

PHYSICAL ACTIVITY PROGRAMS FOR ADULT CANCER SURVIVORS IN ATLANTIC
CANADA

by

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Dedication Page

To Mom, Dad and Kirk, you have been a constant source of strength, guidance, and motivation for all endeavors I have undertaken. I am profoundly grateful for all of the opportunities that you have provided me, and I wholeheartedly believe that without your support, this would not have been possible. You inspire me to live life to the fullest and pursue all of my dreams. I am so thankful to have such an incredible family. I love you all so much.

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Abstract

Although physical activity (PA) has been found to be a safe and effective way to mitigate many of the side-effects of cancer and cancer treatment, PA levels among cancer survivors remain low. The purpose of this study was to gain insight into the attitudes and practices of oncology healthcare professionals in Atlantic Canada with respect to PA for cancer survivors. Cancer specific PA programs were also sought out. Semi-structured telephone interviews were conducted with a purposefully selected sample of oncology healthcare professionals, administrators, and cancer-specific PA program leaders to examine the attitudes and practices of key stakeholders with respect to PA for cancer survivors, as well as identify and describe the available cancer-specific PA programs for cancer survivors in Atlantic Canada. Thirty participants, including 7 oncologists, 7 nurses, 6 allied healthcare professionals, 5 administrators, and 5 program leaders, completed an interview. Several themes emerged, including (1) support for but variable knowledge regarding PA for cancer survivors; (2) lack of PA discussions and counselling in the oncology setting; (3) competing priorities, lack of expertise, and lack of cancer-specific PA programming as barriers to PA discussions and counselling; (4) the addition of an exercise specialist to oncology healthcare teams as an enabler to discussions and counselling; (5) need for structured cancer-specific PA programming; (6) funding, program cost, lack of support and lack of awareness as barriers to PA programming; and (7) partnerships, referrals and awareness of programs as enablers to programming. The results of this study suggest that cancer survivors in Atlantic Canada may require additional resources and support with respect to PA throughout their cancer care journey. Limited PA discussions and counselling by healthcare providers with survivors also suggests a need for initiatives that will help to increase these practices.

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Chapter One: Introduction

Cancer is the leading cause of death in Canada contributing to approximately 25% of deaths (Canadian Cancer Society, 2018). Roughly 1 in 2 Canadians will be diagnosed with cancer at some point in their lives and in 2017 alone, there was expected to be over 206,200 new cancer diagnoses. This makes cancer a very costly illness in Canada, accounting for 7.5 billion in direct and indirect health care costs in 2015 (de Oliveria et al., 2018). Fortunately, with early detection and recent advances in treatments, as many as 60% of those diagnosed with cancer will become long-term cancer survivors (Canadian Cancer Society, 2018; Mery et al., 2014).

Despite increasing survival rates, a cancer diagnosis can have a profound impact on a survivor's overall health and well-being. In addition to experiencing late and long-term effects from treatment, many cancer survivors are at an increased risk of co-morbidities, recurrent disease, and secondary cancers (Buffart, Galvao, Burg, Chinapaw, & Newton, 2014). Physical activity (PA) has been found to be a safe and effective means to help mitigate many of the potential physiological (e.g., fatigue), psychological (e.g., depression), and social (e.g., feelings of isolation) side-effects of cancer and cancer treatment, ultimately improving a survivors' quality of life (Mutisan et al., 2016; Sabiston & Brunet, 2012; Sabiston, McDonough, & Crocker, 2007; Garcia & Thomson, 2014). Consequently, organizations including the American College of Sports Medicine have created PA recommendations for cancer survivors (Buffart et al., 2014; Schmitz et al., 2010).

Although the development of guidelines is a positive and necessary step in guiding standardized change, it remains unclear whether or not there are sufficient cancer specific PA programs available to support these recommendations. For example, while a 2008 scan of supportive care services and programs available to cancer patients and survivors in Canada

identified several psychosocial (e.g., family counselling, support groups) and adjunct supportive care resources (e.g., education, wellness centres, rehabilitation, and PA) amongst the services available to cancer survivors, only one program included in this scan offered a cancer-specific PA program (Ristovski-Slijepcevic, 2008). More recently, Santa Mina and colleagues (2015) conducted a pan-Canadian scan of cancer-specific PA programs available to cancer survivors across the country. Although 20 cancer-specific PA programs were identified across British Columbia, Alberta, Manitoba, Ontario and Quebec, no cancer-specific PA programs were identified in the Atlantic region.

With some of the highest cancer rates in the country (Canadian Cancer Society, 2018) and given the documented benefits of PA, it is concerning to note that Atlantic Canadians have some of the lowest levels of PA in the country (Navaneelan & Janz, 2014). This suggests that there may be unique barriers and enablers to PA for cancer survivors in the Atlantic Provinces. Previous studies have identified a lack of physician support as a key barrier to PA for cancer survivors (Santa Mina et al., 2015). While the reasons for this lack of support are not fully understood, it is believed that a lack of clinician knowledge on the benefits of PA for cancer survivors remains a fundamental barrier (Santa Mina et al., 2015). This being the case, it is important to gain insight into the beliefs and practices of healthcare professionals and administrators in the field of oncology.

Cancer diagnosis projections for 2030 are estimated to be almost 80% greater than in 2005 (Canadian Cancer Society, 2018). A growing number of cancer survivors has significant implications for Canadians and Canadian healthcare systems. This is due not only to the consequences of cancer and associated side effects, but also the risk of co-morbidities and associated healthcare expenditures. Given the physiological, psychological, and social benefits of

PA for cancer survivors, ensuring that all cancer survivors have access to cancer-specific PA programs is essential in order to meet their unique needs and has the potential to significantly benefit not only survivors, but also the healthcare system (Loprinzi & Lee, 2014; Sabiston & Brunet, 2012). Access to cancer-specific programs is important because treatment and cancer related side effects must be taken into consideration when creating PA programs, and interventions may need to be adapted to meet the needs of individual survivors (Denlinger et al., 2014).

To date, no study has explored and/or reported the cancer-specific PA programs available in Atlantic Canada. Similarly, the prevailing attitudes and practices of healthcare professionals and administrators from cancer centres in Atlantic Canada with respect to PA have likewise not been reported. The purpose of this study was to investigate the cancer-specific physical activity programs available in Atlantic Canada as well as the prevailing attitudes and practices of healthcare professionals and administrators from cancer centers in Atlantic Canada. Given the documented positive relationship between PA and cancer survivorship, the primary objectives of this study were to (1) to identify and describe the range and scope of PA programs available to adult cancer survivors in Atlantic Canada; (2) to gain insight into the attitudes towards and current practices of oncologists, nurses, allied healthcare professionals, and administrators in Atlantic Canadian cancer centres with respect to PA; and (3) to describe the barriers and enablers associated with implementing and maintaining these practices. Using a qualitative approach, semi-structured interviews were conducted with program leaders, oncologists, nurses, allied health professionals, and administrators from cancer centres across Atlantic Canada. This study identified existing cancer-specific PA programs in Atlantic Canada and explored the attitudes and practices of cancer healthcare professionals. Ultimately, this study helped to inform the need

for additional awareness and clinician training, as well as identify a need for additional programming and support for PA in Atlantic Canadian cancer centres.

Definitions

Cancer survivor:

An individual living beyond a cancer diagnosis – from the point of cancer diagnosis, for the duration of their lifetime.

Adult cancer survivor:

An individual who was at least 18 years of age when diagnosed with cancer.

Cancer-specific physical activity (PA) program/ Structured PA program:

A program that is specifically designed for and tailored to cancer survivors, as well as led by individuals who are trained in PA. This included programs which provided individually tailored group or individual training sessions with an exercise leader.

Chapter Two: Literature Review

Cancer and Physical Activity

As the Canadian population continues to age, the expected number of cancer cases will rise. Fortunately, with early detection and improved treatments, many adults diagnosed with cancer are living longer (Canadian Cancer Society, 2018). With an increasing number of cancer survivors, the long-term and late effects of treatment are becoming increasingly evident. Specifically, while effective, several anti-neoplastic therapies have been shown to increase a survivors' risk of developing other health problems that develop during treatment and persist long-term or that appear months or years after the end of treatment (e.g. sleep disturbances, chronic pain, depression, anxiety, fatigue, diabetes, cardiovascular disease) (Albrecht & Taylor, 2012; Bourke et al., 2014; Cho, Mariotto, Mann, Klabunde, & Feure, 2012; Garcia & Thomson, 2014; Loprinzi & Lee, 2014; Sabiston & Brunet, 2012; Talepasand, Pooragha, & Kazemi, 2013; Tomlinson, Diorio, Beyene & Sung, 2014).

PA is a non-pharmacological intervention associated with multiple, well-established health benefits, including weight management, cardiorespiratory fitness, muscular strength and endurance (Warburton & Bredin, 2016). PA also plays a key role in the primary and secondary prevention of chronic disease and premature death (Hills, Street, & Byrne, 2015; Warburton & Bredin, 2016; Warburton, Nicol, & Bredin, 2006). Importantly, PA has been shown to mitigate many of the physiological, psychological, and social side effects associated with a cancer diagnosis and the resulting treatments, making it an important area of study in cancer survivorship (Garcia & Thomson, 2014; Sabiston & Brunet, 2012).

Physiological side effects of cancer. Physiological side effects of cancer and cancer treatment include an increased risk of morbidity and all-cause mortality (Buffart et al., 2014).

Common morbidities among cancer survivors include cardiovascular disease and diabetes, as well as recurrent disease (Talepasand, Pooragha, & Kazemi, 2013). Cancer survivors often experience pain, as well as increased levels of fatigue and sleep disturbances (Albrecht & Taylor, 2012; Bourke et al., 2014; Garcia & Thomson, 2014; Loprinzi & Lee, 2014; Sabiston & Brunet, 2012; Tomlinson, Diorio, Beyene & Sung, 2014). Immune suppression, decreases in muscle mass, cardiovascular fitness and functional capacity are also common among cancer survivors (Sabiston & Brunet, 2012).

Physiological benefits of physical activity. Several recent reviews and meta-analyses have shown that PA, both during and after treatment, is beneficial to adult cancer survivors by helping to mitigate many treatment related side effects and by improving health outcomes (Barbaric, Brooks, Moore & Cheifetz, 2010; Bourke et al., 2014; Garcia & Thomson, 2014; Ibrahim & Al-Homaidh, 2011; Jones & Alfano, 2013; Mishra et al., 2012; Sabiston & Brunet, 2012). The benefits of PA for adult cancer survivors include reduced fatigue (Aguinaga, et al, 2018; Bourke et al, 2014; Sabiston & Brunet, 2012; Garcia & Thomson, 2014; Albrecht & Taylor, 2012) and sleep disturbances (Albrecht & Taylow, 2014; Bouillet et al., 2015; Tomlinson, Diorio, Beyene & Sung, 2014), improved aerobic fitness (Garcia & Thomson, 2014; Jones et al., 2011), immune function (Sabiston & Brunet, 2012), and overall health-related quality of life (Aguinaga, et al, 2018; Fisher et al., 2017; Garcia & Thomson, 2014; Mishra et al, 2012; Sabiston & Brunet, 2012). Furthermore, there is evidence to suggest that PA may decrease the risk of recurrent cancer and increase treatment completion rates (Loprinzi & Lee, 2014; Sabiston & Brunet, 2012). Emerging evidence also suggests that PA may have a survival benefit (Barbaric, Brooks, Moore & Cheifetz, 2010; Ibrahim & Al-Homaidh, 2011; Sabiston & Brunet, 2012). Ibrahim and Al-Homaidh (2011) conducted a meta-analysis of studies on PA and breast

cancer survivors. Analysis of six studies suggests that post-cancer diagnosis PA reduced breast cancer mortality by 34%. Barbaric and colleagues (2010) conducted a systematic review of three studies, which looked at PA and colon or colorectal cancer survivors, and determined that colon and colorectal cancer free survival increased with PA. Furthermore, studies have shown that PA may also decrease pain and other side effects associated with treatment (Loprinzi & Lee, 2014).

Psychological side effects of cancer. Psychological implications, including increased rates of depression, are commonly reported among cancer survivors with as many as 60% of survivors experiencing depressive symptoms at some point during/following treatment (Loprinzi & Lee, 2014; Massie, 2004; Mutisan et al., 2016). Similarly, anxiety has been found to be significantly more common among cancer survivors than the general population (Stark & House, 2000). Given the physical changes that can result from some forms of treatment (e.g., hair loss, amputation), body image concerns are also frequently reported among many cancer survivors (Sabiston & Burnet, 2012). For example, the findings of a recent systematic review suggest that breast cancer survivors under fifty years of age have significantly lower body image scores than healthy controls (Patterson, Lengacher, Donovan, Kip, & Toftagen, 2015). The results of this review also suggest that poor body image was associated with anxiety, depression, and fear of recurrence, suggesting that body image is an important aspect of a survivors' mental health and well-being. The need for better management of mental health side effects of cancer is exemplified by the fact that mental health services are utilized by cancer survivors more than those without a previous cancer diagnosis (Hewitt & Rowland, 2002).

Psychological benefits of physical activity. PA is associated with a decreased incidence of depression, anxiety, stress, and mood disturbances among cancer survivors (Alsharif & Hata, 2013; Bouillet et al., 2015; Fisher et al., 2017; Garcia & Thomson, 2014; Sabiston & Brunet,

2012; Santa Mina et al., 2014; Albrecht & Taylor, 2012). PA for cancer survivors has also been associated with increased self-esteem and improved body image (Bouillet et al., 2015; Garcia & Thomson, 2014; Sabiston & Brunet, 2012). Overall, cancer survivors who are physically active often experience decreased emotional distress and reduced fear of disease recurrence and death – ultimately leading to improved overall quality of life (Alsharif & Hata, 2013; Bouillet et al., 2015; Sabiston & Brunet, 2012).

Social side effects of cancer. Cancer survivors typically report a greater need for social support than those without a history of cancer due to the associated physical and psychological stress (Faller et al., 2016). Some cancer survivors also experience feelings of isolation following a cancer diagnosis (Macmillan Cancer Support, 2013). Lack of social support has been found to be associated with increased rates of anxiety and depression among cancer survivors (Lynch, Steginga, Hawkes, Pakenham, & Dunn, 2008). High distress, particularly among male survivors of colorectal cancer, have also been associated with low levels of social support (Dunn et al., 2013). In addition, survivors of colorectal cancer who have a colostomy or ileostomy often experience reduced social interaction, which is influenced by stigmatization (Smith, Loewenstein, Rozin, Sherriff, & Ubel, 2007). This highlights the importance of social support for cancer survivors, as well as the need for supportive resources and programming that provide a comforting environment.

Social benefits of physical activity. While research on the social benefits of PA in cancer survivors is modest, community-based PA programs have been shown to increase social support and feelings of connectedness among breast cancer survivors (Culos-Reed, Shields, & Brawley, 2005; Emslie et al., 2007; McDonough, Sabiston & Crocker, 2008; Sabiston, McDonough & Crocker, 2007). Cormie and colleagues (2015) have also found that prostate

cancer survivors report that peer support during a PA intervention increased social connections and encouraged participants to discuss their shared experiences. The relationship between social support and PA is thought to be reciprocal, as social support increases PA levels, and PA increases social support (Resnick, Orwig, Magaziner, & Wynne, 2002). Importantly, it is suggested that increased social support may also help improve mental health among cancer survivors (Hauken, Senneseth, Dyregrov, & Dyregrov, 2015).

Physical Activity Levels Among Cancer Survivors

Despite the well-established benefits of PA for cancer survivors, the vast majority of cancer survivors are not engaging in sufficient activity to attain the associated health benefits (Garcia & Thomson, 2014; Loprinzi & Lee, 2014; Lynch et al., 2013). Neil, Gotay, and Campbell (2013) analyzed the 2005-2006 and 2009-2010 Canadian Community Health Survey and found that PA levels of individuals with cancer were lower than individuals who had never been diagnosed with cancer. Furthermore, PA levels in both groups were significantly lower than what was recommended by community health guidelines (Neil et al., 2013). Interestingly, while survivors have been shown to engage in less PA than those without a history of cancer, PA has been cited as the most commonly desired lifestyle change amongst cancer survivors (Dennis, Waring, Payeur, Cosby, & Daudt, 2013).

Physical Activity Recommendations and Programs for Cancer Survivors

The American College of Sports Medicine recommends that cancer survivors engage in 150 minutes of moderate-to-vigorous aerobic PA per week. It is also recommended that they perform resistance and flexibility training two to three times per week. Of note, these are the same recommendations that are given to the non-cancer survivor population (Schmitz et al., 2010). A detailed review by Buffart and colleagues (2014) highlights several other international

PA guidelines for cancer survivors from organizations including the American Cancer Society, British Association of Sport and Exercise Science, and Exercise and Sport Science Australia, among others. All of the guidelines are consistent in suggesting that cancer survivors should engage in at least 150 minutes of PA per week.

Research suggests that lifestyle guidelines, such as those that promote PA to cancer survivors, are not sufficient to produce long-term lifestyle changes (Greenlee et al., 2016). However, structured PA interventions have been found to be more successful in increasing PA participation among cancer survivors (Irwin et al., 2016). This suggests that throughout the cancer journey, cancer survivors may require more precise instruction on what kind of exercise they should be doing based on the stage of their disease and how they are feeling. It could also be an indication that cancer survivors are uncertain of whether they should be doing PA (for safety reasons, etc.). Although PA is not often contraindicated, accommodations may need to be made in order to participate safely. For example, if someone has peripheral neuropathy, balance may be an issue and PA may need to be modified to avoid falls (Buffart et al., 2014). Given the opportunity to participate in structured PA interventions targeting survivors, these individuals may have more reassurance that it is safe to do so.

Several Canadian organizations relevant to cancer care and control (e.g., Canadian Cancer Society, Alberta Cancer Foundation, Cancer Care Ontario) endorse PA guidelines for cancer survivors. However, the breadth and scope of PA programming available to cancer survivors is not completely clear. Although the development of guidelines is positive and a necessary step in guiding standardized change for both healthcare professionals and patients, it remains unclear whether or not there are sufficient cancer specific PA programs available to support these recommendations. Furthermore, individualized prescriptions and additional

counselling from healthcare professionals may be required to effect behaviour change with respect to PA (Buffart et al., 2014).

An environmental scan of cancer survivorship in Canada was conducted in 2008 in association with the Canadian Partnership Against Cancer (Ristovski-Slijepcevic, 2008). Included in the scan was a literature search and interviews with 47 key informants. The goal was to explore cancer survivorship conceptualization, research and practice in Canada, to examine key contributors to cancer survivorship endeavors in Canada, and to identify resources within the literature that may help with Canadian cancer survivorship endeavors in the future. PA was noted as one of the many services available to cancer patients and survivors, among family counselling, education, nutritional/cooking, art/music therapy, patient/parent advocates, rehabilitation and psychosocial oncology support, peer-support groups, camps for children, fatigue clinics, and wellness centres. Of note, however, only one cancer specific PA program (Hope & Cope) was highlighted in the report. While the report emphasized the importance and inclusion of PA recommendations within survivorship care plans, few supporting resources and/or guidelines to support these recommendations were found.

In 2011, Howell and colleagues reviewed the literature to develop evidence-based recommendations for the organization and structure of cancer survivorship services, and best-care practices, to optimize the health and well-being of adult cancer survivors in Canada (Howell et al., 2011). PA was noted as one of the recommendations to promote healthy lifestyle behavior and improve physical functioning, well-being, and quality of life for survivors. However, the only information included is that cancer survivors should gradually increase PA intensity, as tolerated, for a minimum goal of 30 minutes of daily activity, five days a week (Howell et al., 2011). The results of this literature review demonstrate the importance of PA in survivorship of

adult cancer survivors. However, it does not include any information on the resources or programs that are currently available or ways in which survivors can fulfill the PA requirements that are recommended.

Santa Mina and colleagues (2015) conducted a Canada wide scan of the PA programs available to cancer survivors across the country and twenty cancer-specific PA programs were identified. Fourteen program coordinators from thirteen different PA programs were interviewed to gain insight into the program characteristics, as well as barriers and enablers to implementing and maintaining such programs. Program characteristics varied, but programs were most often initiated by expanding research protocols or by responding to the needs of specific cancer populations. Funding was most commonly received through research grants and programs monitored participant progress and adherence. Program enablers for participant uptake included personalized exercise plans, supportive network, personal control, and awareness of benefits. Partnerships between programs and cancer centres, universities and other community-based wellness centres were also found to be enablers. The program barriers identified included lack of funding, lack of physician support, deterrents to participation (including fear, shame, and lack of time to participate) as well as disease progression and effects of treatment (participants stated physical and psychological side effects of cancer limited participation). Despite being a Canada-wide study, the programs identified included one in British Columbia, three in Alberta, four in Manitoba, nine in Ontario, and three in Quebec, leaving many provinces without identified programs. The lack of cancer-specific PA programs identified in Atlantic Canada suggests a need for further research in this region.

Need for physical activity programs in Atlantic Canada. According to a report by Statistics Canada, cancer rates in Atlantic Canada are higher than the national average. The

report suggests that many factors, including PA, contribute to the greater incidence of cancer in Atlantic Canada (Canadian Cancer Society, 2016). PA has been shown to reduce the risk of thirteen different types of cancer (Moore et al., 2006). Of note, Atlantic Canadians are known to have some of the lowest levels of PA and highest obesity rates in the country (Navaneelan & Janz, 2014). Given the low PA levels in Atlantic Canada, there may be unique barriers and enablers to PA and PA programs for cancer survivors in the Atlantic Provinces (Forbes et al., 2015). Since the literature suggests that PA has significant physiological, psychological and social benefits for cancer survivors, it is evident that PA programs are particularly important for the adult cancer survivor population, and the resources available to these individuals in Atlantic Canada must be identified (Loprinzi & Lee, 2014).

Forbes and colleagues (2015) conducted a study in Nova Scotia to investigate PA preferences among cancer survivors in the region. Seven hundred and forty-one breast, prostate and colorectal cancer survivors participated in the study and completed a questionnaire, which assessed their PA preferences, as well as demographic and medical information. It was determined that the percentage of breast, prostate and colorectal cancer survivors, respectively, who participated in PA with other cancer survivors was 42%, 22% and 30%, the percentage who participated with friends was 65%, 40% and 64%, the percentage who engaged at community fitness centre, 59%, 39% and 45%, the percentage preferring supervised sessions 60%, 34% and 45%, as well as the percentage preferring group PA 53%, 24% and 41%. One clear limitation of this study is that it included only participants from Nova Scotia. However, the results suggest that the majority of breast cancer survivors prefer participating in PA with friends, being supervised, and having group sessions. The majority of prostate cancer survivors surveyed preferred not to participate in PA in supervised sessions, with friends, or in groups. Meanwhile,

the majority of colorectal cancer survivors preferred participating in PA with friends, but they were less inclined to participate in PA with other cancer survivors and in groups. It is clear that PA preferences vary among cancer survivor groups, which reinforces the need for evidence-based, individualized, supportive PA programming for cancer survivors. Whether the PA continues in a community-based or home-based setting will be survivor specific, but it is important to ensure that this cancer-specific PA programming, which caters to each individuals' needs, is available to cancer survivors.

Oncology Healthcare Professional Perspectives on Barriers and Enablers to Physical Activity

Oncology healthcare professionals play an essential role in disseminating information to cancer survivors that will help improve health outcomes and quality of life throughout their cancer care journey. There is evidence to show that the recommendation of PA by healthcare professionals increases the likelihood of PA participation among survivors (Fisher, Williams, Beeken, & Wardle, 2015; Orrow, Sanderson, & Sutton, 2013). Therefore, it is important to understand the attitudes, beliefs and practices of oncology healthcare professionals in Atlantic Canada with respect to PA for cancer survivors. Furthermore, it is important to understand the extent to which oncology healthcare professionals are discussing or counselling cancer survivors on PA, as well as whether the availability of cancer-specific PA programming reflects barriers and enablers to PA discussions in the clinical setting.

A study conducted at the cancer centre in Hamilton, Ontario, Canada investigated the perspectives of oncology care professionals on exercise promotion for people with cancer (Nadler et al., 2017). Specifically, the study focused on examining knowledge and beliefs related to exercise guidelines, current practices, as well as facilitators and barriers to exercise discussion.

A survey was completed by 120 respondents, including physicians, nurses, allied healthcare professionals and radiation therapists. The results of this study demonstrated that only 15% of participants were able to correctly identify Canada's PA guidelines, and 69% were unaware of exercise guidelines for individuals with cancer. When surveyed about when, how and which patients to refer to exercise programs, approximately 80% of participants reported that they had poor knowledge in these domains. The most common barriers to exercise discussions reported by participants included lack of knowledge on how or where to refer patients to exercise (50.8%), time limitations for discussion during patient visits (42.5%), participants not feeling as though they have the qualifications to discuss exercise or refer patients to exercise programs (32.5%) and concerns that exercise would be unsafe for patients in certain situations (25.0%). The most common facilitators for increasing discussion about exercise noted by participants included education sessions (48.3%), patient handouts (47.5%), including a kinesiologist or exercise specialist in the clinical team (28.3%) and posters targeted towards patients so that they can ask healthcare professionals about exercise (27.5%). Limitations of this study include the fact that it was conducted at a single cancer centre in Ontario, and the beliefs and practices of respondents may not be representative of healthcare professionals elsewhere in Canada. Furthermore, the use of surveys for data collection limits the depth of information that was collected. This suggests that further research is needed to gain a greater depth of understanding of, and provide further context for, the attitudes and practices of healthcare professionals with respect to PA for cancer survivors, as well as facilitators and barriers to PA discussions in other regions in Canada.

Summary

A growing body of evidence is available to suggest that cancer survivors have much to gain by increasing their level of PA. Barriers to PA among cancer survivors include impaired

mobility, lack of time, fear, fatigue and pain (Fisher, Wardle, Beeken, Croker, Williams & Grimmett, 2016; Blaney, Lowe-Strong, Rankin-Watt, Campbell, & Gracey, 2013). Lack of physician support and healthcare professional factors including perception of patients' ability to engage in PA have also been found to be potential barriers to PA for cancer survivors (Granger et al., 2016). PA guidelines alone have not been shown to successfully increase PA among cancer survivors (Greenlee et al., 2016). However, structured PA interventions have been found to be more successful in increasing PA participation in this population (Irwin et al., 2016). This being the case, it is important to ensure that there are sufficient programs available to support the PA recommendations for cancer survivors and that programs are led by individuals who understand the physiology and medical risks associated with PA for the cancer population. Furthermore, it is important to increase awareness of these resources and programs so that more survivors take advantage of them.

The objectives of this study were: (1) to identify and describe the range and scope of PA programs available to adult cancer survivors in Atlantic Canada; (2) to gain insight into the attitudes towards and current practices of oncologists, nurses, allied healthcare professionals, and administrators in Atlantic Canadian cancer centres with respect to PA; and (3) to describe the barriers and enablers associated with implementing and maintaining these practices. Specific research questions were: 1) What is the availability and setting/nature (i.e., cancer centre, community-based, or academic) of cancer specific PA programming available to survivors within the Atlantic provinces?; 2) What are the attitudes of healthcare professionals and administrators at Atlantic Canadian cancer centres with respect to PA for cancer survivors?; 3) What are the practices of healthcare professionals with respect to PA discussions and counselling

for cancer survivors?; and 4) What are barriers and enablers of existing cancer specific PA programs?

Chapter Three: Methodology

Study Design

This study employed a descriptive qualitative approach to address the research objectives (Braun & Clarke, 2006). Semi-structured interviews and relevant probes were utilized to elicit in-depth responses that would likely not have emerged with the use of a simple survey.

Sampling Selection Strategy

Sample population. Eligible participants for this study included key informants from Atlantic Canadian cancer care centres as well as organizations with PA programs tailored specifically for cancer survivors. Inclusion criteria for cancer-specific PA programs for cancer survivors consisted of programs that are designed for and tailored to cancer survivors, as well as led by individuals who are trained in PA. PA programs that target cancer survivors but are not specifically tailored to them (i.e. dragon boat racing for breast cancer survivors) were excluded. Key informants included oncologists, nurses, allied healthcare professionals (i.e. physiotherapists, psychologists, certified exercise professionals/program leaders, and/or related PA professionals) researchers with expertise in PA and cancer, and administrators (i.e. managers and directors of cancer centres). For the purpose of this study, an administrator was defined as an individual who oversees health services that are provided within a cancer centre (i.e., manager or director) and a program leader was defined as an individual who is directly involved in facilitating a current PA program for adult cancer survivors. Key informants were required to be representatives of Atlantic Canadian organizations (i.e., cancer care facility, academic institution) due to the fact that the study was intended to gain insight into the PA programs available to adult cancer survivors in Atlantic Canada, as well as the attitudes and practices of healthcare professionals and administrators at Atlantic Canadian cancer centres with respect to

PA. Participants were also required to be able to speak English because that is the language in which interviews were conducted. Therefore, any non-English speaking individuals were excluded from this study.

Sampling strategy. Stratified purposeful sampling was used to ensure professionally diverse and geographically representative data (Creswell, 2013). Participants from cancer centres in Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland were interviewed. Snowball sampling was also used by asking the initial group of key informants to refer other individuals who may have knowledge of PA resources and programs for adult cancer survivors in their region or across the Atlantic Provinces (Lavrakas, 2008). This was done to promote the inclusion of individuals with knowledge of the available PA supports who were missed when the initial list of potential key informants was created.

Participant Recruitment

Potential key informants were identified through a web-based search and the professional contacts of committee members. The web-based search began with a scan of relevant Canadian government websites (i.e., Public Health Agency of Canada), cancer agencies/foundations (i.e., Canadian Cancer Society, Canadian Partnership Against Cancer), associations and networks (i.e., Canadian Cancer Research Alliance), as well as Canadian academic institutions. A general search of GOOGLE™ was also conducted using key terms “cancer” and “oncology”, as well as key words related to PA (e.g., aerobic, fitness, exercise, rehabilitation) and supportive care resources (e.g., community-based, program, and clinical care). This search was explicitly used to look for informants from Atlantic Canadian institutions/organizations. The study committee also identified individuals within their professional contacts whom they believed would have

knowledge of the PA resources and programs that are available to adult cancer survivors in Atlantic Canada.

Potential key informants were invited to participate in a semi-structured telephone interview. They were initially contacted by email (via a publicly available email address) and sent a letter of invitation (Appendix A) that described the study and consent form (Appendix B). When potential key informants were referred by other participants, the contact information provided by the individual was used. Interested participants were instructed to send their completed consent form (Appendix B) by email to KS. A follow-up email or phone call was made one week following the initial contact if a response was not received. Template for emails sent to potential participants can be found in Appendix C.

Data Collection

Procedures and Key Informant Interviews. Data were collected through semi-structured telephone interviews with key informants. The interview guide (Appendix D) was developed and refined in collaboration with experts in PA and cancer survivorship (MK and SG) and qualitative methodologies (RU). It included open and closed-ended questions, and sought to do the following: i) collect demographic information of participants (province, clinical institution, position) and length of time with the organization; ii) identify the availability and describe the setting/nature (i.e., cancer centre, community-based, or academic) of cancer specific PA programming available to survivors within the Atlantic provinces; iii) gain insight into the attitudes of healthcare professionals and administrators at Atlantic Canadian cancer centres with respect to PA for cancer survivors; iv) gain insight into the practices of healthcare professionals with respect to PA discussions and counselling for cancer survivors; and v) explore barrier and enablers of existing cancer specific PA programs.

The interviews lasted 12 minutes to 78 minutes and were conducted by KS. Interviews were audio-recorded and transcribed verbatim by an administrative assistant in the Faculty of Health and Human Performance at Dalhousie University. Tailoring interview probes based on individual participant responses helped to increase the level of detail in the resulting data, thus providing a more comprehensive description of the perceived barriers and enablers associated with PA programming as well as the attitudes and practices of oncology healthcare professionals and administrators in Atlantic Canada (Creswell, 2013). Participants were recruited until data saturation and provincial representation, both geographical and professional, was achieved. Specifically, it was ensured that at least one professional from each of the key stakeholder groups (i.e., healthcare professional, administrator and program leader) from every province was represented.

Data Analysis

Demographic information of participants was summarized using descriptive statistics in SPSS by providing frequencies in each category. Key informant interviews were transcribed verbatim and analyzed using thematic analysis. Specifically, analysis involved an inductive and deductive grounded approach using constant comparative analysis (Corbin & Strauss, 2008). This method was chosen because it has been found to be effective for analyzing semi-structured interview transcripts (Nowell, Norris, White, & Moules, 2017). Analyses involved creating codes and categorizing data using the Consolidated Framework for Implementation Research (Damschroder et al., 2009). Using this framework, themes were subsequently identified and refined by the research team. This allowed researchers to systematically analyze the data, as well as identify and refine emerging themes. Two investigators, KS and RU, independently coded and analyzed two transcripts. An analytical framework in the form of an electronic codebook was

developed by KS and RU, which KS used to code and categorize the rest of the data. The codebook was discussed and modified until no additional codes emerged. Although NVivo qualitative software was used to organize the data in order to create and compare codes, qualitative analysis was completed manually. Investigator MK reviewed decisions made with regards to coding and emerging themes to compare agreement. The research team resolved disagreements on codes, categories or themes through discussion. When necessary, transcripts and coded data were reanalyzed.

The primary researcher for this study, who conducted participant interviews and performed the majority of data analysis, is a Kinesiology graduate who is currently training to become a physician and believes in the value of PA for cancer survivors. This had the potential to impact participant responses, data analysis, and therefore the results of this study. However, to maximize study rigor, strategies were used to increase the trustworthiness of the findings. As previously mentioned, two investigators independently coded the transcripts, and another member of the research team compared agreement between codes. Direct quotes from key informants were used to support emerging themes. Throughout data analysis, documentation was maintained detailing the methodological and analytical decisions made by the researchers. This allowed the investigators to link interpretations and conclusions back to codes.

Chapter Four: Results

Participant Characteristics

A total of 30 interviews were conducted. Participants included 7 oncologists (4 of whom also had administrative roles), 7 nurses, 6 allied healthcare professionals in oncology, 5 administrators, and 5 program leaders. Two of the program leaders were also nurses currently working in oncology, 1 program leader was a nurse not currently working in oncology, and 2 program leaders were allied healthcare professionals but not specifically working in oncology. Participant distribution by province was as follows: Nova Scotia: 9, New Brunswick: 9, Prince Edward Island: 6, Newfoundland: 6. Allied healthcare professionals included 1 psychologist, 3 social workers and 2 physiotherapists. The average time spent working with their respective organizations (i.e. cancer centre or PA program) was 11 years (range 1-27 years).

A total of 12 cancer-specific PA programs were identified in Atlantic Canada (Table 1).

Table 1.

Structured Cancer-Specific Physical Activity Programs in Atlantic Canada

Province	Program Type			
	Solely Community-Based	Solely Cancer-Centre Based	Academic/Research Based	Community and Cancer-Centre /Hospital Partnership
Nova Scotia	1	0	1	1
New Brunswick	1	0	4	2
Prince Edward Island	0	0	0	0
Newfoundland	1	0	0	1

Additional programs were identified but did not explicitly fit the inclusion criteria for this study. Reasons for this included that a program was no longer offered or not tailored specifically to meet the needs of cancer survivors. Although these programs did not meet study criteria, all PA programs for cancer survivors identified through this study were documented. See Appendix E for program details.

Participant Perspectives

Theme 1: Overall support but variable knowledge regarding physical activity for cancer survivors. The vast majority of participants reported that they believe PA to be very important for cancer survivors, highlighting both the physical and psychological benefits. Certain participants expressed that survivors should be physically active throughout the cancer care journey.

“I think [physical activity] is extremely important and extremely beneficial. Obviously, we need to make sure people are involved in appropriate exercise for their fitness and for the treatment they’re in but I think there’s always some sort of activity that people would be able to find useful and beneficial to their cancer journey and as far as decreasing treatment side effects and that kind of thing. So I think exercise can play a really important role in the treatment and recovery process.” – Participant #1 (Program Leader)

“[Physical activity] certainly needs to be done, I think, like I said evidence coming through that physical activity has an impact on outcomes and I certainly think it helps not only the physical wellbeing but the psychosocial wellbeing in patients undergoing treatment and immediately after treatment” – Participant #17 (Oncologist)

Despite touting the benefits of PA the extent of knowledge of PA for cancer survivors varied among participants. Although none of the participants were completely unaware of PA benefits for survivors, certain participants were less aware of the PA benefits in general.

“So right now, I mean as oncologists we tend to treat people based on data, so I guess we need data in order to prescribe it I think for patients. As a whole it would be nice to know what actually made a difference, meaning does it actually prevent the cancer, does it make them feel better, does it make the cancer stay away longer, does it help them get back to normal? And there is some data but not a lot.” – Participant #12 (Oncologist)

Some participants were more aware of the PA benefits for certain survivor groups (i.e. breast cancer) and unsure about the benefit for other groups.

“It should be part of the treatment, based on at least a couple studies showing benefits of exercise program, particularly in breast cancer. Patients who are on treatment or completed a treatment there’s quite significant benefit overall ... There’s some data of improvement of survival, improvement of almost all the quality of life check points in the patients who are treated for breast cancer, so breast cancer survivors. I’m not quite sure if any study exists for lung cancer or other cancers.” – Participant #2 (Oncologist)

Some participants said that despite believing that PA is good for survivors, they would not recommend survivors start a new PA plan after being diagnosed with cancer.

“I think that it is, I think it’s good for them, like certainly worth bringing up to patients, especially patients who complain of fatigue as a tool to help them to keep active and [I] wouldn’t encourage anyone to do something that they weren’t doing before their cancer diagnosis or anything like that, I wouldn’t want them to start anything new, but if there

was something they were doing beforehand and comfortable doing, I would encourage them to keep doing it.” – Participant #4 (Nurse)

Others expressed that although they now know about the benefits of PA for survivors, it is only something they learned about recently.

“I now think it’s a good idea, but I was not aware of that until fairly recently. We had a presentation on the scientific evidence and it’s very positive about it. It’s very good but I didn’t realize that until recently.” – Participant #7 (Administrator)

Several participants were very supportive of PA in general, but noted that survivors are limited by their sickness and in certain cases, survivors are simply too sick to engage in PA.

“I think if they’re tolerating the treatments well enough that physical activity is encouraged and it’s the only thing that’s been shown to help with chemotherapy-induced fatigue, but it does have to be on a patient-by-patient basis. Some are just far too sick from their chemo or it’s not realistic so it’s a little bit different from one patient to the next, but it is encouraged for those who are able.” – Participant #15 (Oncologist)

Although general awareness of PA benefits for cancer survivors by individual participants was a recurring theme, several participants emphasized that despite their awareness and support for PA for cancer survivors, they perceive a lack of widespread knowledge among survivors and practitioners alike.

“Most [healthcare providers] are just there to manage the medical aspect of it and don’t have the knowledge to actually prescribe meaningful physical activity for their patients, so I really think it’s resources and I think it’s knowledge, or lack of knowledge.” – Participant #5 (Program Leader)

“[Healthcare professionals] don’t know the [physical activity] benefits for the patients, I think that’s basically what I would consider to be the barriers [to physical activity discussions with survivors] is just not really understanding the benefits and not being informed as to what’s available in the community.” – Participant #24 (Program Leader)

Theme 2: Lack of physical activity discussions and counselling in the oncology

setting. In general, participants were very supportive of recommending PA or providing counselling to survivors regarding PA prescription.

“I think it’s a really good idea. I think it’s guided with any prescription whether we’re talking about physical activity or medication or any other lifestyle change, it’s got to be individualized for that person based on their type of cancer, the sequela of the invasiveness of the cancer treatment and what side effects and adjustments they’re dealing with, and their recovery from treatment. So as long as it’s individualized and approached in that way, I think prescription in that sense makes very good sense.” – Participant # 6 (Allied Healthcare Professional)

Brief recommendations regarding PA were reported to be taking place by many healthcare professionals in this study.

“So at this point, I would say that we are certainly talking about it and recommending physical activity. – Participant #25 (Nurse)

However, other participants claimed that discussions were taking place infrequently. Thorough and consistent conversations regarding PA with survivors where specific PA plans were created were perceived to occur infrequently in the hospital setting.

“Seldom being recommended, seldom being discussed, so I’d say infrequently” – Participant #3 (Oncologist)

The use of formal guidelines for discussion was found to be very minimal.

“[Physical activity is encouraged, but at the same time, I don’t think that it’s anything that we do following recommendations or guidelines or that sort of thing. Then of course you have other health care providers who probably, that’s not part of their regular discussions with a patient unless patients are bringing that up themselves”. – Participant #29 (Nurse)

Theme 3: Competing priorities, lack of expertise and lack of cancer specific physical activity programming as barriers to physical activity discussions/counselling. Although many participants stated that PA is something that should be discussed (Themes 1 and 2), they highlighted other aspects of care made it challenging for them to have PA discussions. The most commonly cited barrier to PA discussions by participants was competing priorities.

“Given the time constraints, it falls completely down on the list of the priorities when you’re engaging in a discussion within a 15 to 20 minute timeslot.” – Participant #3 (Oncologist)

“There is a time limitation too and if there are other things that are going on with the patient that need to be addressed then physical activity, having those [physical activity] discussions kind of takes a back seat.” – Participant #9 (Nurse)

A lack of PA expertise among healthcare professionals was also noted.

“Within our healthcare system, patients are seeing their oncologist, they’re seeing their nurse, and obviously that’s very important, but those people are not exercise professionals and they have a lot of other things to counsel a patient on, and exercise might not be at the top of their list, and two, might not be within their comfort zone. So I think the biggest barrier is that we don’t have exercise physiologists, exercise professionals within our core health care team.” – Participant #1 (Program Leader)

Participants proposed that lack of awareness of the benefits of PA may be a reason for perceptions of PA as a lower priority item.

“I hear about the time thing, but I think it’s because the importance of [PA] has not been emphasized enough and if that becomes known then people will take the time. It’s not the lack of time, it’s not taking the time. I think that’s the issue.” - Participant #21 (Allied Healthcare Professional)

A lack of cancer-specific PA programs to which patients and survivors could be directed or referred was also a commonly discussed barrier to PA discussions and counselling.

“I think it is being recommended and there is some counselling, but I think one of the issues is the lack of programs or resources to refer patients to.” – Participant #6 (Allied Healthcare Professional)

Furthermore, it was noted by participants that PA programs were generally not available for cancer survivors who live rurally.

“Geography is a barrier for people trying to access [physical activity programs].” – Participant #23 (Allied Healthcare Professional)

“Unfortunately because of our geographic spread of our province, a lot of our programming is in the [region name] and our patients are from obviously all across the province, so people are hesitant to even bring up programming that’s only available in

the [specific region] because patients can't avail of it and certainly we do not have a good provincial-wide brand around exercise prescription.” – Participant #13 (Administrator)

Theme 4: Addition of exercise specialist to oncology healthcare team as enabler to physical activity discussions and counselling. The incorporation of PA experts into the cancer care team emerged as an enabler for PA discussion and counselling. This was suggested to help overcome the largest barriers to PA discussions which were found to be competing priorities as well as the lack of PA expertise among current healthcare professionals.

“I really do feel that getting sort of a specialized trained exercise professional in place to pilot a program like this and to then demonstrate its value would be super helpful.” – Participant #6 (Allied Healthcare Professional)

“I think that having somebody [at the cancer centre] appropriately trained [in physical activity] because the physicians don't have time to continuously make recommendations and they're not trained to make recommendations in physical activity.” – Participant #8 (Administrator)

“... there are a lot of things we should be discussing that we aren't, like smoking cessation is another one, we do more of that than exercise counselling but a lot of it just comes down, I guess time pressure in the clinic and sort of competing priorities for those patients but we don't really have part of our team here that are kind of responsible for the exercise piece and I think that's probably one of the main barriers that could be overcome.” - Participant #26 (Oncologist)

Theme 5: Awareness of and need for structured physical activity programming for cancer survivors. Twenty-seven of 30 participants believed there was a need for structured PA programming for cancer survivors.

“I definitely do believe that we should have a structured program. I firmly believe that it is as important to their healthcare as any of the other treatment that we give them and I believe it gives them very important tools to strengthen their body, to strengthen their immune system, to help give them energy and to help them with the physiological health and most likely psychological health as well so I believe that we don't really do a good job at empowering our patients with that kind of information or those kinds of tools and I

do believe that there isn't anything easy for these patients to access to I would love to see some sort of structured program.” – Participant #29 (Nurse)

Participants who did not fully support or recognize the need for programming included one administrator who believed that survivors should be more physically active but was unsure of how that should be accomplished. Another administrator indicated that they would have to “do more research”. Similarly, a physician said that cancer survivors should not have a priority over other chronic disease populations. Of the 22 oncology healthcare professionals and administrators interviewed, only 12 were aware of PA programming specifically designed for and tailored to cancer survivors. Seven were aware of 1 program and five were aware of 2 programs that fit the criteria for this study.

Theme 6: Funding, participant cost, lack of support, and lack of awareness as barriers to physical activity programming. Barriers to successful and sustainable PA programming were found to be a lack of or inconsistent funding, large program costs to participants (survivors), lack of support from upper management or administration, lack of awareness of the benefits of PA, and a lack of awareness of PA programming among healthcare professionals and survivors.

“If you're going to have a structured program that's being offered, you need the resources and the funding...it has to be something that is not a cost burden to the patient because they won't be able to do it. And I think that's one of the barriers maybe going back to why people don't do physical activity, is the cost, there is a cost barrier right? If something is free you tend to get more people. When you have to start paying and do [survivors] go for physical activity or do [survivors] buy [their] medication? So I think that one of the barriers is cost for sustainability.”– Participant #10 (Administrator)

“You need to have support from the upper end, the decision makers in order for any of this to even happen, you know minus all the barriers with health professionals and the actual participants themselves and what not. If you don't have funding and the support then it's not going to happen.” – Participant #14. (Nurse/Program Leader)

“I think we’ve got to have buy-in from the health board, from the authority, from government to be able to put the resources into [physical activity].” – Participant #23 (Allied Healthcare Professional / Program Leader)

“Maybe still we’re not of the mindset across the board that there’s lots of benefit for people to engage in physical activity when they’re dealing with cancer... So I think we need some more maybe administrative support of exercise and to reinforce it with our patients who we see individually and also even to be actually leading programs for people who have cancer...I think maybe some further education of the concrete benefits of physical activity for cancer patients that if we educate all our staff.” – Participant #21 (Allied Healthcare Professional)

Theme 7: Partnerships, referrals, and awareness of programs as enablers to physical activity programming. Enablers to successful and sustainable PA programming included having partnerships between community organizations and cancer centres; survivor referrals to PA programs from healthcare professionals at cancer centers; and awareness of existing programs among healthcare professionals.

“I think you have to have community partners for sure.” – Participant #19 (Allied Healthcare Professional/Program Leader)

“I mean since we have this [physical activity program associated with the cancer centre] available... It just makes it a lot easier for me because [program leaders] can do the motivating and trying to get the person to go so it’s not a very long conversation, but if I don’t have access to [physical activity programming] and I have to sit and try to tell them what to do to be active and what’s more important, I think that’s what takes long and why it’s less likely for me to be able to do it.” – Participant #12 (Oncologist)

Of note, is that referrals to PA programs by healthcare professionals were generally only occurring in situations where the program was associated with the cancer centre. An enabler to program uptake according to program leaders was also found to be the supportive network that participants experienced.

“What I hear time and time again from patients is that it’s actually a big emotional support network because all the patients are in the same boat. They’ve just finished treatment completion, they’re trying to get back on track and it’s actually a lot of cancer

patients supporting each other when they're in this type of environment.” – Participant #15 (Oncologist)

One program leader noted that successful funding for their program was secured by collecting data from their program which allowed them to demonstrate positive outcomes.

“All of our data that we collected, took it out and analyzed and it was actually the analysis of that data that has helped us eventually get the support financially to implement the program again.” – Participant #25 (Nurse/Program Leader)

Chapter Five: Discussion

This study offers a unique perspective into the attitudes and practices of healthcare professionals and administrators at Atlantic Canadian cancer centres with respect to PA for cancer survivors, as well as the cancer specific PA programming that is available to cancer survivors in this region. Key themes that emerged included: (1) support for, but variable knowledge regarding PA for cancer survivors, (2) a lack of PA discussions and counselling in the oncology setting, (3) competing priorities, lack of PA expertise among members of the cancer care team, and lack of cancer-specific PA programming as barriers to PA discussions and counselling, (4) the addition of an exercise specialist as an enabler to discussions and counselling, (5) a need for structured cancer-specific PA programming, (6) funding, participant cost, lack of support from upper management and administration, and lack of awareness of PA benefits and PA programming among healthcare professionals and survivors as barriers to PA programming, and (7) partnerships with cancer centres, survivor referrals to programs from oncology healthcare professionals, and awareness of programs as enablers to programming.

Overall Support but Variable Knowledge Regarding Physical Activity for Cancer Survivors

In keeping with literature on the benefits of PA for cancer survivors (Albrecht & Taylor, 2012; Bourke et al., 2014; Cho et al., 2012; Garcia & Thomson, 2014; Loprinzi & Lee, 2014; Sabiston & Brunet, 2012; Talepasand et al., 2013; Tomlinson et al., 2014), oncology healthcare professionals and administrators who participated in this study believe PA to be very important for cancer survivors. However, knowledge of specific benefits varied among participants. Although certain participants were aware of the importance of PA throughout the cancer care journey, others were more hesitant to recommend new PA programming for survivors who were

not accustomed to being physically active. This highlights a lack of knowledge regarding PA among oncology healthcare professionals as a whole and presents an opportunity to increase awareness among professionals of the most beneficial PA practices for cancer survivors.

Additionally, several participants perceived a lack of awareness of the benefits of PA among other members of the healthcare team. The general lack of knowledge of PA among healthcare professionals noted by participants in this study when referring to their colleagues is supported by a study by Fong and colleagues (2018) where oncology healthcare professionals self-reported a lack of knowledge and training related to PA and cancer survivors. This further emphasizes the need for healthcare professional education regarding PA benefits for survivors.

Lack of Physical Activity Discussions and Counselling in the Oncology Setting

The limited PA discussions and lack of counselling by oncology healthcare professionals reported in this study is consistent with research conducted by Smith and colleagues (2016) who found that cancer survivors recounted receiving little information regarding PA from cancer healthcare professionals. Despite general awareness of the benefits of PA for survivors among healthcare professionals, it is clear that knowledge among professionals regarding PA for cancer survivors is still lacking. Furthermore, the brief discussions with survivors regarding PA are likely insufficient to create behaviour change. Given the unique needs of cancer survivors, and the significant benefits that can be attained from PA (Garcia & Thomson, 2014), more thorough PA counselling should be offered. This is supported by the fact that survivors who participated in the 2016 study by Smith and colleagues expressed a desire for more guidance with respect to PA, highlighting a need for further discussion and counselling from healthcare professionals. This is in keeping with studies that have investigated the extent to which PA is included in medical education for physicians, where the majority of institutions did not offer any PA education

(Cardinal, Park, Kim, & Cardinal, 2015). Efforts to increase knowledge among professionals emphasizing the importance of PA and PA counselling may be necessary to increase these practices.

Barriers and Enablers to Physical Activity Discussions and Counselling in an Oncology Setting

Consistent with research conducted on oncology healthcare professionals with respect to PA counselling (Fong, Faulkner, Jones, & Sabiston, 2018), lack of knowledge and expertise regarding PA was commonly reported as a barrier to PA discussions by participants in this study. Additionally, a lack of awareness of PA programming to which survivors could be directed was noted as a barrier in both studies. Competing priorities was the most commonly reported barrier to PA discussions and counselling, which is a frequently documented barrier to implementation of programming in implementation science and knowledge translation literature (Handley, Gorukanti, & Cattamanchi, 2017). Given the competing priorities noted by participants, limiting or preventing PA discussions, as well as the lack of confidence or expertise in PA counselling, consistent with a study conducted by Nadler and colleagues (2017), participants believed that PA experts should be added to the oncology healthcare team. This would allow for healthcare professionals to refer patients to a PA expert such as a certified exercise physiologist who would have the time and skillset to discuss and counsel PA, which participants believed would be an enabler to these practices.

Need for Structured Physical Activity Programming for Cancer Survivors

The vast majority of participants in this study believed that there is a need for structured cancer-specific PA programming for cancer survivors, yet participant knowledge of local PA programming was variable, and relatively few programs in each Atlantic Canadian province

were identified in this study. This highlights the need for more PA programming to serve this population and their unique needs as cancer survivors. While lack of programming was frequently noted in larger urban centers, programming was said to be even more scarce in rural areas, suggesting that programming implementation should focus on both areas.

In contrast to this study, where no PA programs were identified within cancer centres, a study in Australia was conducted by Dennett and colleagues (2007), which identified 31 oncology rehabilitation programs within 202 hospitals. Inclusion criteria for the study were programs that were delivered in a health service setting and lead by at least one health professional (e.g., physician, physiotherapist or nurse). The majority of programs identified followed a model used in cardiac rehabilitation and participants were most often referred to the program by physicians, nurses, or allied health professionals. The programs were most commonly comprised of exercise, education and self-management components. Physiotherapists and exercise physiologists lead the programs, prescribing exercise based on initial assessments. The vast majority of programs prescribed aerobic, resistance and flexibility exercise. Researchers who conducted this study concluded that there are few oncology rehabilitation programs in Australia. As no such programs currently exist in Atlantic Canada, this further emphasizes the need for change. The model outlined in the study conducted by Dennett et al. (2017), as well as the Thrive Program based out of Alberta, Canada (University of Calgary Health and Wellness Lab, 2018) may serve as models for future PA programs in Atlantic Canada.

Barriers and Enablers to Physical Activity Programming

Consistent with the results of the study conducted by Santa Mina and colleagues (2015), this study found that partnerships between programs and cancer centres, awareness of the benefits of PA and support from healthcare professionals, though referral of patients to PA

programs, were found to be enablers to PA programming. The supportive network that survivors experience while participating in cancer-specific PA programming was also noted in both studies as an enabler to PA programming uptake, as well as another study that investigated cancer survivors attitudes towards PA (Smith et al., 2016). Furthermore, referrals to PA programs by oncology healthcare professionals were noted as an enabler to PA program success. Importantly, referrals from healthcare professionals to programs only regularly occurred when the program was associated with the cancer centre, emphasizing the importance of partnerships for future program implementation. A barrier to PA programming in both the current study and the study by Santa Mina and colleagues (2015) included lack of funding. Similar to this study which looked at oncology healthcare professionals as a whole, a lack of awareness of PA programming among oncology healthcare professionals was also noted research conducted by Fong et al., (2018). Another commonly referenced barrier to PA programming by participants was lack of support from upper management and administration, which is consistent with a study conducted by Urquhart and colleagues (2014) which found managerial and administrative support to be very important for implementation of complex innovations in the cancer care setting. Finally, it was noted by a participant that collecting data in order to demonstrate the value of their program aided in securing funding for the program. This is consistent with existing research, where collecting and monitoring data in order to demonstrate value and effectiveness of healthcare interventions has been shown to enhance sustainability (Lennox, Maher, & Reed, 2018).

Factors Influencing Program Implementation and Effectiveness

The Consolidated Framework for Implementation Research (CFIR) is an implementation framework that identifies a broad range of factors that have been shown to influence program implementation (Damschroder, et al., 2009). Consisting of five domains, including intervention

characteristics, outer setting, inner setting, characteristics of individuals, and process, the CFIR was used to discuss the contributing factors that may optimize the implementation of the current study findings.

Intervention characteristics. Although participants in this study believe there is a need for PA programs for cancer survivors, the cost associated with programs was noted as a barrier to implementing and sustaining such programming. In addition to funding required to implement programs, the cost for survivors to participate in programs was also noted as a barrier. However, as reported by one participant, and supported by a previous study, collecting data to demonstrate the value of programming can help to secure funding and avoid cost to participants (Lennox, Maher, & Reed., 2018). Although it did not emerge as a theme, it is important to note the complexity of PA interventions and programming for cancer survivors, as effective implementation requires not only appropriate PA programming, but also support from oncology healthcare professionals to direct and refer cancer survivors to programming. Therefore, it is necessary to ensure that oncology healthcare professionals are educated on the importance of PA so that they discuss PA with survivors.

Outer setting. In the context of this study, the outer setting includes PA programs outside of the cancer centre as well as PA programs offered in collaboration with the cancer centre and a community or academic organization. Participants reported a lack of cancer-specific PA programming for cancer survivors as a barrier to PA discussions and counselling in the oncology healthcare setting. Knowledge of patient needs and resources was demonstrated by individuals, but was perceived by participants as lacking overall. Although there were relatively few cancer-specific PA programs identified, having programs available in the community as well as partnerships with cancer centres were perceived as enablers. Specifically, cosmopolitanism in the

form of partnerships with cancer centres and referrals from oncology healthcare professionals were seen as significant enablers to program implementation success.

Inner setting. The most commonly reported barrier to PA discussions and counselling in this study was competing demands. Many participants stated that often there was not enough time to discuss or counsel PA because of its relatively low priority compared to other aspects of care. Due to the significant benefits that survivors can experience from PA, it is necessary to increase awareness and understanding of the benefits of PA for cancer survivors among oncology healthcare professionals so that PA discussions and counselling become a priority. A commonly cited barrier to PA programming, particularly in the oncology setting, was support from management and administration. This suggests that engaging leaders may be an important implementation strategy.

Characteristics of individuals. Although the level of knowledge regarding PA for cancer survivors varied among participants in this study, participants believed PA to be beneficial for cancer survivors. The attitudes towards and value placed on PA for cancer survivors, as well as support for the need for cancer-specific PA programs for cancer survivors, suggests that key stakeholders in oncology support the implementation of such programming. However, varying levels of knowledge and self-efficacy regarding PA discussions and counselling suggests a need for healthcare professional education on the benefits of PA for cancer survivors, which may help to increase these practices. Lack of PA expertise was reported as a barrier to PA discussions and counselling in the oncology setting by participants, suggesting that, in general, current members of the healthcare team were not believed to be as suitable as PA experts to counsel PA.

Process. An enabler to PA program sustainability was found to be data collection to demonstrate the value of the programming and secure funding. In doing this, program leaders are also able to assess the quality of the implementation and make necessary changes to ensure program success.

Contribution to the Literature

This study explored the attitudes and practices of healthcare professionals and administrators at Atlantic Canadian cancer centres with respect to PA for cancer survivors. Furthermore, the study captured information about the availability of cancer specific PA programming available to survivors in the Atlantic provinces, as well as barriers and enablers to existing programs. To the knowledge of the research team, this is the first study of this nature that has been conducted in the Atlantic provinces. As previously noted, the use of semi-structured interviews in this study provided more in-depth insight into healthcare professionals beliefs and practices than previous studies conducted using surveys.

Limitations

Given the relatively small sample size of participant groups, the results of this study may not be representative of the attitudes and practices the larger population of oncology healthcare professionals and administrators in Atlantic Canada and beyond. Although there is no clear minimum sample size for data credibility, data saturation was reached suggesting that the sample size for this study was sufficient (Saunders et al., 2018). Additionally, it is possible that individuals who participated in this study had a personal interest or awareness of PA for cancer survivors, suggesting that the results of this study may overrepresent the awareness of the benefits of PA for cancer survivors among professionals and administrators, as well as the extent to which PA discussions and referrals are occurring. When participants were discussing PA

discussions and counselling, it is possible that they over-reported this type of behavior knowing that the study was regarding PA and that interviewer had a vested interest in PA and cancer survivorship. However, it was noted that participants were generally willing to talk about the lack of PA discussions in their practice.

Another limitation of this study is that there was no representation from the francophone community or francophone healthcare system. This being the case, information regarding the attitudes and practices of healthcare professionals serving the francophone community was not captured in this study and PA programs may have been missed. Furthermore, there were no participants from satellite cancer clinics in New Brunswick. However, efforts were made to ensure participants were geographically representative, and all Atlantic provinces were represented in this study. Another important limitation of this study is that cancer survivors are not represented in this study. Therefore, the needs and experiences of cancer survivors are highlighted by participants but may not be representative of actual survivor experiences and needs.

Data collected regarding cancer-specific PA programs in Atlantic Canada was limited by the knowledge of participants of PA programming, as well as the web-based search. This being the case, PA programming may have been missed. It is possible that program leaders described their programs in a way that made them sound more impressive by emphasizing positive attributes and minimizing barriers. However, it was noted program leaders were very forthcoming about barriers that have been faced.

Strengths

Semi-structured interviews provided an in-depth understanding of participant beliefs, practices and knowledge of PA programming, as participants were able to express themselves in

their own terms. Questions contained in the interview guides allowed the interviewer to gather specific information to answer research questions, and probes allowed them to elicit more information than would have otherwise been gathered.

The Consolidated Framework for Implementation Research for data analysis and interpretation has been shown to optimize implementation of findings into organizations like those in the healthcare setting (Damschroder, et al., 2009). Therefore, discussing the results in terms of this framework may increase the likelihood that the results of this study will be used to implement organizational change with respect to PA for cancer survivors.

Another strength of the study is that all Atlantic Canadian provinces were represented. Furthermore, a variety of roles within cancer centres, including oncologists, nurses, social workers, psychologists, physiotherapists and administrators, as well as PA program leaders were represented. Given that this is the first study of this nature conducted in Atlantic Canada, to knowledge of the research team, it provides good insight into the current attitudes and practices of healthcare professionals and administrators, as well as PA programs in Atlantic Canada.

Implications for Future Research

This study reported existing cancer-specific PA programming as described by program leaders. However, future research should investigate the experiences of cancer survivors who are accessing these programs to gain insight into barriers and enablers from a survivor perspective. Patient experiences of PA discussions and counselling in the clinical setting should likewise be investigated. This will give greater insight into the frequency and degree to which PA discussions and counselling are occurring.

Given that the addition of a PA expert to the cancer care team was a theme captured in this study, research regarding the implementation of this role should be conducted using the

Consolidated Framework for Implementation Research. This would allow for various factors that influence implementation to be analyzed. The results of this study could help to design implementation strategies to integrate PA experts into the cancer care team (Damschroder et al., 2009).

Since a widespread lack of knowledge of the benefits of PA for cancer survivors was perceived among participants, an educational program could be developed for healthcare professionals working in oncology, and the educational strategy could be tested in Atlantic Canada to determine whether it helps to increase PA knowledge as well as PA discussions and counselling among healthcare professionals. It is important to note though, that education for healthcare professionals alone is often not enough to produce behaviour change. This is supported by a study which evaluated an educational program for improving PA counselling skills, practices, and knowledge of oncology nurses (Karvinen et al., 2017). While the educational intervention in this study increased self-efficacy for PA counselling and decreased perceived barriers to PA counselling, it did not increase the number of patients that nurses counselled in PA. This being the case, the educational program to be tested could be coupled with restructuring the working environment (i.e., provide healthcare professionals with protected time to discuss PA) in order to determine if this, along with education, helps to increase PA discussions and counselling.

A research initiative to determine the effectiveness of a PA education program for cancer survivors and the impact this may have on PA discussions in the healthcare setting could be conducted. Specifically, it could be investigated whether PA discussions and counselling increase when cancer survivors are educated on the benefits of PA for survivors and are encouraged to ask their healthcare professionals about PA. It would also be important to

investigate whether this survivor-focused intervention helps to change healthcare professional practices or has an effect on the extent to which healthcare professionals view PA counselling as part of their professional identity.

Implications for Policy and Practice

This study highlights a lack of standard procedure regarding cancer survivors and PA within the healthcare setting. In order to increase PA among cancer survivors, the lack of policy with respect to PA discussions and counselling conducted by healthcare professionals must be addressed. PA is not often discussed in depth with survivors due to competing priorities and lack of specific expertise in PA. However, given the documented benefits of PA, and that participants believed PA to be beneficial for cancer survivors, policies should be made to include PA as a standard of care for cancer survivors. Current barriers to PA discussions may be addressed by educating healthcare professionals on the benefits of PA for survivors so that they make PA discussions a priority. Furthermore, the addition of a PA expert such as exercise physiologists to the healthcare team would enable survivor referrals for further PA discussions and counselling that meets their needs. This would require the allocation of funding to increase PA among cancer survivors and the acknowledgement of upper management of the benefits of PA in order to secure funding. If a PA expert is not available or the resources to place an expert in the clinical setting do not exist, providing extensive healthcare professional education is particularly important because oncology healthcare professionals will need information to counsel survivors on PA. It may also encourage advocacy efforts so that proper PA resources are obtained. Whether or not PA experts are included as part of the cancer care team, education for oncology healthcare professionals is vital because knowledge of the benefits of PA and a basic understanding of how to properly discuss and counsel PA, and when discussions should be

occurring, is necessary to ensure that survivors are being referred to programs and that the PA needs of survivors are being met.

Although education for healthcare professionals is essential to ensure that they are knowledgeable with respect to PA and have the skillset to counsel survivors on PA, education alone is often not sufficient to change current practices and may not result in increased PA discussions and counselling (Karvinen et al., 2017). Therefore, previously documented implementation strategies may be initiated to increase PA discussions and counselling by oncology healthcare professionals (Handley et al., 2017). For example, healthcare professionals should be persuaded to believe that their professional identity includes the practices of discussing and counseling PA. This may be facilitated by education for cancer survivors on the benefits of PA and encouraging survivors to ask their healthcare professionals about PA. As a means of overcoming the barrier of competing priorities, the work environment may be restructured by allocating time to discuss PA with survivors. This may help to alter the perception of healthcare professionals that there are too many competing priorities to do so (Handley et al., 2017). Champions, both administrators and healthcare professionals, have been shown to improve implementation success (Miech et al., 2018). Administrator champions can help to secure funding for PA interventions and healthcare professional champions can support the program by facilitating PA discussions and counselling for survivors and referring them to available programming. Champions may also help to create culture change by supporting, marketing and assisting with the intervention, helping to overcome any resistance or indifference that may exist in response to the intervention (Powell et al., 2015). The importance of champions for cancer-specific PA programs is captured in a study conducted by Santa Mina and colleagues (2015), where successful PA program initiation was constantly associated with champions.

Additionally, collecting and monitoring data in order to demonstrate program value may enhance program sustainability (Lennox et al., 2018).

PA guidelines for cancer survivors were seldom used by participants in discussions with cancer survivors. Therefore, the development and dissemination of local guidelines may help healthcare professionals discuss PA and may help to further emphasize the importance of PA for cancer survivors.

Given the significant benefit that PA has shown to have for cancer survivors, the lack of cancer-specific PA programming in the Atlantic provinces suggests that greater efforts should be made to increase program availability in the region. Therefore, policy should be implemented to allocate funding in support of these programs.

Having PA programs directly associated with the local cancer centre, allowing survivors to be referred to programs by healthcare professionals, was perceived as an enabler by participants. Programs were not located at the cancer centre, but the affiliation of program leaders with the cancer centre was also shown to be an enabler to program success. Therefore, efforts to make partnerships between cancer centres and community-based organizations may allow for more successful programming across the Atlantic provinces.

Conclusions

PA has the potential to significantly improve the lives of the growing number of Atlantic Canadian cancer survivors. This study provides insight into the number of PA programs in Atlantic Canada that are designed for and tailored to the needs of cancer survivors, as well as barriers and enablers to such programming. It also provides insight into the attitudes and practices of healthcare professionals in oncology with respect to PA for cancer survivors as well as barriers and enablers to PA discussions and counselling.

The findings of this study suggest that there are relatively few programs available despite the perception of healthcare professionals and administrators that there is a need for such programming. Participants generally believed PA to be important for cancer survivors, but knowledge regarding PA varied. Participants believed PA should be discussed or counselled to cancer survivors, but barriers including competing priorities, lack of expertise and lack of programs to which cancer survivors could be referred were said to impede these practices. The addition of an exercise specialist to the cancer care team was generally thought to help overcome many of the barriers experienced.

Common themes with regards to program enablers included partnerships between community organizations and cancer centres, survivor referrals from cancer centres, as well as awareness of existing programs among healthcare professionals. Common barriers to programming included a lack of funding, large cost to participants, lack of support from upper management or administration, lack of awareness of the benefits of PA and a lack of awareness of PA programming among healthcare professionals and survivors.

This study highlights the lack of support for cancer survivors with respect to PA and a need for additional resources so that cancer survivors can benefit from PA throughout their cancer care journey into survivorship.

References

- Aguinaga, S., Ehlers, D.K., Cosman, J., Severson, J., Kramer, A.F., & McAuley, E., (2018). Effects of physical activity on psychological well-being outcomes in breast cancer survivors from prediagnosis to posttreatment survivorship. *Psycho-Oncology*, Advance online publication. doi. 10.1002/pon.4755.
- Albrecht, T.A., & Taylor, A.G. (2012). Physical activity in patients with advanced-stage cancer: A systematic review of the literature. *Clinical Journal of Oncology Nursing*, 16, 293-300.
- Alsharif, K., & Hata, J. (2013). Physical and occupational therapy in palliative care. *Essentials of Palliative Care*, 10, 177-188. doi: 10.1007/978
- Barbaric, M., Brooks, E., Moore, L., & Cheifetz, O. (2010). Effects of physical activity on cancer survival: a systematic review. *Physiotherapy Canada*, 62, 25-34. doi: 10.3138/physio.62.1.25.
- Blaney, J.M., Lowe-Strong, A., Rankin-Watt, J., Campbell, A., & Gracey, J.H. (2013). Cancer survivors' exercise barriers, facilitators and preferences in the context of fatigue, quality of life and physical activity participation: A questionnaire-survey. *Psycho-Oncology*, 22, 186-194.
- Bouillet, T., Bigard, X., Mrami, C., Chouahnia, K., Copel, L., Dauchy, S., ... Zelek, L. (2015). Role of physical activity and sport in oncology: Scientific commission of the National Federation Sport and Cancer CAMI. *Critical Reviews in Oncology/Hematology*, 1, 1-19.
- Bourke, L., Homer, K.E., Thaha, M.A., Steed, L., Rosario, D.J., Robb, K.A., ... Taylor, S.J. (2014). Interventions to improve exercise behavior in sedentary people living with and beyond cancer: A systematic review. *British Journal of Cancer*. 110, 831-841.

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101.
- Buffart, L. M., Galvao, D. A., Brug, J., Chinapaw, M.J., & Newton, R. U. (2014). Evidence-based physical activity guidelines for cancer survivors: current guidelines, knowledge gaps and future research directions. *Cancer treatment reviews*, 40, 327-340. doi: 10.1016/j.ctrv.2013.06.007.
- Canadian Cancer Society. (2016). Canadian Cancer Statistics 2016. *Canadian Cancer Society*. Retrieved from <http://www.cancer.ca/~media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2016-EN.pdf?la=en>
- Canadian Cancer Society. (2018). Canadian Cancer Statistics 2018. *Canadian Cancer Society*. Retrieved from <http://www.cancer.ca/~media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2018-EN.pdf?la=en>
- Cardinal, B. J., Park, E.A., Kim, M. S., & Cardinal, M.K. If exercise is medicine, where is exercise in medicine? Review of U.S. medical education curricula for physical activity-related content. *Journal of Physical Activity & Health*, 12, 1136-1343. doi.org/10.1123/jpah.2014-0316
- Cho, H., Mariotto, A.B., Mann, B.S., Klabunde, C.N., & Feuer, E.J. (2012). Assessing non-cancer-related health status of US cancer patients: Other-cause survival and comorbidity prevalence. *American Journal of Epidemiology*, 178, 339-349.
- Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory (3rd ed.)*. Thousand Oaks, CA: SAGE Publications, Inc.

- Cormie, P, Turner, B., Kaczmarek, E., Drake, D., & Chambers, S.K. (2015). A qualitative exploration of the experience of men with prostate cancer involved in supervised exercise programs. *Oncology Nursing Forum*, 42, 24-32.
- Creswell, J.W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oakes, CA: SAGE Publications Inc.
- Culos-Reed, S.N., Shields, C., Brawley, L.R. (2005). Breast cancer survivors involved in vigorous team physical activity: Psychosocial correlates of maintenance participation. *Psycho-Oncology*, 14, 594-606.
- Damschroder, J.J., Aron, D.C., Keith, R.E., Kirsh, S.R., Alexander, J.A., & Lowery, J.C. (2009). Fostering implementation of health services research findings into (2009). Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science*, 4, 1-15.
- Denlinger, C.S., Ligibel, J.A., Are, M., Baker, K.S., Demark-Wahnefried, W., Dizon, D. ...Freedman-Cass, D.A. (2014). Survivorship:Healthy Lifestyles, Version 2.2014: Clinical practice guidelines in oncology. *Journal of National Comprehensive Cancer Network*, 12,1222-1237.
- Dennett, A.M., Peiris, C.L., Shields, N., Morgan, D., & Taylor, N.F. (2017). Exercise therapy in oncology rehabilitation in Australia: A mixed-methods study. *Asia-Pacific Journal of Clinical Oncology*. 13, 515-527.
- Dennis, D.L., Waring, J.L., Payeur, N., Cosby, C., & Daudt, H.M.L. (2013). Making lifestyle changes after colorectal cancer: Insights for program development. *Current Oncology*, 20, 493-511. doi: 10.3747/co.20.1514.

- De Oliviera, C., Weir, S., Rangrej, J., Krahn, M.D., Mittmann, N., Hoch, J.S., Chan, K.K.W., Peacock, S. (2018). The economic burden of cancer care in Canada: A population-based cost study. *Canadian Medical Association Journal Open*. Advance online publication. doi.10.9778/cmajo.20170144.
- Dunn, J., Ng, S.K., Holland, J., Aitken, J., Youl, P., Baade, P.D., & Chambers, S.K. (2013). Trajectories of psychological distress after colorectal cancer. *Psycho-Oncology*, 22, 1759-1765.
- Emslie, C., Whyte, F., Campbell, A., Mutrie, N., Lee, L., Ritchie, D., & Kearney, N. (2007). “I wouldn’t have been interested in just sitting round a table talking about cancer”: Exploring the experiences of women with breast cancer in a group exercise trial. *Health Education Research*, 22, 827-838.
- Faller, H., Weis, J., Koch, U., Brahler, E., Harter, M., Keller, M., . . . Mehnert, A. (2016). Perceived need for psychosocial support depending on emotional distress and mental comorbidity in men and women with cancer. *Journal of Psychosomatic Research*, 81, 24-30. doi: 10.1016/j.jpsychores.2015.12.004.
- Fisher, H.M., Jacobs, J.M., Taub, C.J., Lechner, S.C., Lewis, J.E., Carver, C.S., . . . Antoni, M.H. (2017). How changes in physical activity relate to fatigue interference, mood, and quality of life during treatment for non-metastatic breast cancer. *General Hospital Psychiatry*, 49, 37-43.
- Fisher, A., Wardle, J., Beeken, R.J., Croker, H., Williams, K., & Grimmett, C. (2016). Perceived barriers and benefits to physical activity in colorectal cancer patients. *Supportive Care in Cancer*, 24, 903-910. doi: 10.1007/s00520-015-2860-0

- Fisher, A., Williams, K., Beeken, R., & Wardle, J. (2015). Recall of physical activity advice was associated with higher levels of physical activity in colorectal cancer patients. *British Medical Journal Open*. Advance online publication. doi:10.1136/bmjopen-2014-006853.
- Forbes, C. C., Blanchard, C., M., Mummery, W.K., Courneya, K.S. (2015). A comparison of physical activity preferences among breast, prostate, and colorectal cancer survivors in Nova Scotia, Canada. *Journal Physical Activity and Health, 12*, 823-833.
- Fong, A., Faulkner, G., Jones, J.M., & Sabiston, C.M. (2018). A qualitative analysis of oncology clinicians' perceptions and barriers for physical activity counseling in breast cancer survivors. *Supportive Care in Cancer*. Advance online publication. doi: 10.1007/s00520-018-4163-8.
- Garcia, D.O., & Thomson, C.A. (2014). Physical activity and cancer survivorship. *Nutrition in Clinical Practice, 29*, 768-779.
- Granger, C.L., Denehy, L., Remedios, L., Retica, S., Phongpagdi, P., Hart, N., & Parry, S. (2016). Barriers to translation of physical activity into the lung cancer model of care: A qualitative study of clinicians' perspectives. *Annals of the American Thoracic Society*. Advanced online publication.
- Greenlee, H., Molmenti, C.L., Crew, K.D., Awad, D., Kalinsky, K., Brafman, L. ... Hershman, D.L. (2016). Survivorship care plans and adherence to lifestyle recommendations among breast cancer survivors. *Journal of Cancer Survivorship, 10*, 956-963.
- Handley, M.A., Gorukanti, A., & Cattamanchi, A. (2017). Strategies for implementing implementation science: A methodological overview. *Emergency Medicine Journal, 33*, 660-664.

- Hauken, M.A., Senneseth, M., Dyregroy, A., & Dyregroy, K. (2015). Optimizing Social Network Support to Families Living With Parental Cancer: Research Protocol for the Cancer-PEPSONE Study. *JMIR Research Protocols*. Advance online publication. doi: 10.2196/resprot.5055.
- Hewitt M., & Rowland, J.H. (2002). Mental health service use among adult cancer survivors: Analyses of the National Health Interview Survey. *Journal of Clinical Oncology*, 20, 4581-4590.
- Hills A.P., Street, S.J., & Byrne, N.M. (2005). Physical Activity and Health: "What is Old is New Again". *Advances in Food and Nutrition Research*, 75, 77-95 doi: 10.1016/bs.afnr.2015.06.001
- Howell, D., Hack, T.F., Oliver, T.K., Chulak, T., Mayo, S., Aubin, M.,...Sinclair, S. (2011). Survivorship services for adult cancer populations: A pan-Canadian guideline. *Current Oncology*, 18, 265-281.
- Ibrahim, E.M., & Al-Homaidh, A. (2011). Physical activity and survival after breast cancer diagnosis: Meta-analysis of published studies. *Medical Oncology*, 28, 753-765. doi: 10.1007/s12032-010-9536-x
- Irwin, M.L., Cartmel, B., Harrigan, M., Li, F., Sanft, T., Shockro, L., O'Connor, K., ... Ligibel, J.A. (2016). Effect of the LIVESTRONG at the YMCA exercise program on physical activity, fitness, quality of life, and fatigue in cancer survivors. *Cancer*. Advanced online publication. doi: 10.1002/cncr.30456
- Jones, L.W., & Alfano, C.M. (2013). Exercise-oncology research: past, present, and future. *Acta Oncologica*, 52, 195-215. doi: 10.3109/0284186X.2012.742564

- Jones, L.W., Liang, Y., Pituskin, E.N., Battaflini, C.L., Scott, J.M., Hornsby, W.E., ...Haykowsky, M. (2011). Effect of exercise training on peak oxygen consumption in patients with cancer: A meta analysis. *Oncologist, 16*, 112-120.
- Karvinen, K.H., Balneaves, L., Courneya, K.S., Perry, B., Truant, t., & Vallance, J. (2017). Evaluation of online learning modules for improving physical activity counselling skills, practices, and knowledge of oncology nurses. *Oncology Nursing Forum, 44*, 729-238.
- Keogh, J.W.L., Olsen, A., Climstein, M., Sargeant, S., & Jones, L. (2017). Benefits and barriers of cancer practitioners discussion physical activity with their cancer patients. *Journal of Cancer Education, 32*, 11-15.
- Lavrakas, P.J. (2008). *Encyclopedia of survey research methods*. Thousand Oaks, CA: SAGE Publications, Inc.
- Lennox, L., Maher, L., Reed, J. (2018). Navigating the sustainability landscape: A systematic review of sustainability approaches in healthcare. *Implementation Science, 13*, 1-17. doi: 10.1186/s13012-017-0707-4
- Loprinzi, P.D. & Lee, H. (2014). Rationale for promoting physical activity among cancer survivors: Literature review and epidemiologic examination. *Oncology Nursing Forum, 41*(2), 117-125. doi: 10.1188/14.ONF.117-125.
- Lynch, B.M., Dunstan, D.W., Vallance, J.K., & Owen, N. (2013). Don't take cancer sitting down. *Cancer, 119*(11), 1928-1935. doi: 10.1002/cncr.28028.
- Lynch, B.M., Steginga, S.K., Hawkes, A.L., Pakenham, K.I., Dunn, J. (2008). Describing predicting psychological distress after colorectal cancer. *Cancer, 112*, 1363-1370.

Macmillan Cancer Support (2013). Facing the fight alone: Isolation among cancer patients.

Macmillan Cancer Support. Retrieved from

http://www.macmillan.org.uk/documents/aboutus/mac13970_isolated_cancer_patients_media_reportfinal.pdf

Massie, M.J. (2004). Prevalence of depression in patients with cancer. *Journal of National Cancer Institute Monographs*, 32, 57-71.

McDonough, M.H., Sabiston, C.M., & Crocker, P.R. (2008). An interpretive phenomenological examination of psychosocial changes among breast cancer survivors in their first season of dragon boating. *Journal of Applied Sport Psychology*, 20, 425-440.

doi.org/10.1080/10413200802241857

Mery, L., Dale, D., De, P., Ellison, L., Nuttall, R., Rahal, R.,...Xie, L. (2014). Canadian Cancer Statistics 2014. *Canadian Cancer Society*. Retrieved from

<http://www.cancer.ca/~media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2014-EN.pdf>

Miech, E.J., Rattray, N.A., Glanagan, M.E., Damschroder, L., Schmid, A.A., & Damush, T.M. (2018). Inside help: An integrative review of champions in healthcare-related implementation. *SAGE Open Medicine*, 6, 1-11. doi: 10.1177/2050312118773261.

Mishra, S.I., Schrerer, R.W., Geigle, P.M., Berlanstein, D.R., Topaloglu, O., Gotay, C.C., & Snyder, C. (2012). Exercise interventions on health-related quality of life for cancer survivors. *Cochrane Database of Systematic Reviews*, 11, 124-156.

Moore, S.C., Lee, I., Campbell, P.T., Sampson, J.N., Kitahara, C.M., Keadle, S.K.,...Patel, A.V. (2016). Association of leisure-time physical activity with risk of 26 types of cancer in 1.44 million adults. *JAMA International Medicine*, 176, 816-825.

- Mutisan, K.M., Cole, C.L., Asare, M., Fung, C., Janelsins, M.C., Karmen, C.S...Magnuson, A. (2016). Exercise recommendations for the management of symptoms clusters resulting from cancer and cancer treatments. *Seminars in Oncology Nursing*, 32, 383-393.
- Nadler, M., Bainbridge, D., Tomasone, J., Cheifetz, O., Juergens, R.A., & Sussman, J. (2017). Oncology care provider perspectives on exercise promotion in people with cancer: An examination of knowledge, practices, barriers, and facilitators. *Supportive Care in Cancer*, 25, 2297-2304. doi. 10.1007/s00520-017-3640-9.
- Navaneelan, T., & Janz, T. (2014). Adjusting the scales: Obesity in the Canadian population after correcting for respondent bias. *Statistics Canada Catalogue*. Retrieved from: <http://www.statcan.gc.ca/pub/82-624-x/2014001/article/11922-eng.htm>
- Neil, S.E., Gotay, C.C. & Campbell, K.L. (2013). Physical activity levels of cancer survivors in Canada: findings from the Canadian Community Health Survey. *Journal of Cancer Survivorship*, 8, 143-149. doi:10.1007/s11764-013-0322-6.
- Nowell, L.S., Norris, J.M., White, D.E., & Moules, N.J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Method*, 16, 1-13.
- Orow, G., Sanderson, S., & Sutton, S. (2012). Effectiveness of physical activity promotion based in primary care: Systematic review and meta-analysis of randomized controlled trials. *British Medical Journal*. Advance online publication. doi: 10.1136/bmj.e1389
- Patterson, C.L., Lengacher, C.A., Donovan, K.A., Kip, K.E., & Toftagen, C.S. (2015). Body image in younger breast cancer survivors: A systematic review. *Cancer Nursing*, 39, 39-58. doi: 10.1097/NCC.0000000000000251

- Powell, B.J., Waltz, T.J., Chinman, M.J., Damschroder, L.J., Smith, J.L., Matthieu, M.M., Proctor, E.K., Kirchner, J.E. (2015). A refined compilation of implementation strategies: Results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Science*, doi: 10.1186/s13012-015-0209-1.
- Resnick, B., Orwig, D., Magaziner, J., & Wynne, C. (2002). The effect of social support on exercise behaviour in older adults. *Clinical Nursing Research*, 11, 52-70.
doi: 10.1177/105477380201100105
- Ristovski-Slijepcevic, S. (2008). Environmental scan of cancer survivorship in Canada: Conceptualization, practice and research. *Canadian Partnership Against Cancer*. Retrieved from:
https://wiki.usask.ca/download/.../SurvivorshipEnvScanReportMarch31_web.pdf
- Sabiston, C.M., & Brunet, J. (2012). Reviewing the benefits of physical activity during cancer survivorship. *American Journal of Lifestyle Medicine*, 6, 167-177.
- Sabiston, C.M., McDonough, M.H., & Crocker, P.R. (2007). Psycho-social experiences of breast cancer survivors involved in a dragon boat program: Exploring links to positive psychological growth. *Journal of Sport Exercise Psychology*, 29, 419-438.
- Santa Mina, D., Petrella, A., Currie, K.L., Bietola, K., Alibhai, S.M.H., Trachtenberg, J., Ritvo, P., & Matthew, A.G. (2015). Enablers and barriers in delivery of a cancer exercise program: The Canadian experience. *Current Oncology*, 22, 374-384.
- Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., ... Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality & Quantity*, 52, 1893-1907.

- Schmitz, K.H., Courneya, K.S., Matthews, C., Demark-Wahnefried, W., Galvão, D. A., Pinto, B.M., ... Schwartz, A. L. (2010). American College of Sports Medicine roundtable on exercise guidelines for cancer survivors. *Medicine and Science in Sports and Exercise*, 42, 1409-1426. doi: 10.1249/MSS.0b013e3181e0c112.
- Smith, D.M., Loewenstein, G., Rozin, P., Sherriff, R.L., & Ubel, P.A. (2007). Sensitivity to disgust, stigma, and adjustment to life with a colostomy. *Journal of Research in Personality*, 41, 787-803.
- Smith, L., Croker, H., Fisher, A., Williams, K., Wardle, J., & Beeken, R.J. (2016). Cancer survivors' attitudes towards and knowledge of physical activity, sources of information, and barriers and facilitators of engagement: A qualitative study. *European Journal of Cancer Care*, 26, 1-8.
- Stark, D.P.H., & House, A. (2000). Anxiety in cancer patients. *British Journal of Cancer*, 83, 1261-1267.
- Talepasand, S., Pooragha, F., & Kazemi, M. (2013). Resiliency and quality of life in patients with cancer: Moderating role of duration of awareness of cancer. *Iranian Journal of Cancer Prevention*, 6, 222-226.
- Tomlinson, D., Dorio, C., Beyene, J., & Sung, L. (2014). Effect of exercise on cancer-related fatigue: A meta-analysis. *American Journal of Physical and Medicine Rehabilitation*, 93, 675-686. doi: 10.1097/PHM.0000000000000083
- University of Calgary Health and Wellness Lab. (2018). Thrive Program. Retrieved from <https://www.ucalgary.ca/healthandwellnesslab/programs/thrive-program>

Urquhart, R., Porter, G.A., Sargeant, J., Jackson, L., & Grunfeld, E. (2014). Multi-level factors influence the implementation and use of complex interventions in cancer care: A multiple case study of synoptic reporting. *Implementation Science, 9*, 1-16. doi: 10.1186/s13012-014-0121-0.

Warburton, D.E., & Bredin, S.S. (2016). Reflections on Physical Activity and Health: What Should We Recommend? *Canadian Journal of Cardiology, 32*, 495-504.

Warburton, D.E.R., Nicol, C.W., Bredin, S.S.D. (2006). Health benefits of physical activity: The evidence. *Canadian Medical Association Journal, 174*, 801-809.
doi:10.1503/cmaj.051351

Appendix A: Invitation Letter

PHYSICAL ACTIVITY PROGRAMS FOR ADULT CANCER SURVIVORS IN ATLANTIC CANADA

Dear <insert informant name>,

We are contacting you to ask if you would be interested in participating in a research project. You are being invited to join this study because you have been identified as an individual who may have knowledge of the physical activity programs available to adult cancer survivors in Atlantic Canada. Alternatively, you have been identified because we would like to gain insight into the attitudes and practices related to physical activity for cancer survivors at your institution or organization.

With improvements in cancer treatments, more people diagnosed with cancer are becoming long-term survivors. However, studies have shown that the damage caused by the treatments responsible for this success can lead to other health problems. Physical activity has been shown to be a safe and effective means to help reduce many of the potential physiological (e.g., fatigue), psychological (e.g., depression), and social (e.g., feelings of isolation) side-effects of cancer and cancer treatment, ultimately improving a survivors' quality of life.

Organizations including the American College of Sports Medicine have created physical activity recommendations for cancer survivors. Although the development of guidelines is a positive and necessary step in guiding standardized change, it remains unclear whether or not there are sufficient cancer-specific physical activity programs available to support these recommendations. With some of the highest cancer rates in the country and given the documented benefits of physical activity, it is concerning to note that Atlantic Canadians have some of the lowest levels of physical activity in the country. This suggests that there may be unique barriers and enablers to physical activity for cancer survivors in the Atlantic Provinces. It is important to gain insight into the beliefs and practices of healthcare providers and administrators in the field of oncology to explore this further. The purpose of this study is to explore the cancer-specific physical activity programs available in Atlantic Canada as well as the prevailing attitudes and practices of healthcare professionals and administrators from cancer centers in Atlantic Canada. Ultimately this may inform the need for additional awareness and clinician training, as well as potentially identify a need for additional programming.

If you agree to participate, you will be asked to take part in a one-time interview. Before completing the interview, you will need to sign a copy of the Informed Consent Form and return it to the research team by email at Kelsey.Shea@Dal.ca. Your participation is voluntary. Should you wish to participate, your responses will remain anonymous.

If you are interested in learning more about the study, please contact the research lead Kelsey Shea at 902-449-5584 or by email at Kelsey.Shea@Dal.ca.

Sincerely yours,

Kelsey Shea, BSc,
MSc Kinesiology (candidate)
School of Health and Human Performance, Dalhousie University

Appendix B: Consent Form

Informed Consent Form Non-Interventional Study

STUDY TITLE: *Physical Activity Programs for Adult Cancer Survivors in Atlantic Canada*

PRINCIPAL INVESTIGATOR: *Kelsey Shea, Dalhousie University Dept. of Kinesiology, 6230 South Street, Halifax NS. B3H1T8, (902)449-5584*

STUDY SPONSOR: *N/A*

FUNDER: *This study is being funded by Cancer Care Nova Scotia.*

1. Introduction

You have been invited to take part in a research study. A research study is a way of gathering information on a treatment, procedure or medical device or to answer a question about something that is not well understood. Taking part in this study is voluntary. It is up to you to decide whether to be in the study or not. 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. The research team will tell you if there are any study timelines for making your decision.

Please ask the research team to clarify anything you do not understand or would like to know more about. Make sure all your questions are answered to your satisfaction before deciding whether to participate in this research study.

The researchers will:

- Discuss the study with you
- Answer your questions
- Be available during the study to deal with problems and answer questions

You are being asked to consider participating in this study because you have been identified by our research team as a healthcare provider, administrator, researcher or other individual who may be able to provide insight into attitudes and practices of healthcare providers with respect to

physical activity for cancer survivors, as well as physical activity programs available to cancer survivors in Atlantic Canada.

Your participation is voluntary and if you decide not to take part or if you leave the study at any time without consequence.

2. Why Is This Study Being Conducted?

With improvements in cancer treatments, more people diagnosed with cancer are becoming long-term survivors. However, studies have shown that the damage caused by the treatments responsible for this success can lead to other health problems. Physical activity has been shown to be a safe and effective means to help reduce many of the potential physiological (e.g., fatigue), psychological (e.g., depression), and social (e.g., feelings of isolation) side-effects of cancer and cancer treatment, ultimately improving a survivors' quality of life.

Organizations including the American College of Sports Medicine have created physical activity recommendations for cancer survivors. Although the development of guidelines is a positive and necessary step in guiding standardized change, it remains unclear whether or not there are sufficient cancer-specific physical activity programs available to support these recommendations. With some of the highest cancer rates in the country and given the documented benefits of physical activity, it is concerning to note that Atlantic Canadians have some of the lowest levels of physical activity in the country. This suggests that there may be unique barriers and enablers to physical activity for cancer survivors in the Atlantic Provinces. It is important to gain insight into the beliefs and practices of healthcare providers and administrators in the field of oncology to explore this further. The purpose of this study is to explore the cancer-specific physical activity programs available in Atlantic Canada as well as the prevailing attitudes and practices of healthcare professionals and administrators from cancer centers in Atlantic Canada. Ultimately this may inform the need for additional awareness and clinician training, as well as potentially identify a need for additional programming.

3. How Long Will I Be In The Study?

The total anticipated time commitment for you is approximately 25-40 minutes. It will take approximately 10 minutes to review and complete the consent form, and 15-30 minutes to complete the interview.

4. How Many People Will Take Part In This Study?

About 5-7 people from each of the four Atlantic provinces will participate, representing oncologists, allied healthcare professionals, exercise professionals, academics, and administrators of cancer centers (1-2 oncologists, 1-2 allied healthcare professionals, 1

administrator, 1-2 exercise professional/program coordinator, 1 academic). It is anticipated that a total of 20-30 people will participate in this study throughout Atlantic Canada.

Oncologists, allied healthcare professionals (i.e., nurses, physiotherapists, psychologists, certified exercise professionals/program leaders, and/or related PA professionals, including researchers with expertise in PA and cancer), and administrators from each of the six Atlantic Canadian cancer care centres (i.e., Nova Scotia Cancer Centre, Cape Breton Cancer Centre, Dr. Leon-Richard Oncology Centre, Saint John Regional Hospital, Prince Edward Island Cancer Treatment Centre, and Dr. H. Bliss Murphy Cancer Clinic) as well as from organizations with PA programs tailored specifically for cancer survivors (e.g., PSA Fitness, Halifax NS) will be recruited to participate in telephone interviews.

4. How is this Study Being Done and What Will Happen If I Take Part In This Study?

The overall duration of this study will be approximately 5 months. However, if you agree to take part in the study, you will simply be asked to complete one (1) 15-30 minute telephone interview with a member of the research team. You will be asked a variety of questions about your thoughts and beliefs about the role of physical activity for patients receiving treatment for cancer and for cancer survivors (i.e., post treatment). These questions will be asked to gain insight into the level of importance you place on physical activity for cancer patients and survivors, and to understand the extent to which physical activity is being discussed and/or counselled at your institution/organization. You will also be asked questions about structured physical activity programming available to cancer patients and survivors at your institution/organization, or elsewhere, that you are aware of, as well as opportunities/strengths and challenges/weaknesses of these programs. The interview will be audio recorded and transcribed for data analysis. However, all data will be de-identified and no one will know how you answered the questions.

Your participation in this study is entirely voluntary. If there any questions that you do not wish to answer, they can be skipped. Likewise, if you decide at any point that you would like to withdraw from the study, you are free to do so. If you decide to stop participating at any point in the study, you can also decide whether you want any of the information that you have contributed up to that point to be removed or if you will allow us to use that information. You can also decide for up to two weeks following the completion of the interview if you want us to remove your data. After that time, it will become impossible for us to remove it because it will already be anonymized.

6. Are There Risks To The Study?

We do not anticipate that you will experience any serious risks related to this study. However, as with all interview research, you may feel discomfort or anxiety related to some of the interview questions. You may not like all of the questions that you will be asked. You do not have to answer those questions that make you feel uncomfortable or distressed. We cannot guarantee complete confidentiality when participating in the interview. Your healthcare will not be affected by participating in this study or by choosing to answer or not answer any questions we ask you.

We cannot guarantee complete confidentiality when participating in this study. As with any study, there is the potential of a confidentiality breach, but measures will be taken to reduce the likelihood of this occurring.

The results of this study will be presented as a group and your name will not appear in any report or article published as a result of this study. Specifically, any publication of results will not attribute specific comments to identifiable individuals. All quotes will be anonymized in the reporting of results, with all participants identified as Participant #1, Participant #2, and so on. Furthermore, anonymity will be preserved to the greatest extent possible by not specifying/reporting your community (e.g., Halifax). Rather, if communities, and/or other potentially identifying information are present in your remarks, any resultant quotations will be modified to state Community X and so on.

7. Are There Benefits Of Participating In This Study?

We cannot guarantee that you will benefit from participating in this study. However, we may learn things that will benefit others. For example, indirect benefits from this study may include increased knowledge of physical activity programs in Atlantic Canada, increased knowledge of the attitudes and practices of healthcare providers and administrators within Atlantic Canadian Cancer Care Centres, as well as increased knowledge of the opportunities and challenges associated with physical activity programs for cancer survivors. Furthermore, your participation may or may not help with informing the development of physical activity programs for cancer survivorship in the future.

8. What Happens at the End of the Study?

If you would like a summary of the results, please notify the research team and a summary will be mailed or emailed to you upon completion of the study.

It is anticipated that the results of this study will be published and or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified.

9. What Are My Responsibilities?

As a study participant you will be expected to:

- Read and sign the consent form;
- Follow the directions of the research team;
- Sign and return a copy of the informed consent; and
- Participate in one (1) 15-30 minute telephone interview with a member of the research team.

10. Can My Participation in this Study End Early?

Yes. If you chose to participate and later change your mind, you can say no and stop participating at any time. If you wish to withdraw your consent please inform the research team.

If you choose to withdraw from this study, your decision will have no effect on your current or future medical treatment and healthcare.

If you decide to withdraw from the study, you can also decide whether you want any of the information that you have contributed up to that point to be removed or if you will allow us to use that information.

Also, Cancer Care Nova Scotia, the Nova Scotia Health Authority Research Ethics Board, or the Principal Investigator, has the right to stop patient recruitment or cancel the study at any time.

Lastly, the principal investigator may decide to remove you from this study without your consent for any of the following reasons:

- You do not follow the directions of the research team;

If you are withdrawn from this study, a member of the research team will discuss the reasons with you.

11. What About New Information?

You will be told about any other new information that might affect your health, welfare, or willingness to stay in the study and will be asked whether you wish to continue taking part in the study or not.

12. Will It Cost Me Anything?

Compensation

Participating in this study will not result in any cost to you. =

Research Related Injury

If you become ill or injured as a direct result of participating in this study, necessary medical treatment will be available at no additional cost to you. Your signature on this form only indicates that you have understood to your satisfaction the information regarding your participation in the study and agree to participate as a subject. In no way does this waive your legal rights nor release the Principal Investigator, the research staff, the study sponsor or involved institutions from their legal and professional responsibilities.

13. 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. If the results of this study are presented to the public, nobody will be able to tell that you were in the study.

However, complete privacy cannot be guaranteed. For example, the principal investigator may be required by law to allow access to research records.

If you decide to participate in this study, the research team will look at your personal information and collect only the information they need for this study.

- Name;
- Telephone number and/or E-mail address; and
- Responses from the study interviews.

Access to Records

Other people, during visits to this healthcare facility, may need to look at your personal information to check that the information collected for the study is correct and to make sure the study followed the required laws and guidelines. These people might include:

- The Nova Scotia Health Authority Research Ethics Board (NSHA REB) and people working for or with the NSHA REB because they oversee the ethical conduct of research studies at the Nova Scotia Health Authority.

Use of Your Study Information

Any study data about you that is sent outside of the Nova Scotia Health Authority will have a code and will not contain your name or address, or any information that directly identifies you.

The research team and the other people listed above will keep the information they see or receive about you confidential, to the extent permitted by applicable laws. Even though the risk of identifying you from the study data is very small, it can never be completely eliminated.

The research team will keep any personal information about you in a secure and confidential location for seven (7) years and then destroy it according to NSHA policy. Your personal information will not be shared with others without your permission.

After your part in the study ends, we may continue to review your records for safety and data accuracy until the study is finished or you withdraw your consent.

You have the right to be informed of the results of this study once the entire study is complete.

The REB and people working for or with the REB may also contact you personally for quality assurance purposes.

14. Declaration of Financial Interest

The sponsor, Cancer Care Nova Scotia, is reimbursing the principal investigator and/or the principal investigator's institution to conduct this study. The amount of payment is sufficient to cover the costs of conducting the study.

The PI has no vested financial interest in conducting this study.

15. What About Questions or Problems?

For further information about the study you may call the principal investigator, who is the person in charge of this study and/or any other research team member listed below.

The Principal Investigator and Research Coordinator is Kelsey Shea.

Telephone: (902) 449-5584

The Supervising Investigator is Dr. Robin Urquhart

Telephone: (902) 473-8245

The Sub-Investigators are:

Dr. Melanie Keats

Telephone: (902) 494-7173

Dr. Scott Grandy

Telephone: (902) 494-1145

16. What Are My Rights?

You have the right to all information that could help you make a decision about participating in this study. You also have the right to ask questions about this study and your rights as a research participant, and to have them answered to your satisfaction before you make any decision. You also have the right to ask questions and to receive answers throughout this study.

If you have any questions about your rights as a research participant, contact Patient Relations at (902) 473-2133 or healthcareexperience@nshealth.ca

If you are calling us long distance (NS, NB NFLD and PEI), please use our toll free number 1-855-799-0990>>.

In the next part you will be asked if you agree (consent) to join this study. If the answer is "yes", please sign the form.

17. Consent Form Signature Page

I have reviewed all of the information in this consent form related to the study called:

Physical Activity Programs for Adult Cancer Survivors in Atlantic Canada

I have been given the opportunity to discuss this study. All of my questions have been answered to my satisfaction.

This signature on this consent form means that I agree to take part in this study. I understand that I am free to withdraw at any time without affecting my future care.

Please provide your contact information and preferred telephone number so that we can arrange for your telephone interview.

Email: _____

Phone: _____

Signature of Participant Name (Printed) Year / Month / Day*

Signature of Person Conducting Name (Printed) Year / Month / Day*

Consent Discussion

Signature of Investigator Name (Printed) Year / Month / Day*

****Note: Please fill in the dates personally***

You may keep a signed copy of this consent form and send a copy back to us.

Appendix C: Email Template

Initial Email:

Dear <Insert Name Here>,

I am a master's student at Dalhousie University and I was wondering if you would be willing to participate in a study that I am conducting related to physical activity for cancer patients and survivors. You are being invited to join this study because we would like to gain insight into the attitudes and practices of (*insert appropriate title here (i.e. healthcare providers, administrators, researchers, physical activity professionals, program leaders)*) related to physical activity for cancer patients and survivors at your institution or organization. Alternatively, you have been identified as an individual who may have knowledge of the physical activity programs available to adult cancer patients and survivors in Atlantic Canada. *1*<Insert name> has suggested that you would be a great person to speak with on this topic and has referred you to us.** *2**<Insert name> has informed us that you are involved with a physical activity program for cancer patients and/or survivors, and we would love to hear more about it. ** Your participation would consist of a one-time telephone interview lasting approximately 15-30 minutes which can take place any day and time that is most convenient for you. I would love to get your insight on this topic and would be so grateful if you were able to find time to speak with me.

For more information about the study, an invitation letter and consent form are attached.

Thank you for your time. I look forward to hearing from you.

Sincerely,

Kelsey Shea, BSc
MSc Kinesiology (candidate)
Dalhousie University

Follow-up Email:

Dear <Insert Name Here>,

I just wanted to follow up on my previous email to ask if you would be willing to participate in my study. I am conducting a study related to physical activity for cancer patients and survivors as part of my MSc program at Dalhousie University. You are being invited to join this study because we would like to gain insight into the attitudes and practices of (*insert appropriate title here (i.e. healthcare providers, administrators, researchers, physical activity professionals, program leaders)*) related to physical activity for cancer patients and survivors at your institution or organization. Alternatively, you have been identified as an individual who may have knowledge of the physical activity programs available to adult cancer patients and survivors in Atlantic Canada. *1*<Insert name> has suggested that you would be a great person to speak with

on this topic and has referred you to us. ** *2** <Insert name> has informed us that you are involved with a physical activity program for cancer patients and/or survivors, and we would love to hear more about it. ** Your participation would consist of a one-time telephone interview lasting approximately 15-30 minutes which can take place any day and time that is most convenient for you. I would love to get your insight on this topic and would be so grateful if you were able to find time in your busy schedule to speak with me.

For more information about the study, an invitation letter and consent form are attached.

Thank you for your time. I look forward to hearing from you.

Sincerely,

Kelsey Shea, BSc
MSc Kinesiology (candidate)
Dalhousie University

1 If the individual was referred by another participant or member of the research team and that person as agreed to allow the use of their name when contacting the potential participant**

*2*In the event that we were informed of a physical activity program that the individual is involved with, this would be explained in the email. **

Appendix D: Interview Guide

Semi-structured Interview Guide

Below is the interview guide that will be used for the participant interviews. The following information will be given to participants at the beginning of the interview.

Section 1

For participants who sent a consent form:

Hello, my name is Kelsey Shea and I am a student from Dalhousie University. I am calling with regards to a study on physical activity for cancer patients and survivors that I am leading as part of my Masters study. You were sent a package including a consent form, which you sent back indicating that you would like to participate in an interview. Is this a convenient time for your interview? If not, when would be a convenient date and time for your interview?

If YES (it is a convenient for an interview), continue to *Section 3*

If NO (not convenient time for an interview), interview date and time will be scheduled.

Section 2

For participants who did not send a consent form:

Hello, my name is Kelsey Shea and I am a student from Dalhousie University. I am calling with regards to a study on physical activity for cancer patients and survivors that I am leading as part of my Masters study. You are being invited to join this study because you have been identified as an individual who may have knowledge of the physical activity programs available to adult cancer survivors in Atlantic Canada. Alternatively, you have been identified because we would like to gain insight into the attitudes and practices related to physical activity for cancer survivors at your institution or organization. Your participation would consist of a one-time telephone interview lasting approximately 15-30 minutes.

If you would like to participate, I will send you the invitation letter and consent form. What is the best email address for me to send it to? I would ask that you complete the form and email it to me at Kelsey.Shea@dal.ca. Once your consent form is received, I will contact you to schedule your interview. If you are not interested/comfortable participating in this interview, would you be able to recommend someone else who I could speak with?

Section 3

Please feel free to ask questions at any point during this conversation.

The interview will take about 15-30 minutes or so and I will ask a variety of questions about your thoughts and beliefs about the role of physical activity for patients receiving treatment for cancer and for cancer survivors (i.e., post treatment). I will be asking questions to gain insight into the level of importance you place on physical activity for cancer patients and survivors, and to understand the extent to which physical activity is being discussed and/or counselled at your institution/organization. I will also be asking questions about structured physical activity programming available to cancer patients and survivors at your institution/organization, or elsewhere, that you are aware of. I will be asking open-ended questions to capture as much information as possible. If at any time a question is unclear, please let me know and I can rephrase the question or perhaps explain it better. If you do not wish to answer any question, just let me know and we'll move onto the next. You do not need to answer any question you do not want to. Finally, if you want to stop participating in the discussion, you can feel free to do so without consequence; your participation is entirely voluntary.

As explained in the consent form, I will be recording the discussion so that I can transcribe verbatim your responses. All responses will remain anonymous, with no attribution. The findings will be reported by themes and not by individual response. If quotes are used, they will not be attributed to any one respondent. All personal information will be protected and used only by the research team.

Participant ID (*unique ID generated by research team*): _____

For the purpose of this study, a cancer patient will be defined as an individual with cancer who is currently receiving treatment, and a cancer survivor will be defined as an individual who has completed cancer treatment. Finally, a structured physical activity program will be defined as a program that is specifically designed for and tailored to cancer patients and/or survivors, and led by individuals who are trained in physical activity.

Do you have any questions or concerns before we start? Is it okay if we start now? If so, I will start recording now.

Semi-structured Interview Guide Questions

PART A: (2 minutes)

The first part of the interview includes a few background questions:

1. What is/are the name(s) of the organization(s)/institution(s) where you work?
2. What is your current role/professional title?
3. How long have you been working with this/these organization(s)/institution(s)?

PART B: (15 minutes)

The following questions refer to your current thoughts and practices with respect to physical activity for cancer patients and survivors.

1. What do you think about cancer patients (people on active cancer treatment) engaging in physical activity?
2. What do you think about cancer survivors (people who have completed treatment) engaging in physical activity?
3. Based on your knowledge of physical activity for cancer patients and survivors, what do you think about recommending physical activity or providing counselling to patients/survivors regarding physical activity prescription?
4. Is physical activity being discussed and/or counselled to cancer patients and/or survivors at your institution/organization? Please specify – patients, survivors, both, or neither.

IF YES, go to questions #5-#6, then #8-#9. If NO, skip to questions #7-#9:

5. Who is discussing/counselling patients and/or survivors on physical activity? (PROBES: physician, nurse, physiotherapist, exercise professional, other allied healthcare professionals, etc.)
6. To what extent do you think physical activity is being discussed/counselled? (PROBES: Is physical activity simply being recommended, are physical activity guidelines being distributed, are people being referred to programs? Are they cancer specific? Individualized? Conducted by individuals who are trained in physical activity for cancer patients/survivors?)
7. Why is physical activity not being discussed/counselled with/to cancer patients and survivors?
8. What are the key barriers to having these discussions or counselling cancer patients and survivors on physical activity? (PROBES: Awareness/knowledge, patient or provider attitudes, skill, training, confidence, supportive resources such as dedicated physical activity specialist, patient compliance/non-compliance, patient treatment related side-effects, late effects and/or co-morbidities, lack of time, competing demands, clinical practice guidelines, community resources and services, support from leadership)
9. What are the key enablers to having these discussions or counselling cancer patients and survivors on physical activity? (PROBES: Awareness/knowledge, patient or provider attitudes, skill, training, confidence, supportive resources such as dedicated physical activity specialist, patient compliance/non-compliance, patient treatment related side-effects, late

effects and/or co-morbidities, lack of time, competing demands, clinical practice guidelines, existence of community resources and services, support from leadership)

PART C: (10 minutes)

The following questions will refer to structured physical activity programs for cancer patients and survivors. As a reminder, we want to know about program(s) that are designed for and tailored to the individual needs of cancer patients and/or survivors. We are also interested in learning more about programs that are led by individuals who are trained in physical activity.

1. Are you aware of any structured physical activity programs at your institution/organization or another institution/organization in Atlantic Canada?

IF YES, continue to questions #2-#9. If NO, skip to questions #6-#9.

2. What are these programs called?
3. Where are these programs located? (e.g. Cancer Centre based? Community based? Academic based?)
4. Based on your knowledge of these programs, can you tell me...
 - a. What is the structure of this/these physical activity program(s)?
 - b. What type of physical activity is done in this/these program(s)?
 - c. What are some of the key strengths/benefits of this/these program(s)? (PROBES: benefits to patients/survivors)
 - d. What are some areas where this/these programs might be improved?
 - e. How many staff in the program(s) are trained in physical activity counselling for cancer patients and/or survivors?
 - f. What is their level of training (Professional certification such as CSEP or ACSM; Professional designation such as Kinesiologist, Exercise Physiologist, Recreation therapist, or Rehabilitation specialist (e.g., physiotherapist, occupational therapist))?
5. If you are not directly involved with this/these programs(s) and/or do not have specific knowledge of it/them, would you be able to direct me to someone who may be able to tell me more about this/these program(s)?

If YES, would you be able to provide their professional contact information?

6. Do you believe there is a need for structured physical activity programming for cancer patients and/or survivors? Why or why not?
7. What do you believe are the key enablers or “keys to success” for successful and sustainable programming? (PROBES: funding, education (patient and/or provider), leadership and/or organizational support, provider awareness/knowledge of benefits of physical activity,

provider attitude, skill, training, confidence, patient/survivor compliance, patient/survivor/provider education on physical activity, program characteristics (i.e. group-based programming), community partnerships, consideration of patient needs/preferences, guidelines/mandates, hospital/community resources (i.e. dedicated physical activity specialist), policy.

8. What do you believe are key barriers to successful and sustainable programming? (PROBES: lack of funding, lack of leadership and/or organizational support, lack of provider awareness/knowledge of benefits of physical activity, provider attitude, skill, training, confidence, patient treatment-related side effects, late effects and/or co-morbidities, patient/survivor compliance, patient/survivor perceived difficulty of physical activity, lack of guidelines/mandates, lack of hospital/community resources (i.e. dedicated physical activity specialist), lack of policy.
9. Are you aware of any other individuals in your region or within another organization in Atlantic Canada who would be able to speak to structured physical activity counselling or programming for cancer patients/survivors?

If YES, would you be able to provide their professional contact information?

Thank you very much for your taking the time to participate in this interview.

Appendix E: Program Details

PA Programs specifically designed for and tailored to cancer survivors in Atlantic Canada

Note: This data was collected in Summer, 2017 and may not accurately reflect currently available programming

Nova Scotia

EXercise to prevent AnthrCycline based Cardio-Toxicity (EXACT) Study: Halifax, NS

This program, in the form of a research project, was conducted at the Nova Scotia Cancer Care Centre in Halifax by researchers at Dalhousie University to investigate the heart protective role of physical activity for adults actively undergoing chemotherapy treatment for breast cancer, leukemia, and lymphoma. Initially, oncologists and oncology nurses discuss the research program with patients. If patients show interest they are referred to the research coordinator to discuss the program, and ultimately decide if they would like to enroll. The physical activity consists of aerobic-based exercise twice a week for twelve weeks within individually prescribed heart rate zones that are based on an initial cardiac instructive. The vast majority of physical activity is performed on treadmills, with the exception of those who made use of cycle ergometers.

YWCA Encore Program: Cornwallis and Yarmouth, NS

Originally developed in the United States, following a study by a review committee of medical and health consultants, the Encore program was deemed to be safe and effective for breast cancer survivors, following a mastectomy. The program has expanded and is now offered to women who are patients or survivors of breast cancer or have undergone breast cancer surgery at some point in their lives. Within the program, both aquatic and land-based physical activity is performed, placing an emphasis on improving movement and flexibility over an eight-week period. The program aims to rebuild muscular fitness, improve mobility and strength, reduce disabilities associated with treatment, reduce pain and discomfort, maintain or improve cardiovascular health, relieve stress and tension, and maintain or help to restore a sense of control and self-esteem among participants. In addition to physical activity, the program also features guest speakers and open discussion amongst participants.

The program takes place in a non-medical environment and offers participants the opportunity to share common experience with fellow participants, while allowing participants to progress at their own pace.

The program is offered through the YWCA, and takes place in the YMCA in Cornwallis, and Yarmouth, NS. Participation is free of cost to participants.

<https://ymcayarmouth.net/encore-program/>

New Brunswick

CO21 Challenge – St. John, Fredericton, and Moncton, NB

The CO21 Challenge study is a hospital-based research study for survivors with late stage three, and early stage four colorectal cancer that begins following the completion of treatment. The goal of the study is to assess the outcomes of physical activity on the survival rate of colorectal cancer survivors.

Participants complete the Physical Activity Readiness Questionnaire and leisure study questionnaires. They then complete a six-minute walk test and a two-phase treadmill test. If successful, participants are then placed in a randomized control trial, with two groups: a control, and experimental group. Those assigned to the control group are seen over a three-year period at 12, 24, and 36 months, respectively, and assessed on the same fitness tests from initial assessment. Members of the experimental group are seen every two months for the initial six-month period and take part in physical activity and behavioral support sessions aimed to keep them motivated and exercising. Participants are encouraged to do aerobic activity but there are no strict guidelines for the type of physical activity that is to be performed. In the first six months of the program physical activity must be ten minutes or more to count towards their physical activity and participants keep track in a physical activity log. After being enrolled in the program for six months, participants are encouraged to increase physical activity to 20 minutes per day, and to 25 to 40 minutes in the following six months. Efforts are made to help participants establish weekly physical activity plans that consist of individually-tailored activities. Reassessment of members of the experimental group takes place on the same schedule as the control. Following the six-month reassessment behavioral sessions continue at the same interval but the physical activity sessions no longer take place.

Participants are eligible to receive up to \$200.00 in the first year to help them access physical activity resources. In years two and three the amount available to participants is reduced to \$100.00 per year.

The study is currently active in St. John, Fredericton, and Moncton, NB in conjunction with and funded by the Canadian Cancer Society. The program is run by three physiotherapists, one of whom has training in medical exercise therapy.

Focus on Healing - Healthy Steps: Moncton, NB

This program is based on a franchised framework developed in the US. Providers must register and complete training that provides them with the skills and information to facilitate workouts, both dryland and aquatic, that are specifically tailored to enhance the well-being of those with cancer or other chronic illnesses.

The YMCA in Moncton offers the program to women who have had breast surgery, node dissection, radiation, or chemotherapy in relation to breast cancer. Weekly land and aquatic programs, that are 1hr, and 45min in length, respectively, are instructed by two individuals who have been certified through Healthy Steps. The classes focus on improving range of motion, balance, strength and endurance. Participation in the classes is free of charge, offered through a partnership between the Moncton YMCA and the Angel Fund at the Moncton Hospital.

<https://moncton.ymca.ca/en/Programs/Group-Fitness-Yoga-Mind-Body/Focus-on-Healing-Healthy-steps?nolocation=1>

Stay Strong – St. John and Fredericton, NB

This 12-week program aims to minimize the negative side effects associated with chemotherapy, radiation and hormonal treatments for various cancers. It is open to individuals undergoing cancer treatment as well as those who have completed treatment. The program offers individualized exercise programs emphasizing cardiovascular health, strength, endurance and flexibility performed under the supervision of experienced rehabilitation professionals including nurses, and physiotherapists. Upon signing up for Stay Strong, each participant undergoes assessments to determine current levels of stress and side effects experienced, a medical history is taken, and a physical activity plan is developed with program staff. At the end of the 12 weeks, participants are then reassessed on the same parameters.

Though programs are individually tailored for each participant, sessions occur two times per week in a supervised group setting as a means of increasing the social support available to individuals recovering from, or currently undergoing cancer treatment. Participants are given materials help track their physical activity, including physical activity that takes place outside of the structured weekly sessions. This allows for progress to be monitored and helps program leaders tailor programs to suit meets participants individual needs. It is also used to help cater programs to the forms of exercise that participants enjoy most. Participants are able to access the entire YMCA facility and all of the equipment and exercise classes offered including, but not limited to, water aerobics and yoga. Once participants have completed ten visits, they receive a Stay Strong t-shirt as a reward.

Stay Strong is currently being offered free of cost for twelve weeks at the YMCA of Greater St. John and YMCA of Fredericton, NB in association with Horizon Health. In order to keep using the facility participants must purchase a membership at the end the end of the 12-week period. Participants are required to have a medical certificate dictating what level of activity is appropriate in each individual case, outlining restrictions when necessary. In addition to the physical activity aspect of the program, there are also events held four times a year as part of the program that focus on psychosocial aspects cancer treatment, and life after treatment. Participants may self-refer to the program or can be referred by a healthcare professional.

<https://saintjohnny.ymca.ca/Programs/Health-Management/Stay-Strong?nolocation=1>

Newfoundland

Defy Cancer: St. John's, NL

This six-week program is meant to educate and motivate cancer patients and survivors to become physically active as they move forward into the post-treatment recovery process. Each weekly 3hr session features a guest speaker covering a cancer-related topic and an open discussion. Following the presentation, a certified personal trainer guides participants through a low impact dry-land fitness program that progresses in intensity throughout the six-week period. In addition to the guided workouts, participants are also given educational take-home materials on at home strengthening exercises. Each session finishes with an aquatic workout in warm shallow water. The emphasis of the aquatic portion is on joint, muscle, and flexibility health.

Defy Cancer is a Canadian Cancer Society program and is currently being offered in St. John's, NL at New World Fitness, a privately owned and operated fitness center. The program is free for cancer patients and survivors and is partially funded by The Government of Newfoundland and Labrador Department of Seniors, Wellness and Social Development.

<http://www.cancer.ca/en/events/nl/community-services/defy-cancer-program/?region=nl>

Multiple Provinces in Atlantic Canada

Cancer Transitions: Sydney, NS and St. John's, NL

This program is meant to help cancer survivors transition from active-treatment to post-treatment life, specifically tailored to individuals who have just finished treatment and those who are as far as two years post-treatment. Six 2.5hr sessions once a week for six weeks cover a wide breadth of topics related to transitioning to life post-treatment. Most pertinent to the report at hand is the inclusion of 30-minute exercise routines during the sessions tailored specifically for cancer survivors, and to the needs of individual participants. Additionally, there is an entire session dedicated to physical activity as part of the transitional process entitled "Exercise for Wellness: Customized Exercise."

Cancer Transitions was offered through the Halifax and Cape Breton Cancer Centers in collaboration with the YMCA and the Canadian Cancer Society but is not currently being offered in Halifax, as the YMCA in this region no longer exists.

The program is being offered three to four times a year in St. John's, NL at The Works, the on-campus fitness facility at Memorial University. This version of the program takes place over an 8-week period and is coordinated by social workers in the cancer care program at the Dr. H. Bliss Murphy Cancer Clinic. Exercise components are developed and supervised by physiotherapists and kinesiologists, and volunteer support for the program is provided by kinesiology students at Memorial as part of their learning. Participants were given materials to track, and were encouraged to perform, physical activity outside of the structured sessions.

****The programs below do not explicitly fit the criteria of the study, but have been included because they are physical activity programs for cancer survivors****

Nova Scotia

Canadian Cancer Society, Sobey Cancer Support Centre: Halifax, NS

Various weekly physical activity programs are offered including Deb's Restorative Yoga, Group Exercise, and Walking for wellness. Deb's Restorative Yoga incorporates props to allow for participants to more easily maintain balance throughout poses, and classes move through series of poses slowly. No prior yoga experience is required of participants. Group Exercise is a weekly 30min session that incorporates gentle movement and functional exercises making use of body weight, resistance bands and light dumbbells. Workouts can be modified to meet the needs and fitness levels of individual participants. Walking for Wellness is a seasonal outdoor walking program that varies in distance and offers participants a low-impact physical activity alternative. When in season, walks take place on a weekly basis.

<https://sobeycancersupportcentre.ca/programs>

True NTH Canada: Prostate Cancer Canada - Movember Foundation

The True NTH exercise program is part of a larger lifestyle management framework offered to men who have had a previous diagnosis of prostate cancer regardless of whether participants are actively receiving treatments. True NTH partners with community-based organisations across Canada to offer an in-person evidence-based fitness and yoga program. Additionally, free home-based programs are offered online which include video, photo, and written instructions, and offer tools to track weekly progress.

In the Halifax-based in-person version of the program, participants initially underwent individual baseline fitness and body composition assessment, as well as a health assessment. Recruitment to the program took place through both self-referrals, as well as direct referrals from cancer clinics. Each session ran for 12 weeks and participants could attend additional sessions. Of the two weekly classes, one focused on strength and aerobic exercise, the other on yoga. All classes took place in a group setting. The designated yoga day followed the Yoga Thrive program (see below). The program was run under the supervision of a MSc Kinesiology graduate with a CSEP-CPT, a MSc Kinesiology graduate with a CSEP CEP, a MSc kinesiology graduate, and a yoga instructor with Yoga Thrive training. This version of the program was offered in partnership with the University of Calgary.

Currently, the in-person program is no longer being offered in Atlantic Canada. The program was offered in Halifax for three years at the Kinesic Sport Lab, a community-based, private business. Cost to participants varied within the three-year period due to variable funding from

organisations such as Prostate Cancer Canada, and the Movember Foundation. When funding was available, the program was offered free of cost to participants.

<https://lifestyle.truenth.ca/>

Yoga Thrive: Health and Wellness Lab, University of Calgary, AB

This is a therapeutic yoga program for cancer survivors, and individuals currently undergoing treatment. The program is research-based and consists of 75min classes, once a week over a twelve-week period. A main tenet of the program is its commitment to training and certifying instructors through the *Yoga Thrive Teacher Training Program*. The 32hr training provides instructors with the ability to teach therapeutic, cancer specific classes.

This program is not currently being offered in Atlantic Canada.

<https://www.ucalgary.ca/healthandwellnesslab/programs/yoga-thrive>

Ways to Wellness: Cape Breton, NS

This program is an annual two-day workshop for cancer survivors and patients and a family member, or support person. The program aims to help participants live well beyond cancer through providing information, education and skills in a variety of subject areas including psychosocial, and physical aspects of living beyond cancer. The program features presentations from occupational therapists, and doctors speaking to the benefits of physical activity in relation to the recovery process. In addition to the educational component, participants are invited to partake in yoga, and Tai Chi classes throughout the weekend, and are encouraged to continue to attend weekly classes being offered in each discipline.

The workshop is hosted by the Cape Breton Cancer Centre at the Whitney Pier Legion and is free of cost to participants.

Weekly Yoga and Tai Chi Classes for Cancer Patients: Cape Breton, NS

The Cape Breton Cancer Centre offers weekly yoga and Tai Chi classes for cancer patients and survivors from September to June. Both classes are 1hr in duration. Classes are taught by experienced instructors and are hosted at the Whitney Pier Legion.

Prince Edward Island

Women's Cancer Exercise Program: Charlottetown, Prince Edward Island

The Women's Cancer Exercise Program was a pilot program independently created and run by an exercise physiologist, who is also a CSEP CPT, out of a community physiotherapy clinic. The program consisted of 1hr training sessions twice a week over an eight-week period. Each beginning with a warm up, followed by circuit-based exercise, concluding with a cool down and stretching. The physical activity consisted of aerobic, strength, and flexibility training. Additionally, during stretching and cool down participants were provided with information pertaining to the exercise they had done and what they would be working towards in sessions to come.

Being a pilot project, the training group was kept small (three participants), and included a recent post-operative participant, as well as a survivor, and an individual who was undergoing treatment during the pilot period. The program was offered to women with reproductive cancers as well as breast cancer. The cost to participants was \$100 for the eight-week period.

New Brunswick

Cancer Rehabilitation and Support Team Program – Fredericton, NB

Program offered through CBI Health group and focuses on therapeutic exercise. Physical activity and exercise is offered to participants through community-based and home-based fitness programs. Additionally, the program offers resources focused on life skills, as well as nutrition. Participation in the program is at direct cost to survivors.

Newfoundland

A research-based physical activity program specifically designed for and tailored to prostate cancer survivors based on Canadian Society for Exercise Physiology (CSEP) guidelines was offered at Memorial University through a Master's of Science student's research project. Participants were permitted to do any type of physical activity, but participants were provided with a DVD workout program, which was created by the researchers, that participants could use at home. Participants were also given printed materials containing information about stretching, physical activity guidelines, and a tracking sheet for their physical activity. Researchers met with participants to discuss guidelines and the amount of physical activity that they should be participating in. Walking was noted as a popular choice among participants. Physical activity outcomes of participants were measured. This program was no longer offered when the related study ended.

Another program formerly offered through research at Memorial University was a group-based physical activity program for prostate cancer survivors. The program was co-lead by certified exercise physiologists. However, the program ended when the research project ended.

Multiple Provinces in Atlantic Canada

Dragon Boat Racing for Breast Cancer Survivors

Multiple dragon boat teams across Atlantic Canada comprised of women who are survivors of breast cancer train and participate in dragon boat racing, both in the Atlantic region and at festivals across Canada.

Running Room Survivor Training Program

A ten-week walking and/or running clinic offered free of cost to women who have survived breast cancer to train for the CIBC Run for the Cure. Physical activity in the program takes the form of running, walking and stretching. Each week, a 20-30min health education group seminar takes place, followed by a group walk and/or run. In addition to these sessions, participants take part in Run Club twice a week to complete a weekly training schedule.

These programs are offered at locations throughout Atlantic Canada.