well as the challenges and opportunities encountered that could impact the development of future exercise referral schemes. Overlap exists between a number of themes expressed in the data. The SEM, which was used to frame data collection and analysis, explains health-related problems through the analysis of a multidimensional cause. Thus, it is consistent with the literature that there could be interaction between the various thematic elements (12,13).

CEP-led advocacy for exercise referral in healthcare

The first theme highlighted the important role CEPs can play in advocating for their utilization within healthcare. Both physicians and the CEPs in the exercise referral program reported that the ability of the CEP to effectively communicate and advocate for their role on the healthcare team served as a catalyst for greater opportunities. The physicians, in particular, highlighted that if a CEP was outgoing and looked for opportunities to get involved in patient care, then the physician was more likely to avail of the service.

CEPs also emphasized the importance of working to demonstrate their value and integrate themselves into the healthcare team. In some cases, they felt a need to frequently educate physicians on their broad scope of practice. One individual stated, "I think that's the only way it's going to happen, if we're kind of like, 'We'll do it ourselves.'" For the CEPs, educating physicians was essential to creating opportunities for exercise referral. One individual described their approach to establishing the CEP role at the clinic by stating:

You make yourself valuable. The doctors are informed, they inform the patients because you've been clear from the beginning. Now that patient is aware of what they can get out

of the interaction. They come to you, it comes full circle because you show your professional, valuable role in this health care community.

When CEPs were able to effectively demonstrate their skillset to physicians and patients, it reinforced the value of the exercise referral service and contributed to a positive experience for all those involved. For example, one CEP explained that they worked to quickly demonstrate their value by establishing a training space in the medical clinic, stating:

We took a large office sized space, procured some equipment from separate contacts like physiotherapists that I had worked with in the past.... We got a hold of a treatment table, some dumbbells, some Therabands, some Swiss balls, some instability implements. We built a gym inside the family medicine clinic.

It was also important for the CEPs to advocate for the benefits of exercise to patients so that they would be receptive to lifestyle management as part of their treatment plans. For the most part, patients were open to working with CEPs when the service was introduced by family physicians. This dynamic was described by one CEP, who emphasized:

If you can clearly and poignantly relay how you are going to contribute to their health care system and their relationship with physical activity, and how they can use that to stay healthy, stay mobile, stay independent ... then the comfort level was fairly high.

The CEPs reported that although there was some initial hesitancy because the service was new and unfamiliar, the response from individuals who participated was positive. Both CEPs and physicians described some patients who changed the course of their illness “by their own lifestyle effort.” Although not all patients experienced such drastic changes in health outcomes, the physicians emphasized that for those who were willing to go talk to the CEP, “the experience was always positive... there was no negative response to the interaction.”

Gaps in training and regulation of CEPs

According to the CEPs interviewed, physician support was a very important factor in the success of the exercise referral program. However, physicians highlighted two primary concerns regarding the integration of CEPs into healthcare teams, which were in relation to patient confidentiality and CEP regulation. In expressing concerns with regard to CEP training on confidentiality and health ethics, one physician stated:

The kinesiologists went through privacy training modules ... so I had no concerns about them personally. The problem was they were in our team rooms. The resident has to report back to the physician about the patients they saw, the issues that are going on with every patient. So there would be patients that the kinesiologist wasn't seeing, and I just really felt ... they should only be seeing and hearing about the patients that they were seeing.

This physician went on to explain that although nurses and pharmacists are also in the team room, those professionals go through an ethics curriculum that is much more intensive than the privacy and confidentiality modules completed by the CEPs through the Regional Health Authority. To deal with these perceived inadequacies in CEP training, one of the physicians highlighted the need for an “ethics curriculum” within the kinesiology program at the host institution that could be adapted from the medicine, nursing, or pharmacy program.

It was also suggested that changes to the way exercise professionals are regulated could facilitate more effective integration into the healthcare team. Although it was explained that CEPs operate under a national regulatory body (i.e., the Canadian Society for Exercise Physiology, or CSEP), and are required to pass a national licensing exam, one physician suggested that a provincial licensing body and certification exam would increase their confidence

in exercise referrals. Another physician—with an educational background in exercise science—proposed that strengthening regulation of kinesiology at the provincial level, using a separate designation from the CSEP-CEP certification, could be beneficial in advancing the exercise profession. Although this physician recognized that CSEP functions as a regulatory body for CEPs, offering insurance and continuing education opportunities, they suggested that not all kinesiologists pursue the CEP certification. From their perspective, this limits the ability of those exercise professionals to practice within healthcare. In commenting on how regulating kinesiology (not just CEPs) at the provincial level would strengthen the profession, the physician said:

I think it would strengthen the profession because not all the kins are going to become CSEP certified depending on what they do. The CSEP certification is fantastic, and you can throw in the Strength & Conditioning specialist on top of that. You can get all these credentials. So it helps the individual, it doesn't necessarily help the overall profession. And then you've got a physician that you're trying to get refer to you, and now you have to sell yourself and let them understand what a CEP is.

This physician suggested that difficulties integrating exercise professionals into healthcare have contributed to many undergraduate students viewing the profession as a stepping-stone or a “feeder program” to other better regulated and better compensated professions, such as physiotherapy and medicine.

Unclear role for exercise professionals within healthcare

The role for exercise professionals in healthcare was not clearly defined in NL. Furthermore, the potential clinical applications of exercise referral/prescription were not clearly understood by the physicians with whom the CEPs were working. One of the first CEPs to

participate in the referral program described this lack of understanding, stating: “I would say there was... a broad gap in knowledge of what we were despite repeated attempts to educate”.

The physician with an exercise science background suggested that there are a number of barriers to creating a more clearly defined role for exercise professionals in healthcare. When dealing with patients with multiple comorbidities, some of the doctors may have concerns that the scope of practice for CEPs doesn't allow them to manage complex medical issues.

Kinesiology is still seen as a relatively new profession compared to other more established ones within healthcare. Thus, it was suggested that without a clear understanding of the role of CEPs or their training and capabilities, physicians may be hesitant to refer to them for chronic conditions. Furthermore, it was suggested that physicians may not understand how CEPs are different from other kinesiologists who do not have the same training for working with clinical populations.

The scope of practice to which the CEPs were able to practice generally depended on the physicians from whom they received most of their referrals. For example, the physician with an exercise science background reported that they encouraged CEPs to work with a wide variety of medical conditions. In describing their range of exercise referrals to CEPs, this physician said:

My personal experience with them was I knew what they were there for, I knew their scope. I was comfortable with what they could do. So I would refer for education on walking, stretching, strengthening, balance training, and for motivating. A person says, “Yeah, I'm walking.” Ok, very good, but talk to the kinesiologist [CEP] about how fast you should be walking, how often, how to check your heart rate and all these sorts of things so they can get that feedback.

In reflecting on their clinical experiences, multiple CEPs reported feeling under-utilized. It was suggested by the CEPs that such underutilization seemed to be due to the fact that most physicians were not sure how to utilize their skillset. Another recurrent issue for CEPs related to physicians' lack of understanding regarding the distinction between their scope of practice and that of physiotherapists. One physician was quite frank in discussing this issue, stating:

The kinesiologist [CEP] present I think would have decreased my physiotherapist referrals. I mean, there were certainly those who I would refer to both and those who I would send straight to physiotherapy, but there was a subgroup of my kinesiology referrals which now, without a kinesiologist, go to a physiotherapist. But with a kinesiologist, I found I was satisfied with their care and it didn't require a PT ... I do not have a very good understanding of the distinction between kinesiology and physiotherapy.

In reflecting on the unclear role for exercise professionals within healthcare, participants suggested that—moving forward—CEP's should be involved in interprofessional education initiatives aiming to educate current and future physicians on their clinical scope of practice.

Policy and organizational changes to improve exercise referral

The participants in this study highlighted a number of systemic barriers within healthcare impacting the effectiveness of exercise referral. Specifically, it was suggested that changes focusing on billing and insurance coverage for exercise referrals and exercise education for physicians could improve the ability of medical professionals to deliver this service. In reflecting on these barriers to exercise referral and counselling, one physician stated:

The way it's set up in Newfoundland, you actually can't bill unless there is a complaint ... if somebody came in for primary prevention, that's not what we're about. I mean, as

physicians, we are about treating illness. You have to have an illness code. So if all my codes were 780—no illness diagnosed—I'd be getting questions from MCP wondering why I am billing people for not doing anything.

Although physicians stated that there have been recent changes to coding for chronic disease management, reflecting the fact it takes more time to deal with complex illnesses, they also highlighted the need for a code specific to exercise and/or lifestyle interventions to facilitate greater opportunities for CEP involvement in patient care.

Another important consideration highlighted was the need for insurance coverage for exercise referrals. Physicians suggested that many patients would have been unable to afford the service offered in this program had it not been free. In commenting on billing and the cost associated with exercise referrals for patients, one physician stated:

It's kind of that physio model right now where physicians are happy to refer people to a physiotherapist. But, you know, if the patient doesn't have insurance ... they know it's a financial barrier for some people. I think they would feel the same with kinesiology once they knew what they could do, and who the person was and their value. They would send that referral. If there was no financial barrier, they'd be in.

Participants stated that addressing the lack of exercise referral specific coding and insurance coverage will be important to expanding the role of CEPs within healthcare. A number of physicians suggested that healthcare and government leaders must demonstrate a commitment to improving preventive care within the NL medical system. They also proposed that broader support for primary and secondary prevention programs could help create opportunities for changes to billing codes and insurance coverage for exercise referral within the province.

Educating physicians on how to better utilize CEPs was also identified by participants as essential to improving the effectiveness of exercise referral. The idea that exercise education should be expanded in both undergraduate and postgraduate medical training was reiterated by physicians and CEPs alike. One physician recommended adding content related to the role of exercise professionals to existing interprofessional education in undergraduate medical school. It was also suggested that recent changes at the host institution should allow for greater discussion of exercise within the core curriculum. With regard to the importance of educating about exercise and the role of CEPs in undergraduate and postgraduate curricula, one physician stated:

You could go to an academic half-day and give a lecture ... You could look at integrating into the curriculum in undergraduate. You could talk about finding a way for the clerks to gain exposure to kinesiologist clinics. You know, these are all opportunities, but as post-grad med ... when you as a clinician or as a resident have a patient and you need to help them and there is a kinesiologist sitting next to you who can help you do that, and it's not going to cost anyone anything, then it's like, "well that's a no brainer." Right? And it's not the way that it's typically been done ... all the barriers come down at that point. ... I think if that were able to continue and be done on a consistent basis, that would be excellent.

Evidently, this statement highlights the importance of not only integrating exercise education into the formal undergraduate and postgraduate curricula, but also of creating opportunities for interaction with CEPs so that medical learners can better understand their scope of practice.

Discussion

The current study explored the experiences of CEPs and physicians during the integration of CEPs into a primary healthcare team in NL, and identified challenges and opportunities that could impact future exercise referral initiatives. Our findings reflected multiple levels of the

SEM of health systems and highlighted a number of factors that had an important impact on the experiences of those participating in the exercise referral program. Specifically, the results highlighted the important impact of individual factors related to the CEPs, organizational influences on exercise (and medical) professional training and regulation, and policy factors influencing billing codes and insurance coverage for exercise referral services. While participants largely highlighted a positive experience, they also underlined potential areas for improvement to enable the broader integration of CEPs into primary healthcare.

At the intrapersonal level of the SEM, issues were identified regarding the role exercise professionals play in advocating for greater use of exercise referral services. It was recognized that CEPs felt a need to advocate for more opportunities to work with patients, as their role within healthcare was not clearly defined or understood. It became apparent that the response of medical professionals to the exercise referral service was likely impacted by the ability of the CEPs to highlight their value, as physicians had a lack of understanding regarding the scope of practice of CEPs. Confusion and uncertainty about the role of CEPs was identified as an important barrier to their integration into the primary healthcare team. This is consistent with literature prior suggesting that the role of exercise professionals is not well understood within Canadian healthcare (16). Additionally, a lack of public knowledge and professional awareness about the educational background, level of knowledge, and practical skills of exercise professionals has been shown to contribute to reduced utilization of exercise referral services (16). A number of CEPs reported in our study feeling underutilized by physicians because of a lack of understanding of their role despite repeated attempts to educate. The need for CEPs to advocate for their own usage and the lack of understanding other professionals hold regarding their scope of practice pose a number of practical implications for future exercise referral

programs in NL. Moving forward, efforts should be made to ensure other healthcare professionals have a strong understanding of the skillset and scope of practice of CEPs so that they can be effectively integrated into the patient's healthcare team.

At the organizational level of the SEM, the need for improved regulation of exercise professionals was identified as a primary issue. Participants suggested that improving regulation of exercise professionals (particularly at the provincial level) could lead to growth of the kinesiology field. Additionally, it was suggested that this could increase awareness regarding the role of exercise professionals within healthcare. Currently, the CSEP is the regulatory body for exercise professionals in Canada who have completed an exercise science degree and additional training preparing them to work with clinical populations (17). The CEP designation is regulated through the CSEP organization, and promotes clinical practice focusing on the safe adaptation of exercise-based activities for patients (18). Unfortunately, many of the physicians interviewed did not demonstrate a strong understanding of the CEP designation or its associated skill set, which allows CEPs to provide exercise supervision, counselling, and lifestyle education to patients. This lack of familiarity with the CEP profession serves as a barrier to widescale implementation of exercise professionals into primary healthcare teams in NL. In considering the support (and rationale) raised for provincial regulation of exercise professionals, there could be value in advocating for a regulatory body for clinical kinesiologists—separate from CSEP—similar to the one that exists in Ontario. In Ontario, kinesiology is a regulated profession under the *Regulated Health Professions Act* of 1991. Although the *Registered Kinesiologist* designation differs from the CEP certification in terms of scope of practice, healthcare professionals in Ontario have suggested that provincial regulation of kinesiology has provided more opportunities for integration into multidisciplinary healthcare teams. Over time, provincial regulation has

increased career viability for kinesiologists, while allowing for improved holistic care for patients within the Ontario healthcare system (16). Canadian exercise science researchers still maintain that CSEP is the organization most capable of overseeing the training and professional regulation of clinical exercise professionals across the country (19). However, exploring the possibility of a provincial regulatory process for kinesiologists in NL (as suggested by our study participants) could help raise awareness about clinical exercise referral and expand opportunities for exercise professionals within healthcare.

Another issue raised by CEPs and physicians in relation to the organizational level of the SEM was the need for greater exercise education for medical students and residents within academic medical institutions. Although a majority of Canadian medical students perceive competence to prescribe PA to patients as either moderately important or important to their future practice, just 16% feel capable of doing so upon graduation (9). Similarly, a majority of family residents demonstrate low knowledge of Canadian PA Guidelines, and low self-reported competence prescribing exercise to patients with chronic disease (20). The lack of physician PA knowledge highlighted by participants in this study is consistent with trends reported in the literature. Evidently, this gap in physician training and knowledge underscores the important role exercise professionals can play in counselling patients on exercise and PA within primary healthcare. Over time, improving exercise education for physicians should improve their confidence to engage in conversations with patients about exercise, which may create more opportunities for referral to exercise specialists. In fact, it has been shown in the literature that exercise education initiatives can improve physicians' confidence to provide PA information to patients, provide PA advice, and identify which patients would benefit from referral to exercise professionals up to 3 months post-intervention (21). This confidence in counselling on PA is

particularly important for physicians working in rural areas where access to a registered exercise professional might not be possible. Future research should investigate the impact of exercise education initiatives for physicians (and medical students) on long-term exercise referral confidence and behaviour, and PA counselling.

At the policy level of the SEM, billing codes and insurance coverage were highlighted as major barriers to expanding exercise referral services in NL. A number of physicians commented on the fact that our current payment model is about ‘treating illness’, and that there are considerable difficulties associated with billing for primary prevention. Furthermore, they stated that local insurance companies do not provide coverage for the cost of exercise counselling sessions from CEPs or kinesiologists. In reflecting on the sustainability of exercise referral initiatives in NL, a number of physicians suggested that governments are less likely to invest in prevention-based programs because they pay off in the long-term rather than the short-term. In 2016, the NL government released *The Way Forward* strategic plan outlining its vision for sustainability and growth. Although the government committed to increasing PA by seven percent and reducing obesity by five percent by 2025, it neglected to include a long-term plan detailing how it intended to achieve these goals (22). Thus far, there have been no reported improvements in these areas. Evidently, policy level changes to promote exercise referral within primary care can have a positive effect on both healthcare spending and population health outcomes (11,23,24).

A number of limitations exist for the present study. First, the results are based on data collected from only nine participants (4 CEPs and 5 physicians) due to the purposeful sampling technique used and the small population eligible to participate. Only 4 CEPs had participated in the program being studied, and multiple efforts were made to recruit physicians who had been

involved in the program at the host clinics. Additionally, the referral program studied operated at just two sites (i.e., clinics), which were both located in a small city in Atlantic Canada with a poorly developed network of exercise professionals. Thus, the results of this study may not be generalizable to larger urban centres across Canada, particularly those with existing relationships between the exercise professional and healthcare communities. Nevertheless, the research team believes that the findings offer value for future exercise referral schemes—particularly those in small cities and rural areas—due to the unique experiences and difficulties highlighted relating to efforts to integrate CEPs into primary healthcare teams. The discussion regarding regulation of exercise professionals at a regional level is also an important one, and the commentary offered by the CEPs and physicians in this study should have an impact on conversations pertaining to the future of the kinesiology profession in NL. Moving forward, research focusing on the effectiveness of CEP referral programs in improving patient PA behavior, physician confidence in exercise referral and counselling, and frequency of physician referral to CEPs would be useful in assessing the value of exercise referral programming in healthcare. Additionally, future research should investigate changes in patient health and healthcare spending outcomes associated with the trial integration of CEPs into local primary healthcare clinics. The results of such research would allow for a better understanding of the potential implications of widescale integration of CEPs into primary healthcare clinics across the province. Finally, it is necessary to gain a better understanding of the potential impact of exercise education initiatives on physician and medical student confidence to perform exercise counselling and make referrals to CEPs. As efforts are made to expand exercise referral programming within healthcare, it is essential for physicians to understand the important role exercise professionals can play in a multidisciplinary healthcare setting.

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Chapter 5: Conclusion

This qualitative research study was guided by the Socio-Ecological Model (SEM), which is a systems model that aims to explain health-related problems through a multidimensional cause as opposed to the single cause explanations offered by many traditional theories (Kumar et al., 2014). Contrary to most health behaviour theories, which focus predominantly on variables at the intrapersonal level related to attitudes, the SEM suggests that health-related behaviours are shaped by factors at multiple levels, including organizational, community, and policy levels, in addition to intrapersonal (individual) and interpersonal levels (McLeroy et al., 1988). Given that this theoretical framework has commonly been used in the literature to explain interactions between different levels of the healthcare system, it has been a valuable tool in providing insight into the challenges and opportunities impacting exercise referral in the St. John's area.

This research study highlighted a number of important findings that could have practical implications for primary healthcare and population health in the years to come. First of all, participants highlighted the importance of CEP-led advocacy for greater uptake of exercise referral initiatives within our healthcare system. Both the CEPs and physicians suggested that the onus is currently on exercise professionals to demonstrate their value within the primary healthcare setting. If the CEP is able to demonstrate value to the physician and his or her patients, participants suggested that broader integration into the healthcare system would become possible. It should be noted, however, that a lack of physician understanding regarding the role of CEPs in healthcare—and how their scope differs from other professionals such as physiotherapists—indicates a need for better education of medical students and physicians on PA and the role of exercise professionals. If physicians were to gain a better understanding of PA counselling and the role CEPs could play on a multidisciplinary team, this might facilitate more

effective PA/exercise referral and reduce the pressure being placed on exercise professionals to prove their value within the healthcare system.

This study also highlighted the lack of understanding existing among physicians with regard to the scope of practice of exercise professionals. Despite repeated efforts to educate them on the expertise and skillset of the CEPs, there sometimes appeared to be a lack of clarity with regard to how to best utilize exercise referral to the exercise professionals clinically. Evidently, a lack of exercise education in medical curricula was highlighted as another potential barrier to effective use of the exercise referral service by family physicians. It was suggested that improving exercise education initiatives for current and future physicians would likely impact a physician's comfort level with and understanding of the many indications for referral to an exercise professional. Currently, there are a number of local and national initiatives aiming to improve exercise education within medical schools in hopes of improving physician exercise counselling and exercise referral. Further research must be performed in the years to come to measure the impact of changes to exercise education within medical schools on physician referral to qualified exercise professionals.

Additionally, it was suggested that making changes to the regulation of exercise professionals so that clinical kinesiologists are more tightly regulated at the provincial level, rather than the national level, could improve physician understanding of the kinesiology profession. A number of participants believed that regulating clinical exercise professionals locally could increase the confidence of other healthcare professionals to make exercise referrals, as the regulatory process would be better understood and trusted. Although Ontario currently employs registered kinesiologists with specific training that is tailored towards clinical practice in healthcare, there is currently no literature available suggesting that this designation is more

effective than the CEP designation in preparing exercise professionals for practice within primary care settings. Nevertheless, according to the literature, healthcare professionals in Ontario have suggested that regulating the kinesiology profession at the provincial level has allowed for increased multidisciplinary collaboration (Braniff et al., 2012). Legislation in the province allows graduates of an accredited kinesiology undergraduate program to complete a post-program process of certification to deliver healthcare services within a designated scope of practice. The designation differs from the CEP certification, as it focuses on the “assessment of human movement and performance and its rehabilitation and management”, and does not highlight the same potential for involvement in the management and treatment of acute and chronic conditions or functional impairments (Braniff et al., 2012). However, the regulation of the kinesiology profession means that one must be registered under the College of Kinesiologists of Ontario in order to practice in kinesiology and use the title ‘kinesiologist’. This process ensures a specific baseline of standards to provide adequate, trained, and competent professionals, while also formalizing the scope of kinesiologists so that the profession is better understood by other healthcare professionals (College of Kinesiologists of Ontario, 2020). Exploring a provincial regulatory process for kinesiologists in NL similar to Ontario—as suggested by our study participants—could help raise awareness about clinical exercise referral and improve opportunities for exercise professionals within healthcare. Additionally, it may help reduce confusion surrounding the certifications offered to exercise professionals and the extent to which each certification prepares the individual to work with clinical populations. Nevertheless, it should be noted that Canadian exercise science researchers maintain that CSEP is the organization most capable of overseeing the training and professional regulation of clinical exercise professionals across the country (Warburton & Bredin, 2009).

Finally, physicians and CEPs highlighted a pressing need for policy changes at the provincial level to allow for greater use of exercise referral services within healthcare. A number of physicians stated that the way the fee structure is currently set up in Newfoundland and Labrador for physicians inhibits them from billing for primary prevention. In order to receive compensation for a clinical encounter, there must be an illness code, the physicians suggested. Additionally, there is a need for insurance coverage of exercise referral services to allow physicians to send patients to qualified exercise professionals. The service offered in this pilot study was free of charge to patients, but future iterations of this initiative would likely require payment for the CEPs. To ensure sustainability for exercise referral programs, we must find a way for physicians to bill for referral to exercise professionals, and for patients to receive insurance coverage so that they will not have to pay out of pocket for this service. In reflecting on the way our medical system is currently structured, one physician in particular lamented the lack of funding local governments put into initiatives targeting primary prevention of chronic disease. Moving forward, exercise professionals, physicians, healthcare administrators, and policymakers within government must engage in constructive dialogue regarding the potential benefits of integrating CEPs into primary healthcare teams across the province, in order to help combat the growing chronic disease epidemic. Research suggests that 63% of NL residents have at least one chronic disease, with 88% of seniors in the province having one or more chronic diseases. This is particularly concerning as 31% of the population is predicted to be over the age of 65 by 2035. Due in large part to the high chronic disease rates in the province, the government is spending \$5,087 per person on healthcare, which is \$1,127 more than the Canadian average (Government of Newfoundland and Labrador, 2015). Evidently, an effective system for exercise

referral within healthcare could provide clinicians in the province with another tool to combat the chronic disease epidemic.

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Appendix A: Case Report on CEP Clinical Placement

Case Report (Jared Ryan—December 2016)

The subject of the study was a 22 year-old Master of Science in Kinesiology student from Memorial University, a CEP under the Canadian Society for Exercise Physiology (CSEP). The CEP had previously completed a Bachelor of Kinesiology honours degree, and had considerable experience working in rehabilitation and exercise programming. He participated in a 12-week placement as a CEP in a family medicine clinic located in a small community on the Avalon Peninsula of Newfoundland and Labrador. The placement, which ran from September to December, was offered as an independent research course through the university and counted toward the requirements for the master's program. It was supervised by a family physician at the clinic (who is also an Assistant Professor of Family Medicine at the university) and an exercise physiology professor from the kinesiology program.

The student and two of his academic supervisors from the university's kinesiology program met with members of the Faculty of Medicine before the academic semester to discuss the details of the placement, including weekly hours, responsibilities at the clinic, and the development of potential research projects. A subsequent meeting between the student, the supervising physician, and other members of the clinic staff took place during the first week of the semester. The clinic staff discussed the unique opportunities presented to researchers within the small community, as the "close-knit" environment had previously allowed for effective collaboration between the clinic, the nearby school, and local social groups. Consequently, the clinic staff highlighted the engagement of youth and older adults in PA promotion initiatives as an important goal for the student during his placement. The roles of the student CEP over the course of the placement could be divided into two categories: clinical practice and community

outreach/education.

Before implementing weekly clinic hours at the medical center, the student developed several resources that aimed to educate the general public about the role of the CEP in primary healthcare and the free services he would be offering in the community. Recruitment posters were created and subsequently placed within the family medicine clinic and shared with community members through the local parish newsletter. Before the CEP clinic hours began in late September, the student developed a number of documents outlining exercise and stretching protocols that could be prescribed to potential patients. He also reached out to the Director of *Exercise is Medicine (EIM) Canada* to obtain resources for exercise prescription in clinical settings, including the official EIM prescription pads. Furthermore, the student was able to acquire Thera-Band resistance bands from the university, which enabled him to prescribe resistance-training programs to clients to help manage their respective health conditions and/or injuries. The student opened regular clinic hours on Wednesday afternoons and met with an average of one to two clients per week from late September until early December. On several occasions there were no clients booked for counselling with the CEP. The student felt as though there could be several explanations for the difficulties in recruiting patients for his clinic hours. First of all, recruitment issues could be related to a lack of understanding or a sense of discomfort among the general public with regard to the role of the CEP within the healthcare team. CEPs and kinesiologists have not traditionally been a part of primary healthcare in Newfoundland and Labrador, thus members of the community might not have felt comfortable consulting with someone they perceived as an “alternative” healthcare professional. This could also explain some of the difficulties the CEP experienced with regard to client retention. Additionally, the student felt as though the lack of patients could have potentially resulted from a

misunderstanding on behalf of the staff physicians with regard to the scope of practice of CEPs. Despite the fact that the student suggested he was capable of, and interested in, performing healthy lifestyle counselling and education for patients with chronic disease, he noted that all of his clients resulted from referrals for injuries requiring rehabilitative exercise. Although CEPs can serve an important role in helping an individual recover from injury, it is important to remember that their role within the healthcare system should extend beyond the prescription of rehabilitative stretches/exercises as a substitute for physiotherapy. Nevertheless, patients who participated in counselling sessions with the CEP reported gaining valuable insight with regard to the importance of regular PA in managing their respective conditions. The majority of clients expressed interest in receiving additional counselling from the CEP in the future, although there were often issues associated with booking follow-up appointments due to their work and family commitments.

The community outreach component of the CEP's placement involved attempting to develop and implement PA promotion programming for seniors and youth in the community. In an attempt to recruit seniors for a weekly low-impact aerobic exercise program, the student visited a Bingo event taking place in the local community center and spoke to those in attendance about the importance of regular PA and the free programming he was hoping to offer. The seniors in attendance asked questions about the potential programming and expressed interest in getting involved, however, nobody showed up to the first class later that week. The literature reports low PA rates among older adults in Canada and suggests that there are many barriers to changing the PA behaviour of individuals within this age group (Colley et al., 2018; Justine et al., 2015). The difficulties the CEP experienced with regard to the recruitment of seniors prompted him to perform research with regard to PA promotion within the older adult

population. He was then able to develop an outline for a future PA promotion project based on the cognitive-behavioural techniques highlighted in the literature. The CEP also visited the local school to discuss with teachers and staff possible PA promotion initiatives for youth in the area. The group expressed considerable interest in a lunchtime exercise and fitness education session for junior high students. The CEP then visited several classes within the school to recruit participants for the fitness program. The lunchtime program began in mid-October and will likely continue for the remainder of the school year. The students have shown considerable interest in learning more about exercise training; thus far, there has been an average of 8-10 students in attendance each week. The PA promotion initiative is currently limited to just one exercise class per week, but opportunities exist for greater integration of CEPs into the school setting within the small community. It is interesting to note that the program appears to be more than just a PA opportunity for the children involved; the CEP seems to serve as a mentor for some of the students with regard to academics and life outside of school.

Case Discussion

This report demonstrates the potential for effective integration of CEPs into primary healthcare teams in Canada. The student felt as though issues with participant recruitment could be reduced by better educating physicians on the broad scope of practice of CEPs and by educating potential clients on the important role of CEPs within the healthcare system. If CEPs are provided opportunities to perform lifestyle counselling in addition to rehabilitation-based exercise prescription, their effectiveness within primary healthcare might increase. It has been suggested in the literature that stereotypes and predispositions previously existed with regard to the potential impact of exercise science on public health, illustrated by the fact that the medical community often resisted attempts to utilize exercise as a medication (Kohl et al., 2012; Sallis,

2011). It should be noted that there currently seems to be much greater interest among healthcare professionals with regard to innovative public health efforts aimed at physical activity (PA) promotion and chronic disease prevention (i.e., the *Exercise is Medicine (EIM)* movement). In order to reduce the incidence of chronic disease in Canada, referral to exercise professionals should be considered an effective alternative to traditional treatments moving forward. In fact, it has been suggested that the health benefits of PA are often equivalent or superior to those of medication-based treatment (Naci & Ioannidis, 2013). In considering the role of CEPs in community outreach and education, numerous studies within PA promotion literature have demonstrated the potential for cognitive-behavioural techniques in the development of effective PA interventions (Rejeski et al., 2009; Stewart et al., 2001). Future cognitive-behavioural PA initiatives targeting older adults should include counselling programs that focus on educating participants on the importance of regular PA and associated health benefits, as well as exercise sessions supervised by a CEP. This case study demonstrates that there are a number of challenges that must be considered when integrating a CEP into a community health clinic. It is important to emphasize the major role that family medicine clinics play in small communities across Canada. In order to maximize the effectiveness of CEPs in primary healthcare, PA promotion initiatives and exercise referral schemes must be carefully designed so as to appeal to the members of the general community.

Appendix B: Informed Consent Document



Consent to Take Part in Research

TITLE: Assessing the Effectiveness of Integrating Exercise Physiologists into Primary Healthcare Teams in Newfoundland, Canada

INVESTIGATOR: Jared Ryan

SUPERVISOR: Dr. Erin McGowan

COLLABORATORS: Dr. Duane Button, Dr. Erin Cameron, & Richard Buote

You have been invited to take part in a research study. Taking part in this study is voluntary. It is up to you to decide whether to be in the study or not. You can decide not to take part in the study. If you decide to take part, you are free to leave at any time.

Before you decide, you need to understand what the study is for, what risks you might take and what benefits you might receive. This consent form explains the study.

Please read this carefully. Take as much time as you like. If you like, take it home to think about for a while. Mark anything you do not understand, or want explained better. After you have read it, please ask questions about anything that is not clear.

The researchers will:

- discuss the study with you
- answer your questions
- keep confidential any information which could identify you personally
- be available during the study to deal with problems and answer questions

1. Introduction/Background:

Regular physical activity (PA) is consistently associated with the management and/or prevention of chronic diseases. The economic burden of physical inactivity and related health concerns is estimated to be \$29 billion per year; consequently, innovative public health efforts aimed at physical activity promotion and chronic disease prevention, such as the Exercise is Medicine movement, are of utmost importance. Although it has been suggested in the literature that physicians are in an ideal position to counsel patients on their PA habits, statistics regarding counselling practices in healthcare present cause for concern. Recently it has been suggested that Certified Exercise Physiologists (CEPs)¹ can play an important role in an integrated approach to PA promotion, yet limited research has focused on the effectiveness of incorporating CEPs into primary healthcare teams. This study will evaluate the effectiveness of integrating CEPs into family medicine clinics in Newfoundland. It will use a qualitative research methodology (involving individual interviews) to explore the subjective experiences of the exercise physiologists and the healthcare professionals with whom they have worked (e.g., family physicians, nurses).

2. Purpose of study:

The objectives of this research study are to: (1) explore the experiences of Certified Exercise Physiologists (CEPs) and members of the healthcare team (e.g., physicians, nurses) during the integration of CEPs into primary healthcare settings; and (2) identify the challenges and opportunities encountered by the CEPs and the healthcare team that could potentially impact future exercise referral schemes in clinical settings.

3. Description of the study procedures:

You are being invited to take part in a semi-structured, open-ended individual interview lasting roughly 30-60 minutes. You will be offered the opportunity to participate in the interview over the phone or via FaceTime or Skype if you are unable to make it to the university. Interview questions will be designed to explore your experiences with regard to the placement of CEPs in family medicine clinics. Interviews will be audio-recorded and transcribed verbatim. Transcripts will be emailed or printed and delivered to you for verification approximately 1-2 weeks after completion of the interview. It is expected that you will verify the transcript and report back to the research team as quickly as possible (i.e., within 1-2 weeks after receiving the transcript).

¹ As of November 2019, the Canadian Society for Exercise Physiology (CSEP) has changed the name of its CEP certification from “Certified Exercise Physiologist” to “Clinical Exercise Physiologist”. The informed consent documents, recruitment email templates, and individual interview guides included in this appendices section were published prior to November 2019 and thus make reference to the previous title (CSEP, 2020).

4. Length of time:

You will be expected to participate in one individual interview that will last 30-60 minutes at a place of your convenience, and verify the transcripts. This process of verification should only take roughly 30 minutes to an hour to complete.

5. Possible risks and discomforts:

You will encounter no physical or psychological/emotional risks due to your participation in this study. There will be no financial risks to you or the organizations with whom you are employed. If you are a CEP still currently enrolled as a student at Memorial University, your decision to participate or not to participate in this study will in no way affect grading for any future courses taken in your respective program. If you are a healthcare professional who has been invited to participate in this study, information regarding your decision to participate or not to participate will not be shared with Memorial University faculty or members of the medical community (i.e., colleagues).

6. Benefits:

It is not known whether this study will benefit you.

7. Liability statement:

Signing this form gives us your consent to be in this study. It tells us that you understand the information about the research study. When you sign this form, you do not give up your legal rights. Researchers or agencies involved in this research study still have their legal and professional responsibilities.

8. What about my privacy and confidentiality?

Protecting your privacy is an important part of this study. Every effort to protect your privacy will be made. However it cannot be guaranteed. For example we may be required by law to allow access to research records.

When you sign this consent form you give us permission to

- Collect information from you
- Share information with the people conducting the study
- Share information with the people responsible for protecting your safety

Access to records

The members of the research team will see study records that identify you by name.

Other people may need to look at the study records that identify you by name. This might include the research ethics board. You may ask to see the list of these people. They can look at your records only when supervised by a member of the research team.

Use of your study information

The research team will collect and use only the information they need for this research study.

This information will include your

- age
- sex
- information from study interviews

Your name and contact information will be kept secure by the research team in Newfoundland and Labrador. It will not be shared with others without your permission. Your name will not appear in any report or article published as a result of this study.

Information collected for this study will be kept for five years.

You will have the ability to withdraw from the study, without consequence, up until one week after verification of your respective interview transcript. If you decide to withdraw from the study, the information collected will be destroyed.

Information collected and used by the research team will be stored in the office of Dr. Erin McGowan at Memorial University (PE 2022b). Dr. McGowan is the person responsible for keeping it secure.

Your access to records

You may ask the principal investigator, Jared Ryan, to see the information that has been collected about you.

9. Questions or problems:

If you have any questions about taking part in this study, you can meet with the investigator who is in charge of the study. That person is: Mr. Jared Ryan

Jared Ryan: Call (709) 687-6877 or email jmr683@mun.ca

Or you can talk to someone who is not involved with the study at all, but can advise you on your rights as a participant in a research study. This person can be reached through:

Ethics Office at 709-777-6974

Email at info@hrea.ca

This study has been reviewed and given ethics approval by the Newfoundland and Labrador Health Research Ethics Board.

After signing this consent you will be given a copy.

Signature Page

Study title: Assessing the Effectiveness of Integrating Exercise Physiologists into Primary Healthcare Teams in Newfoundland, Canada

Name of principal investigator: Jared Ryan

To be filled out and signed by the participant:

Please check as appropriate:

I have read the consent form.	Yes { }	No { }
I have had the opportunity to ask questions/to discuss this study.	Yes { }	No { }
I have received satisfactory answers to all of my questions.	Yes { }	No { }
I have received enough information about the study.	Yes { }	No { }
I have spoken to Mr. Ryan and he has answered my questions	Yes { }	No { }
I understand that I am free to withdraw from the study	Yes { }	No { }
<ul style="list-style-type: none"> • at any time • without having to give a reason • without affecting my future care [i.e. future grades, student status, and/or employment opportunities within healthcare, etc.] 		
I understand that it is my choice to be in the study and that I may not benefit.	Yes { }	No { }
I understand how my privacy is protected and my records kept confidential	Yes { }	No { }
I agree to be audio recorded.	Yes { }	No { }
I agree to take part in this study.	Yes { }	No { }

Signature of participant

Name printed

Year Month Day

To be signed by the investigator or person obtaining consent

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

Signature of investigator

Name printed

Year Month Day

Telephone number: _____

Appendix C: Recruitment Email Templates

- **Graduate student/CEP recruitment email script:**

Hello _____ (insert student's name),

My name is Jared Ryan and I am a Master's of Science in Kinesiology student at Memorial University. As part of my research, I am exploring the integration of Certified Exercise Physiologists (CEPs) into family medicine clinics in Newfoundland. I am planning to conduct interviews with kinesiology graduate students from Memorial who have previously completed a practicum as a CEP in a local family medicine clinic.

I am reaching out to see if you might be interested in participating in a brief interview regarding your experience working as a CEP during the clinical placement. The main objective of this study is to identify the challenges and opportunities encountered by CEPs and healthcare professionals that could potentially impact future exercise referral schemes within our healthcare system. The interview would likely be 30-60 minutes in duration, and all information would be kept anonymous and confidential. The interview would be audio-recorded and it would serve as part of a research study that has been reviewed and given ethics approval by the Newfoundland and Labrador Health Research Ethics Board. If you have any questions please feel free to contact me via email (jared.ryan@mun.ca) or by phone at (709) 687-6877.

Sincerely,
Jared Ryan

- **Medical professional email script:**

Dr./Mr./Mrs. _____,

My name is Jared Ryan and I am a Master's of Science in Kinesiology student at Memorial University. I am currently exploring the integration of Certified Exercise Physiologists (CEPs) into family medicine clinics in Newfoundland as part of my thesis research, and I am planning to conduct interviews with healthcare professionals to investigate the effectiveness of the physician-CEP referral scheme.

In recent years, students from the kinesiology graduate program have participated in placements as CEPs at the Health Sciences Centre and the Shea Heights Community Health Centre. Ms. Barbara Morrissey provided me with a list of staff working at each of these locations, and it is my understanding that you may be involved with the referral of patients to and/or supervision of these students during their placements.

I am reaching out to see if you might be interested in participating in a brief interview regarding your experience working with CEPs during their integration into the primary healthcare team. The main

objective of this study is to identify the challenges and opportunities encountered by CEPs and healthcare professionals that could potentially impact future exercise referral schemes within our healthcare system. The interview would likely be 30-60 minutes in duration, and all information would be kept anonymous and confidential. The interview would be audio-recorded and it would serve as part of a research study that has been reviewed and given ethics approval by the Newfoundland and Labrador Health Research Ethics Board. If you have any questions please feel free to contact me via email (jared.ryan@mun.ca) or by phone at (709) 687-6877.

Sincerely,
Jared Ryan

Appendix D: Individual Interview Guides

- **Research objectives:**

- The main research objectives of this study are to: (1) explore the experiences of Certified Exercise Physiologists (CEPs) and members of the healthcare team (e.g., physicians) during the integration of the CEP into primary healthcare settings; and (2) identify the challenges and opportunities encountered by the CEPs and the healthcare team that could potentially impact future exercise referral schemes.
-

- **General questions: (Need to get demographic information)**

1. Please describe your educational background.
2. Please describe your current occupational status (i.e., Are you currently involved in the healthcare system? If so, in what capacity?)
3. When did you graduate from your respective professional program? (I.e. When did you graduate from the Bachelor of Kinesiology program? OR When did you graduate from medical school?)

- **Graduate student CEPs – Themes to be explored:**

Prompts: Can you tell me an example of... Can you tell me a story about...

1. How comfortable were you practicing as a CEP in the healthcare setting? What were some factors that influenced your ability to practice? (Internal & General)
 - a. Prompts about confidence in their own abilities, etc
 - b. Attitudes, beliefs, confidence, knowledge
 2. How would you describe your interactions with other members of the primary healthcare team? The clients?
 - a. Healthcare professionals prompts about discussion of CEP objectives, scope of practice, etc.
 - b. Potential client prompts about their comfort (& retention), any feedback provided, etc.
 3. Were there any resources/supports provided to you that influenced the quality of your practice?
 4. What were some barriers (1) or facilitators (2) that may have influenced your ability to practice in the primary healthcare setting?
 - a. systemic (i.e., related to organization of the healthcare team), training-related or personal challenges. Careful with the prompts for these
- **General:** In what ways did the CEP positively impact the healthcare team?

Take notes on the interview sheet to see if I've hit on all Qs. At end, tell them you'll look through the Qs to see if I've gotten everything I want. Also ask them if there is anything else they would like to share or that would be relevant to the study.

→ Transcript review: Usually give up to 2 weeks. Say that if you don't get back to me we will assume that you are okay with what we have.

- **Medical professional questions – Themes to be explored:**

- ***Background information***

1. Please explain your current role in the primary healthcare setting.
2. Please discuss any education or training on physical activity counseling/exercise referral you have received in your chosen profession.
3. How often do you counsel patients on the benefits of physical activity? Under what circumstances?

Prompts: Can you tell me an example of... Can you tell me a story about...

1. Can you describe your experiences of what it was like having a CEP on your team?
 - a. Prompt about discussing interactions w/ the CEP// influence on the way they practice medicine? How did it change the team dynamics?
2. How would you describe the role of the CEP in your healthcare team? (Organizational – want to assess understanding)
3. When did you find it appropriate to refer to the CEP?
4. How would you describe the response of patients to the addition of the CEP to the healthcare team? The response of other team members?
 - a. Prompts about recruitment (potential issues), patients comfort level, etc.)
5. From your perspective, what were some of the benefits/issues associated with the addition of the CEP to your team?
 - a. Prompts about benefits of CEP involvement for patients, suggestions to improve/increase effectiveness of CEP role

* Can also prompt for some feedback received from patients on the CEP role... Could you tell me a story from a patient about the benefit of working the CEP