Mind the (Knowledge-to-Action) Gap: Exploring Factors that Affect Physical Activity in Breast Cancer Survivors

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy

Graduate Department of Exercise Sciences University of Toronto

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Abstract

This program of research aimed to assess the *predisposing*, *reinforcing* and *enabling* factors that influence physical activity (PA) among women with breast cancer from individual, environmental and provider perspectives. Study 1 was a cross-sectional study involving an online questionnaire completed by breast cancer survivors (BCS; N=201). This study aimed to identify unmet needs and preferences for PA resources among BCS. Various forms of social support for PA were identified as salient unmet needs or preferences. Study 2 involved an environmental scan of regional cancer centres in Ontario (N=14) and textual analysis of free and available materials collected from the centres (N=58). The aim of this study was to evaluate cancer centers for PA information and infrastructure. The infrastructure of the cancer centres provided some opportunities for dissemination of PA information. Gathered textual materials were rated favourably, included consequences of physical inactivity, yet included only some behaviour change techniques (BCTs) that are critical for initiating or maintaining PA. Study 3 involved four focus groups with cancer care clinicians (N=27) from cancer centres in southern regions of Ontario. The aim of the focus groups was to examine factors affecting PA counselling between clinicians and BCS. Clinicians found that cancer center administration and clinic flow were barriers to PA counselling, perceived lack of available resources and time constraints. In order to facilitate PA counselling, clinicians wanted resources that were patient-focused and available on

multiple platforms. Together, the studies identify key individual, environmental, and practitioner factors that need to be addressed through future research in order to develop appropriate resources to facilitate PA in BCS. Importantly, the *predisposing factors* include BCS' age, time since treatment and PA level and clinicians' PA attitudes and skills; *reinforcing factors* included textual materials with few BCTs and social and environmental norms of cancer centres; *enabling factors* included materials and resources for BCS and clinicians.

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"When the wind blows hard and the sky is black, ducks fly together"

Miss MacKay, D2: Mighty Ducks

Much like that ragtag hockey team in *D2: Mighty Ducks* who had to work together to win the Junior Goodwill Games, this dissertation would not be possible without the help of many individuals working together.

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Chapter 1 Introduction

In Canada, one in eight women will be diagnosed with breast cancer in her lifetime, and with increases in screening practices and improved treatment technology, the 5-year survival rate has reached 87% (Canadian Cancer Society, 2017). As such, there is a large population of Canadian women, at least 166,000, who are living with the debilitating effects from cancer and its related treatments (Canadian Cancer Society, 2017). Physical activity has been shown to improve survival and physical and psychological functioning in breast cancer survivors (Battaglini et al., 2014; Sabiston & Brunet, 2012; Speck, Courneya, Mâsse, Duval, & Schmitz, 2010), yet as many as 90% of breast cancer survivors (i.e., post-diagnosis until end of life; National Cancer Institute, 2015) report not being physically active at levels that lead to health benefits (Lynch et al., 2010). Thus, there is an apparent knowledge-to-action gap between the accumulating evidence that physical activity is beneficial and disseminating this information to breast cancer survivors.

1 Rationale for Program of Research

In order to better bridge the knowledge-to-action gap, approaches that implement knowledge translation strategies are required. The Translational Science Process model provides a framework to help understand knowledge-to-action gaps and consists of multiple phases (Alfano et al., 2014; Khoury, Gwinn, & Ioannidis, 2010). The phases detail scientific discovery, dissemination and evaluation of public health knowledge and its population impact (Alfano et al., 2014; Khoury et al., 2010). Within this model, researchers have provided ample high quality evidence that physical activity is beneficial for breast cancer survivors through the scientific discovery phases. However, there is insufficient effort placed on the phase related to dissemination of public health knowledge (Phillips, Alfano, Perna, & Glasgow, 2014). Focusing on this phase will allow for the development of feasible and sustainable physical activity interventions for breast cancer survivors. Furthermore, this program of research will address this knowledge-to-action gap by using an integrated knowledge translation approach that will be informed by the PRECEDE (Predisposing, Reinforcing and Enabling Constructs in Educational/ Environmental Diagnosis and Evaluation) – PROCEED (Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) model (Green & Kreuter, 2005). This model was selected as it is a comprehensive planning and evaluation framework that has

been empirically tested in previous research (Davies, Walker, & Grimshaw, 2010; Porter, 2016). The main goal of using the PRECEDE-PROCEDE model to advance the dissemination phases of the Translational Science Process model by understanding what physical activity needs have to be addressed in future programs and interventions, where the interventions could take place, and who are the key informants in developing a sustainable physical activity program for breast cancer survivors. Specifically, the PRECEDE-PROCEED model has eight phases. The first four phases (PRECEDE) involve the following: (1) social assessment; (2) epidemiological, behavioural and environmental assessments; (3) educational and ecological assessment; (4) alignment of intervention components with administration and policy. The last four phases (PROCEED) involve implementation and evaluation of an intervention for its impact to change predisposing, reinforcing, enabling, behavioural and environmental factors. For the purpose of this dissertation program of research, only the PRECEDE phases of the model are used to help inform the development of physical activity resources and programs for breast cancer survivors. With future complimentary work in policy, the development of large-scale population level physical activity programs and resources can ben evaluated and may become part of standard cancer care.

Phase 1 of the model entails a social assessment, which involves uncovering the needs and desires of community members. Currently, there is little evidence of researchers focusing on understanding breast cancer survivor unmet needs for physical activity resource and therefore, the underlying predisposing, reinforcing and enabling factors from an individual (breast cancer survivor) perspective. In the context of physical activity, unmet needs refer to informational, tangible and social support physical activity needs that are not satisfied and, if met, could be potential facilitators for physical activity (Charlier et al., 2012). Further, a salient barrier to physical activity is lack of social support (Barber, 2012; Wurz, St-Aubin, & Brunet, 2015) and this may also be reflected as unmet needs. It is important to understand physical activity unmet needs in order to direct efforts for physical activity programs, resources, and interventions to help breast cancer survivors initiate and maintain an active lifestyle. In the current program of research, the first study was designed to identify the unmet needs for physical activity resources and preferences within a convenient sample of breast cancer survivors. The identification of these unmet needs may inform future program and intervention efforts and physical activity

resource allocation and management. Understanding preferences may help identify strategies for improved physical activity among women with breast cancer.

Phase 2 of the PRECEDE-PROCEED model involves epidemiological, behavioural and environmental assessments. Based on the model, the predisposing, enabling and reinforcing factors associated with this phase can be identified through using previous research. For instance, there is substantial epidemiological evidence that there are low levels of physical activity among breast cancer survivors (e.g., Lynch, 2010; Sabiston, Brunet, Vallance, & Meterissian, 2014). Similarly, there is abundant evidence examining behavioural determinants of physical activity in breast cancer survivors (e.g., Rogers, McAuley, Courneya, & Verhulst, 2008). Currently, a clearer understanding of the environmental facilitators to physical activity within oncology centers is needed. One effort to evaluate physical activity information offered to breast cancer survivors involved an evaluation of cancer center websites (Sylvester, Zammit, Fong, & Sabiston, 2017). While not part of this program of research, the findings offer insight into the environmental facilitators for physical activity. Specifically, this web evaluation highlights the lack of behaviour change techniques in online resources for physical activity and breast cancer survivorship (Sylvester et al., 2017). An environmental scan is a common strategy used in school-based health behaviour evaluations (Leatherdale et al., 2014) that could be used to assess the availability and quality of resources in cancer centres. Cancer centres were chosen for the scans because they are perceived as reliable sources of health related information and regularly accessed by breast cancer survivors (Santa Mina, Alibhai, Matthew, Guglietti, Steele, Trachtenberg, & Ritvo, 2012). Furthermore, identifying physical activity programs offered at the cancer centres could help inform gaps in knowledge and practice. In the current program of research, an environmental scan was conducted among all regional cancer centers in Ontario and any centre-specific textual and published resources will be collected and analyzed.

Phase 3 of the PRECEDE-PROCEED model involves an educational and ecological assessment to summarize the factors identified in Phases 1 and 2 to determine the predisposing, reinforcing and enabling factors that influence behavioural change. Cancer care clinicians have been identified as important messengers of health-related information for breast cancer survivors. Nadler and colleagues (2017) described a cancer care clinician to include physicians (general practitioner in oncology, medical oncologist, and radiation oncologist), nurses (advanced practice nurse, registered nurse, specialized oncology nurse), radiation therapists, and other hospital/clinic based health professionals (e.g., dieticians, occupational therapists, physiotherapists, social workers). However, many cancer care clinicians do not consistently offer physical activity counselling including inquiring about physical activity, assessing patients for physical activity readiness and offering advice to their patients (Karvinen, DuBose, Carney, & Allison, 2010; Nadler et al., 2017). Further, while oncology nurses may be available to counsel their patients on physical activity (Karvinen, McGourty, Parent, & Walker, 2012), they face similar barriers as oncologists. These barriers include lack of physical activity counselling knowledge, time restraints and decreased self-confidence to counsel on physical activity (L. W. Jones, Courneya, Peddle, & Mackey, 2005; Karvinen et al., 2010, 2012). The evidence alludes to factors experienced by cancer care clinicians when attempting to counsel patients on physical activity. As such, this program of research was also focused on assessing these factors by conducting focus groups with various cancer care clinicians to determine the most salient factors affecting physical activity counselling of breast cancer survivors.

1.1 General Program of Research Aims

Using the Translational Science Process model as a guiding framework, and the PRECEDE-PROCEED model as the planning framework, the main purpose of this program of research was to assess the predisposing, reinforcing and enabling factors that influence physical activity in the breast cancer population from individual, environmental and provider perspectives. This was achieved through three specific aims:

- i. Identify unmet needs and preferences for physical activity resource among breast cancer survivors (Study 1).
- ii. Identify physical activity information and infrastructure support within cancer centers. A secondary aim was to identify the physical activity behaviour change techniques used in the information that is available to breast cancer survivors in cancer clinics and to evaluate this information for quality (Study 2).
- Examine factors affecting physical activity counselling between clinicians and breast cancer survivors (Study 3).

1.2 Significance

Understanding potential factors that affect a knowledge-to-action gap is important in order to bridge the gap. As a result, this program of research will identify these predisposing, reinforcing

and enabling factors within the PRECEDE-PROCEED model. Once identified, these factors can serve as key areas for future research. In particular, developing and implementing programs that address various dimensions of social support for breast cancer survivors, developing simple resources for clinicians to give to breast cancer survivors and using the cancer centre as a medium for passive dissemination of physical activity information for survivors would attempt to address this gap. Further, understanding these factors can assist with dissemination of current research or physical activity materials. For example, Cancer Care Ontario (provincial care agency) has recently developed evidence-based physical activity guidelines for people with cancer (Segal et al., 2017). These guidelines currently have a clinician-facing version only, and using data from this program of research could assist with educating clinicians on how to implement the guidelines. Additionally, data could inform developing and disseminating a patient-friendly version of the guidelines.

1.3 Overview of Dissertation

In this chapter, low levels of physical activity among breast cancer survivors were introduced despite ample evidence highlighting the benefits of physical activity for survivors. This suggests a knowledge-to-action gap and the need for using knowledge translation models and frameworks to guide future research. In Chapter Two, the literature on breast cancer survivorship in Canada, and the effects of physical activity on breast cancer survivors is reviewed and breast cancer and knowledge translation models and frameworks are reviewed in-depth. Chapters Three to Five are Studies 1 through 3 presented in manuscript form, where Chapter Three is a cross-sectional study identifying the unmet physical activity resource needs in breast cancer survivors in Canada; Chapter Four is an environmental scan and textual materials analysis of the infrastructure and information found in regional cancer centres in Ontario; and Chapter Five is a qualitative analysis of focus groups conducted with oncology clinicians examining factors that influence physical activity counselling and breast cancer survivors. Finally, Chapter Six is the integrated discussion examining the overall implications, limitations and strengths, and future recommendations for the three studies as a whole.

Chapter 2 Review of the Literature

2 An Overview of Breast Cancer Survivorship in Canada

In Canada, breast cancer is the most frequently diagnosed cancer with one in eight women being diagnosed in her lifetime (Canadian Cancer Society, 2017). It is projected that 25,000 women will be diagnosed with breast cancer, which accounts for 26% of cancer diagnoses for the year (Canadian Cancer Society, 2017). Breast cancer, which is a malignant tumour that commonly grows in the lining of the milk duct or the milk glands of the breast tissue, is the second-most common cancer death in females, resulting in 14% of cancer death and is second to lung cancer, which results in 28% of cancer-related deaths. Due to increased breast cancer screening and treatment practices, the 5-year survival rate is approaching 90% resulting in a large population of Canadian women who are anticipated to live to a normal life expectancy (Canadian Cancer Society, 2017).

For women diagnosed with breast cancer, surgery is a common treatment option that may include axial node dissection, lumpectomy, and/or mastectomy to remove the cancerous tissue. Radiation therapy uses high-energy rays to destroy cancer cells and may be offered prior to or following surgery. Chemotherapy (cytotoxic drugs) is a treatment option that is used when the cancer has a high chance of recurrence and can also be offered before or after surgery. Hormonal therapy is offered for hormone receptor-positive breast cancer that is early stage with low risk of recurrence or locally advanced. Often, a combination of surgery and therapy is required to treat cancer and this requires a follow-up plan upon treatment completion (Canadian Cancer Society, 2017). During and following primary treatment, women may be offered a variety of services and programs to help manage the effects of cancer.

Unlike other chronic diseases, the term *cancer survivor* has various definitions (Jones & Grunfeld, 2011; Twombly, 2004). The National Cancer Institute labels an individual cancer survivor from the time of diagnosis until end of life (National Cancer Institute, 2015). However, given the different challenges and outcomes during and post-treatment, some researchers define a survivor from the time of post-primary treatment completion (Feuerstein & Ganz, 2011; Hewitt & Ganz, 2006; Hewitt, Greenfield, & Stovall, 2006). Somewhat consistent with these differing

definitions, Mullan (1985) proposed three phases of the survivorship trajectory: (1) *acute survival*, which begins at diagnosis and into treatment; (2) *extended survival*, which is the phase following treatment completion; and (3) *permanent survival*, which is a time where focus turns to treating the long-term physical, psychological and social effects of cancer treatment. For the purposes of this literature review chapter, the term *cancer survivor* will follow the National Cancer Institute (2015) definition of a cancer survivor (i.e., time of diagnosis until end of life).

Breast cancer survivors must cope with treatment-related side effects. These types of effects and co-morbidities, which appear as a result of cancer treatment, are collectively referred to as *persistent effects*. Persistent effects are comprised of long-term and late effects related to cancer treatment. *Long-term effects* are chronic effects from treatment such as cardiac toxicity, peripheral neuropathy and pain. *Late effects* are effects which appear anywhere from one to five years post-treatment and can include fatigue and lymphedema (Feuerstein & Ganz, 2011).

2.1 Health Effects of Breast Cancer

2.1.1 Physical Health Effects of Breast Cancer

Cancer treatments affect multiple systems within the body and result in various physical health effects including cardiovascular events and dysfunction (Patnaik, Byers, DiGuiseppi, Dabelea, & Denberg, 2011), decreased respiratory function (Spyropoulou, Leotsinidis, Tsiamita, Spiropoulos, & Kardamakis, 2009), pain (Enck, 2010; Gärtner et al., 2009) and neuropathy (Stein, Syrjala, & Andrykowski, 2008). Based on breast cancer survivor cohort studies, many of these effects have a delayed onset appearing between 5 to 30 years after acute diagnosis (Kenyon, Mayer, & Owens, 2014). Additionally, cancer survivors are at-risk for secondary cancers due to genetic or environmental factors related to their first tumour and treatment-related aspects such as genetic susceptibility and immune-suppression (Fosså, Vassilopoulou-Sellin, & Dahl, 2008). Likewise, as cancer survivors age, they are at increased risk for other comorbidities such as osteoporosis, diabetes and cardiovascular disease (Patnaik et al., 2011).

Some of the persistent effects that are particularly stressful for breast cancer survivors include weight gain, lymphedema and cancer-related fatigue. Weight gain is common following treatment as approximately 20% of breast cancer survivors experience post-treatment weight gain of 10kg to 20kg (Goodwin et al., 2014). Additionally, weight gain is a salient risk factor for

chronic conditions related to obesity such as cardiovascular disease and diabetes in addition to being a risk-factor for recurrence and secondary cancers (Demark-Wahnefried, Pinto, & Gritz, 2006; Goodwin et al., 2014). Similarly, lymphedema is chronic arm swelling resulting in pain and discomfort. It is reportedly experienced by 25% to 42% of breast cancer survivors during the first 5 years, post-treatment completion (Hayes, Janda, Cornish, Battistutta, & Newman, 2008; Norman et al., 2009). Lymphedema can greatly impair range of motion of the arm and subsequently become a barrier to physical activity (Johansson & Branje, 2010). Similarly, cancer-related fatigue is a common and distressing part of the survivorship trajectory, affecting upwards of 90% of breast cancer survivors receiving chemotherapy and radiation. Of the survivors experiencing cancer-related fatigue (Carter et al., 2016), 60% rate their fatigue as severe or moderate (Bower et al., 2000).

Other physical health effects include bone loss, sleep disturbances, sexual dysfunction, joint pain, hypertension and balance issues (Ingram, Courneya, & Kingston, 2006; Schmitz et al., 2010). Furthermore, persistent effects may also occur in *symptom clusters* whereby three or more cancer symptoms co-occur that may or may not share the same aetiology (Dodd, Miaskowski, & Paul, 2001). For example, a survivor who experiences pain and cancer-related fatigue may also experience depression and anxiety. These symptom clusters can impact both physical and psychological health and consequently negatively affect quality of life for survivors (Ganz et al., 1996).

2.1.2 Psychosocial Effects of Breast Cancer

Breast cancer survivors must also cope with a host of psychological effects from cancer and its related treatment. Breast cancer survivors may experience anxiety, fear of cancer recurrence and cancer worry, and depression at varying points of the survivorship trajectory (Ganz et al., 2002; Ganz, Kwan, Stanton, Bower, & Belin, 2011; Sabiston, McDonough, & Crocker, 2007). It is estimated that approximately 10% to 50% of breast cancer survivors experience depressive symptoms as a result of cancer and its treatment (Badger, Braden, Mishel, & Longman, 2004; Burgess et al., 2005; Fann et al., 2008). Similarly, researchers have suggested anywhere from 33% to 96% of breast cancer survivors report experiencing fear of recurrence at some point during the survivorship trajectory (Simard, Savard, & Ivers, 2010; Tewari & Chagpar, 2010). Furthermore, there is also evidence that psychological symptoms also occur in clusters. As a

result, breast cancer survivors who report increased experiences related to fear of recurrence and cancer worry also exhibit depressive symptoms and anxiety and report a lower tolerance for uncertainty in their lives (Tewari & Chagpar, 2010). Psychological effects, occurring both independently and in clusters, can have an effect on quality of life and physical functioning (Kim et al., 2008).

Following a breast cancer diagnosis, many breast cancer survivors experience challenges and may have problems finding appropriate social support needed to cope (A. J. Fong, Scarapicchia, McDonough, Wrosch, & Sabiston, 2016). For example, relationships may change following a breast cancer diagnosis and during the survivorship trajectory and these changes have been related to decreased psychological wellbeing (A. J. Fong et al., 2016; Fredette, 1995). Further, once primary treatment has completed, many breast cancer survivors perceive a decrease in support from their medical team as they transition from frequent contact their oncology team back to regular contact with their primary health care provider (M. Hewitt et al., 2006). As a result, finding appropriate and required support may be difficult for breast cancer survivors (Sammarco & Konecny, 2008).

Taken together, it is clear that persistent physical and psychosocial effects are intertwining and prevalent amongst breast cancer survivors and have adverse effects both physically and psychologically. Non-pharmacological strategies are needed for improving the persistent effects from breast cancer diagnosis and treatment (Feuerstein & Ganz, 2011; Kangas, Bovbjerg, & Montgomery, 2008; Schmitz et al., 2010; Speck et al., 2010). Non-pharmacological strategies are ideal since these strategies may have fewer adverse events compared to pharmacological strategies (Pinto, 2013). Physical activity may be a non-pharmacological strategy to ameliorate the persistent effects of cancer and its related treatment on physical and psychosocial outcomes (McNeely et al., 2006).

2.2 Physical Activity and Breast Cancer Survivorship

Based on the findings related to an ever-growing area of research, researchers provide an overall consensus that physical activity is beneficial and safe for breast cancer survivors at different points along the survivorship trajectory. Physical activity can attenuate persistent effects and modifiable risk factors, for example weight-gain, and associated with comorbidities, such as cardiovascular disease and diabetes. For the purposes of this dissertation, physical activity is

operationalized as any bodily movement produced by skeletal muscle and includes exercise (i.e., structured active to improve fitness) and sport (Thornton et al., 2016).

2.2.1 Physical Activity and Mortality

There is evidence that physical activity decreases all-cause mortality in breast cancer survivors (Holmes, Chen, Feskanich, Kroenke, & Colditz, 2014; Irwin et al., 2008). In a meta-analysis (N=23 total analyzed studies; n=13 studies with breast cancer survivor samples), physical activity was associated with a 71% decreased relative risk (RR) of mortality among postmenopausal breast cancer survivors (RR=0.71; 95% CI=0.62-0.82; Schmid & Leitzmann, 2014). Furthermore, the effect of post-diagnosis physical activity, such that for every 5, 10, or 15 metabolic equivalent-hours (MET-h) per week increase in activity levels, was associated with a 13% (95% CI=6–20%), 24% (95% CI=11–36%), and 34% (95% CI=16–38%) respective decrease in total risk of mortality, thus supporting a potential protective, dose-like effect from physical activity (Schmid & Leitzmann, 2014). Some study participants may have been less active at the time of measuring physical activity due to cancer, which may have impacted results. Further, physical activity was measured using self-report and interview methods, which may have inflated findings (Schmid & Leitzmann, 2014). Regardless, this comprehensive evidence supports moderate-to-vigorous physical activity (MVPA; 5-10 MET-h/week) for decreasing the risk of mortality in breast cancer survivors, post-diagnosis; however more research is needed to determine how best to incorporate physical activity into survivors' daily routines so that benefits can be accumulated (Nelson et al., 2016; Schmid & Leitzmann, 2014).

2.2.2 Effects of Physical Activity on Physical Health Outcomes

Engaging in increased physical activity behaviours may lead to improved physical health outcomes related to breast cancer survivorship (Speck et al., 2010). Physical activity may ultimately protect cancer survivors from co-morbidities associated with diagnosis and treatment. Physical activity interventions are effective for attenuating physical effects, based on evidence from a systematic review (N=51 analyzed studies; Battaglini et al., 2014). Moderate-intensity aerobic exercise, for instance walking on a treadmill or ergometer cycling, significantly improved cardiorespiratory functioning by 9% from baseline to post-intervention between breast cancer survivors prescribed aerobic exercise and control (i.e., no exercise) survivors (Battaglini et al., 2014). There were few adverse events reported (e.g., worsened lymphedema) thus

supporting the safety of physical activity for breast cancer survivors. Improved cardiovascular function is important, as it is a modifiable lifestyle factor that is also a risk factor for cardiovascular disease in addition to other co-morbidities such as diabetes and obesity (Doering & Eastwood, 2011). Overall, there is evidence that supports physical activity for improving cardiovascular capacity (Battaglini et al., 2014). The collected evidence from systematic reviews is generally high quality and experimental in nature (McNeely et al., 2006). Moreover, the lack of adverse events further strengthens the safety of various types of physical activity (Battaglini et al., 2014; McNeely et al., 2006).

Weight gain is a compounded risk factor for cardiovascular disease, chronic conditions (e.g., diabetes) and cancer recurrence (Ewertz et al., 2011; Speck et al., 2010). Following treatment completion, MVPA improves body composition outcomes including improved percent body fat and lean muscle mass compared to standard care, or no-exercise controls; however, there is insufficient evidence for weight maintenance (Battaglini et al., 2014). Following treatment, the literature on physical activity interventions for weight management is inconsistent. Specifically, favourable changes were determined in body weight such that overweight and obese breast cancer survivors who adhered 90% to a 12-week physical activity intervention lost weight (5.6+2.0 kg, p < .05) compared to those adhered less (Travier et al., 2014). In contrast, breast cancer survivors enrolled in a 12-week aerobic exercise program did not show significant decreases in weight compared to wait-list controls (Pinto, Clark, Maruyama, & Feder, 2003; Tometich et al., 2017). Finally, researchers using a randomized controlled trial (RCT) with moderate aerobic exercise prescription demonstrated better improvements in body composition (difference of 2.5% pre- to post-intervention) over body weight (difference of 0.6% pre- to postintervention; Burnham & Wilcox, 2002; Ingram et al., 2006). Consequently, the evidence for physical activity to manage weight is inconsistent, but changes in body composition are favourable, which is promising for improved physical health outcomes in breast cancer survivors.

Following completion of primary treatment, physical activity has been shown to alleviate cancerrelated fatigue in breast cancer survivors (Carter et al., 2016; Lipsett, Barrett, Haruna, Mustian, & O'Donovan, 2017). However, there are inconsistencies in the literature that are likely due to participants being recruited on eligibility criteria that are not related to management of cancerrelated fatigue (Jacobsen, Donovan, Vadaparampil, & Small, 2007). Consequently, this may dampen any effect on cancer-related fatigue (Jacobsen et al., 2007).

In summary, the accumulated evidence suggests that the effect of physical activity interventions on physical health in breast cancer survivors is efficacious predominantly in structured, laboratory-based settings.

2.2.3 Effects of Physical Activity on Psychological Outcomes

Physical activity participation can lead to numerous psychological benefits (see Sabiston & Brunet, 2012 for review), including the most frequently reported symptoms of depression and anxiety (Irwin et al., 2017; Rogers, Markwell, Courneya, McAuley, & Verhulst, 2011), and mood (McNeely et al., 2006; Pinto & Trunzo, 2004), and improvements in the experience of positive psychological growth (Love & Sabiston, 2011; McDonough, Sabiston, & Ullrich-French, 2011; McDonough, Sabiston, & Wrosch, 2014; Sabiston et al., 2007).

Moderate-to-vigorous physical activity (aerobic exercise) has been associated with decreased self-reported depression (Beck Depression Inventory) and state and trait anxiety (Speilberger State-Trait Anxiety Inventory) compared to no-exercise control participants (Segar et al., 1998). Additionally, the anti-depressive effects (Beck Depression Inventory – II) of physical activity have been sustained at least eight weeks post-interventions (Daley et al., 2007). Further, breast cancer survivors who maintained physical activity post-diagnosis experienced lower depression, compared to those who decreased physical activity levels (D. Y. T. Fong et al., 2012). Similarly, active breast cancer survivors reported lower depression symptoms than non-active survivors (Pinto, Trunzo, Reiss, & Shiu, 2002). In terms of specific intensities of exercise, yoga (i.e., lightintensity) has been shown to decrease depressive symptoms and anxiety (Culos-Reed, Carlson, Daroux, & Hately-Aldous, 2006; Sylvester, Ahmed, Amireault, & Sabiston, 2017). Vigorous intensity exercise as measured by the International Physical Activity Questionnaire (IPAQ) was associated with lower self-report depressive symptoms in rural breast cancer survivors in a crosssectional study (Rogers, Markwell, Courneya, McAuley, & Verhulst, 2011). Taken together, the evidence is mounting that there is a clear benefit from physical activity for reducing depression and anxiety in breast cancer survivors.

Physical activity participation may also foster post-traumatic or positive psychological growth among breast cancer survivors. For example, breast cancer survivors climbing Mount Kilimanjaro reported experiencing feelings of self-belief and connectedness (Burke & Sabiston, 2012). Likewise, survivors who were part of a dragon boat team found that the sport facilitated psychological strength, appreciation for life, closer relationships and new possibilities (Sabiston et al., 2007). Finally, women who were part of a structured exercise program found that physical activity helped foster positive feelings and re-connectedness towards their changed bodies and feeling "whole" (Hefferon, Grealy, & Mutrie, 2010; McDonough et al., 2014). Based on the findings from these qualitative studies, it is clear that various types of physical activity are useful for building positive psychological experiences.

Taken together, the evidence suggests that physical activity attenuates many negative persistent effects of breast cancer and its related treatment. While the benefits are clear, as many as 70% to 90% of breast cancer survivors are not meeting physical activity guidelines (Lynch et al., 2010; Sabiston et al., 2014). Currently, efforts towards facilitating physical activity in this population are needed in order for this group to take advantage of the health benefits.

2.2.4 Physical Activity Guidelines for Cancer Survivors

Physical activity has been deemed safe for breast cancer survivors at all points of the survivorship trajectory (Battaglini et al., 2014; Schmitz et al., 2010). A group of leading experts in the field and the American College of Sports Medicine (ACSM) developed cancer-specific physical activity guidelines (Schmitz et al., 2010). For breast cancer survivors, it is recommended that they aim for 150 weekly minutes of moderate-to-vigorous physical activity (MVPA) and begin a supervised, 16-week resistance program that is gradually progressed as the survivor improves in muscular strength and range of motion (Schmitz et al., 2010). Moreover, physical activity programs for survivors should include aerobic training 3 times per week for 30 minutes, resistance training two to three times per week (6-12 exercises) and flexibility training three times per week for 50-60 minutes to gain health benefits as per the evidence-based recommendations (Brunet, Sabiston, & Meterissian, 2012). Recently-released guidelines from Cancer Care Ontario, suggest that 150 minutes of MVPA and two sessions of resistance training are safe for all cancer survivors (Segal et al., 2017). Unfortunately, few breast cancer survivors

are physically active at levels that confer health benefits (Lynch et al., 2010; Sabiston et al., 2014).

2.2.5 Physical Activity Levels in Breast Cancer Survivors

Following diagnosis and compared to pre-diagnosis levels, physical activity levels naturally decline for breast cancer survivors (Sabiston et al., 2014). Evidence from observational prospective cohort data, during the first year post-diagnosis survivors reported 11% to 50% decrease in total physical activity levels depending on severity of diagnosis, age and treatment (Irwin et al., 2003). Three years following diagnosis the same sample reported that 33% were meeting physical activity guidelines (Baumgartner et al., 2010). Participants who were younger (< 50 years of age) engaged in more physical activity than those who were older (> 60 years). In a larger, cohort study of breast cancer survivors observed over 10 years, recreational physical activity decreased by a mean of 4.3 ± 16.2 MET-h/week. Moreover, at any follow-up time point (i.e., 24 months, 5 years and 10 years after enrolment in the study), no more than 8% of the sample were meeting physical activity guidelines (Mason et al., 2013).

Breast cancer survivors reported spending less than 2% of their day in MVPA (Sabiston et al., 2014). Within this cohort, subsamples of survivors were consistently inactive, or decreased physical activity levels over the first-year post-treatment. Survivors in these subsamples tended to be older and reported greater physical and depression symptoms than survivors who increased their physical levels, were somewhat active or consistently meeting physical activity guidelines (Brunet, Amireault, Chaiton, & Sabiston, 2014). Overall, 70% to 90% breast cancer survivors have reported not meeting physical activity guidelines to gain health benefits and this has an impact on physical and psychological health (Lynch et al., 2010; Sabiston et al., 2014).

The combined observational and RCT evidence suggest that there are clear benefits for physical activity in breast cancer survivorship; however, the low levels of physical activity engagement are discouraging. It is clear that a knowledge-to-action gap exists and it is important to determine an appropriate knowledge translation framework that will guide future intervention work. A similar gap exists in public health regarding population level physical activity engagement and has been heavily researched. Consequently, it is important to examine physical activity strategies that have been implemented in the general population in order to gain better insight for developing appropriate strategies for a breast cancer survivor population.

2.2.6 Psychosocial Factors Affecting Physical Activity among Breast Cancer Survivors

While there are many factors that have been identified as correlates of physical activity (e.g., motivation, cancer-related variables such as time since treatment and stage of breast cancer diagnosis, personal factors such as age and body mass index; L. Q. Rogers et al., 2008; Stacey, James, Chapman, Courneya, & Lubans, 2015), two key predictors of interest to physical activity programming include self-efficacy and social support.

Self-efficacy is the belief than an individual is capable of successfully carrying out a course of action (Bandura, 1986). Within the context of physical activity, self-efficacy can be further described as either confidence in one's ability to overcome physical activity barriers (barrier selfefficacy) or confidence in one's ability to perform components of physical activity (task selfefficacy; McAuley, Lox, & Duncan, 1993). Self-efficacy is a significant predictor (Phillips & McAuley, 2013) and correlate of physical activity in breast cancer survivors both during (Rogers et al., 2005) and following treatment (Rogers, McAuley, Courneya, & Verhulst, 2008). Moreover, breast cancer survivors must also overcome many common barriers including lack of time and social support (Brunet, Taran, Burke, & Sabiston, 2013) and cancer-specific barriers, for example lymphedema (Courneya, Mackey, & McKenzie, 2002), to physical activity. Taken together, it is not currently known how confidence in one's own ability to find physical activityrelated resources and how resource-related barriers, or difficulties accessing resources can impact physical activity engagement in breast cancer survivors. Similarly, understanding physical activity resource preferences in breast cancer survivors is of importance (Rogers, Courneya, Shah, Dunnington, & Hopkins-Price, 2007; Vallance, Lavallee, Culos-Reed, & Trudeau, 2013; Whitehead & Lavelle, 2009). Understanding physical activity confidence, difficulty, and preferences will assist with development of physical activity programs and resources that address unmet needs. Drawing on the physical activity self-efficacy and barrier theories, a main focus in the current study was to examine confidence and difficulty in obtaining physical activity resources and support among breast cancer survivors, and preferences for physical activity resources.

Social support is a positive determinant of physical activity in breast cancer survivors (Barber, 2012; L. Q. Rogers, Markwell, Hopkins-Price, et al., 2011). Specifically, higher perceived social support is related to higher physical activity levels (Barber, 2012; Phillips & McAuley, 2013).

However, understanding social support in the context of physical activity is unique as it can be conceptualized as both a barrier and facilitator for physical activity (Courneya et al., 2008; Wurz et al., 2015). Qualitative examinations of social support in the context of physical activity highlight that companionship via physical activity and receiving social support can motivate breast cancer survivors to be active (Barber, 2013; McDonough et al., 2011). Dyads who received additional social support increased physical activity levels post-intervention compared to dyads who did not (Demark-Wahnefried et al., 2014). In contrast, lack of companionship (e.g., "not having someone to go with" or absence of an exercise partner) is a salient barrier for physical activity in this population (Brunet, Taran, et al., 2013; Sabiston, Amireault, Tamminen, Fong, & Jones, 2015). Moreover, social support can be conceptualized as unique types beyond companionship, for example emotional (e.g., the provision of comfort), reality confirmation (e.g., being surrounded by like others) and tangible assistance (e.g., offered products, financial assistance and gifts) support types (Richman, Rosenfeld, & Hardy, 1993). In order to have a better understanding of the role of social support in physical activity for breast cancer survivors, further investigation is required. Specifically, a focus on social support as both a barrier and a facilitator is needed to direct targeted intervention efforts.

2.3 Lessons Learned from Public Health Strategies for Increasing Physical Activity in the General Population

In order to understand the next steps for increasing physical activity in breast cancer survivors, it is important to examine strategies implemented in public health for the general, asymptomatic population. Importantly, understanding the factors that influence implementation of these strategies may inform research and practice focused on increasing physical activity among breast cancer survivors. Currently, approximately 20% of Canadians are meeting physical activity guidelines of 150 minutes of MVPA per week (Statistics Canada, 2015). Similar to the breast cancer population, low levels of physical activity in the general population are associated with increased risk for chronic illnesses (Statistics Canada, 2015). Thus, there is a priority to increase physical activity levels in the general population. In order to impact physical activity on a global scale, it is important to examine policy, community and health-care sector levels (Reis et al., 2016).

At the policy level in Canada, the Ottawa Charter for Health Promotion was an action framework for use by health organizations to improve physical activity and healthy eating. To date, there has been an increase of organizations that have physical activity programing. These organizations have focused on creating supportive environments, building healthy public policies and developing personal skills for physical activity (Maximova, Hanusaik, Kishchuk, Paradis, & O'Loughlin, 2016). Further, organizations have also focused on reorienting services to promote physical activity, which the authors suggest is a novel finding as this category of the Ottawa Charter for Health Promotion had received the least amount of research attention (Maximova et al., 2016). Moving forward, examining the extent to which integration of physical activity promotion into clinical practice is unknown. Assessing the role of health care professionals for promoting physical activity is needed (Maximova et al., 2016). Similarly, Active Canada 20/20, a national plan for health promotion, highlights a lack of coordination among different stakeholders and sectors (Spence, Faulkner, Bradstreet, Duggan, & Tremblay, 2015). The current approach for increasing physical activity in Canada has been disjointed and requires a coordinated, strategic approach to efficiently allocate resources. As outlined in the Active Canada 20/20 essay, incorporating the principles of this national plan will involve engagement of individuals, all levels of public health promotion, service provision and advocacy from all levels of government. Together, these strategies suggest that a coordinated effort among various levels, for example policy, community-level and provider, are needed to promote habitual physical activity.

However, findings from a systematic review of community-wide interventions (randomized control trials, quasi-experimental designs) for increasing population levels of physical activity suggest that there is little benefit for multi-component, community-wide interventions for increasing physical activity (Baker, Francis, Soares, Weightman, & Foster, 2015). For example, "high intensity" interventions (n=10 studies) targeting multiple levels within a community with multiple strategies had no impact on average daily minutes of MVPA (Baker et al., 2015). While "medium intensity" interventions (n=14 studies) targeting specific behaviours with multiple strategies showed greater increases in walking behaviours and leisure-time physical activity for the intervention group. Regardless of intensity of intervention, there were notable subgroup effects for gender. Implications for public health include using multi-strategy community wide approaches for increasing leisure time physical activity and walking and should consider

potential impacts for subsets of the population. There is also some discussion about integrating physical activity counselling and information into primary care for screening and intervention.

Primary care providers are motivating agents for physical activity promotion as they have frequent and important contact with the general population (O'Brien, Shields, Oh, & Fowles, 2017). Patients also view primary care providers as sources of credible information regarding healthy lifestyle information (Corra et al., 2010). Physical activity counselling from a primary care provider has been shown to improve patients' fitness, physical activity confidence and reduced body mass index (Orrow, Kinmonth, Sanderson, & Sutton, 2012). Specifically, writing a physical activity prescription may be an effective counselling strategy (Thornton et al., 2016). Unfortunately, few primary care providers regularly assess, prescribe or provide specific recommendations for physical activity to their patients (Thornton et al., 2016). Provider-specific barriers that prevent prescribing physical activity include lack of guidance for patients with chronic disease, lack of time, personal knowledge and education in medical school (O'Brien et al., 2017). Similarly, physical activity prescription pads and referral tools have been developed to address some barriers (Frémont, Fortier, & Frankovich, 2014; Swinburn, Walter, Arroll, Tilyard, & Russell, 1997). While primary care providers are confident to use these tools following an educational workshop (O'Brien et al., 2017), the long-term effect of the use of physical activity prescription pads and referral tools has only been assessed using retrospective, qualitative methods (Hamlin, Yule, Elliot, Stoner, & Kathiravel, 2016) and long-term, causal effects on patient's physical activity levels are not clear (O'Brien et al., 2017). Additionally, primary care providers have used "Exercise as a Vital Sign" (EVS; Grant, Schmittdiel, Neugebauer, Uratsu, & Sternfeld, 2014), where physical activity levels are assessed in addition to other vital signs (e.g., blood pressure). This method is simple and has been easily implemented into many primary care clinics (R. Sallis, 2011) and there is evidence that it can increase patients' physical activity levels (Grant et al., 2014). However, this method does not address the follow-up of physical activity counselling such as referrals to an appropriate program. As such, it is unclear if physical activity prescription pads and EVS are valuable tools for physical activity intervention but may be a way of initiating a conversation about physical activity if used in practice (Hamlin et al., 2016).

The aforementioned strategies (e.g., coordinating all levels and sectors through understanding community interventions and the role of primary care providers) in public health offer insight into avenues that the breast cancer survivorship and physical activity field should examine.

Based on public health endeavours, coordinated efforts between survivors, researchers, health care providers, environment and policymakers are needed to impact physical activity levels. Understanding factors that could affect these different sectors calls for the use of knowledge translation frameworks which can encompass these views (Davies et al., 2010; LaRocca, Yost, Dobbins, Ciliska, & Butt, 2012).

2.4 Knowledge Translation Strategies for Implementing Effective Physical Activity Interventions in Breast Cancer Survivors

Currently, health promotion researchers are moving forward from rigorous RCTs and structured, laboratory-based, scientific discovery research to determining the effectiveness and feasibility of these trials to allow for dissemination of trial findings (Victora, Habicht, & Bryce, 2004). Dissemination of research findings is known as *knowledge translation*; these strategies involve actions that disseminate scientific research into practical use, or into the hands of the user (CIHR, 2014). To date, there is little research evidence of knowledge translation strategies for physical activity among breast cancer survivors (Alfano et al., 2014; Phillips, Alfano, Perna, & Glasgow, 2014). There are unique challenges including heterogeneity of cancer as a disease, multifaceted nature of survivorship care, evolution of cancer treatments and its related effects and the infancy of the survivorship field, which have prevented effective narrowing of the knowledge-to-practice gap in breast cancer survivorship research (Alfano et al., 2014; Phillips et al., 2014). In order to address these challenges, Alfano and colleagues (2014) and Phillips and colleagues (2014) use the Translational Science Process model to guide future research in this field.

Using the Translational Science Process model (refer to Figure 1), multiple phases are outlined (T0 to T4) to assist dissemination of scientific discoveries to the knowledge user (i.e., breast cancer survivor) and evaluate its impacts (Khoury et al., 2010). This translational model has five distinct phases. *Phase T0* is the discovery of an opportunity to examine a health issue, for example health outcomes and determinants. *Phase T1* involves research from all levels to develop clinical and nonmedical (i.e., behavioural, social, public health and policy) interventions. *Phase T2* is the evaluation of the interventions to inform the development of recommendations and guidelines based on best-available evidence. *Phase T3* involves

in real-world settings. Finally, *Phase T4* is the evaluation of the interventions for effectiveness in real-world settings and the impact on the population or public health impact (Aflano et al., 2014; Khoury et al., 2010). The model is non-linear and is driven by ongoing and updated knowledge integration from all levels of science (basic, clinical and population), in addition to collaboration, transdisciplinary teams and technology (Phillips et al., 2014).



Figure 1 Translational Science Process model.

Currently, breast cancer and physical activity researchers have insufficiently addressed implementing scientific evidence in real-world settings (Phase T3; Phillips et al., 2014). According to the strategies outlined by Phillips and colleagues, it is important to examine different levels and sectors that will impact physical activity in breast cancer survivors and engage key stakeholders including survivors, cancer care clinicians and researchers. Drawing from previously used public health strategies for physical activity engagement, an assessment of unmet needs from individual and clinician perspectives, in addition to an environmental scan to determine quantity and quality of resources is an important first step for addressing Phase T3. This identifies the gaps in the resources that need to be addressed in addition to developing physical activity interventions that are preferred by this population.

2.4.1 Knowledge Translation Frameworks

Selecting an appropriate knowledge translation framework is important for developing and aligning future intervention research to address the needs of the knowledge user. Thus, an examination of prominent knowledge translation theories, models and frameworks in public health will be examined and analyzed to determine an ideal framework for this program of research (Davies et al., 2010; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; LaRocca et al., 2012). Moreover, many of these frameworks have yet to be applied in the context of physical activity and breast cancer and as a result, literature has been evaluated from other health behaviour change domains.

2.4.1.1 Diffusion of Innovations (DOI) Theory

Originally developed by Rogers (1969), this theory has roots in rural sociology where farmers would discuss better farming techniques (innovations) amongst individuals in a passive manner (diffusion). Four main elements that influence diffusion of a new idea include the innovation itself, the communication channels, time and social system. Individuals progress through 5 stages when communicating (e.g., verbally or written) about an innovation; their awareness, persuasion, decision, implementation and adoption. If an innovation is adopted, it will spread through different communication channels and social systems (Rogers, 2010). Since its development, DOI has been applied to different areas of the health sector such as health care professionals adopting an innovative technique (Alkhateeb, Khanfar, & Loudon, 2009; Lee, 2004), spinal cord injury (Tomasone, Martin Ginis, Estabrooks, & Domenicucci, 2014) and psychotherapy (Lovejoy, Demireva, Grayson, & McNamara, 2009).

While DOI is prevalent in the health and knowledge translation literature (Davies et al., 2010; Greenhalgh et al., 2004) there are a few gaps that need to be highlighted. First, DOI is a passive process, which relies on human interaction and social networks. These are complicated interactions and networks can be widespread (Katz, Levin, & Hamilton, 1963). As such, it is difficult to quantify the adoption, as the theory itself does not account for all the variables of interpersonal relationships and interactions (Plsek & Greenhalgh, 2001). Similarly, DOI does not evaluate the innovation from a scientific point of view, but rather the innovation's social perceptions influence its diffusion and potential adoption (Estabrooks, Thompson, Lovely, & Hofmeyer, 2006). Also, since passive diffusion is unidirectional, little can be done to systematically evaluate the innovation and evaluating the innovation before adoption is not possible (Katz et al., 1963).

Despite these gaps, DOI is important because this is the cornerstone of many modern knowledge translation theories and frameworks such as Green's diffusion theory for public health (Green, Ottoson, García, & Hiatt, 2009) and Havelock and colleagues' dissemination framework (Havelock & Guskin, 1969). DOI served as the foundation for developing testable and useful interventions for public health (Estabrooks et al., 2006). On the whole, only innovations with characteristics that align with users' needs make it to adoption.

2.4.1.2 Ottawa Model of Research Use (OMRU)

The OMRU framework provides a staged approach to developing and shaping an innovation for the population and local contextual environment. According to the framework, in order to successfully implement an innovation into medical practice, one must systematically address the following: the practice environment, the potential research adopters of evidence, evidence-based innovation, research transfer strategies, the evidence adoption, and health-related and other outcomes (Logan & Graham, 1998). The framework addresses these elements through four stages: (1) assessment of barriers and facilitators; (2) transfer strategies for diffusion and dissemination; (3) adoption and use of the innovation and (4) evaluation of outcomes.

Researchers have used the OMRU framework for knowledge translation in evidence-based practice with health professionals, including physical therapists (Zidarov, Thomas, & Poissant, 2013), nurses in the neonatal intensive care unit (Hogan & Logan, 2004) in addition to community-based research with parental knowledge of their children's health in a rural setting (Campbell, 2010) and implementing healthcare initiatives in developing countries (Santesso & Tugwell, 2006). Collectively, OMRU shows promise for integrating health education with health professionals in the health environment to meet needs the of the knowledge user (Estabrooks et al., 2006; Hogan & Logan, 2004; Zidarov et al., 2013). However, when using the framework in a community-based setting, OMRU is supplemented with other knowledge translation frameworks or research methods as the model does not account for community characteristics such as

including the knowledge users in the research process (Campbell, 2010). Taken together, the strengths of this model include clear definitions of elements and inclusion of all ecological levels (i.e., individual, researcher, environment, policy maker) within the medical field (Estabrooks et al., 2006). However, the final stage (evaluation of outcomes) does not discuss how to validate proposed instruments, which may be crucial to developing clinical assessments (Estabrooks et al., 2006). Moreover, while this framework is a planning framework, it assumes that an innovation has been previously developed and does not allow for adequate development of the innovation.

2.4.1.3 Knowledge-to-Action (KTA) Framework

This process model was developed out of the need to address conceptual clarity of the accumulation of evidence and practitioners' (in)ability to stay up to date. Consequently, this model attempts to determine and fill the key aspects of the knowledge-to-action gap (Graham et al., 2006). The model has two concepts: (1) knowledge creation and (2) knowledge action. These concepts are dynamic and work either together or independently (Graham et al., 2006). Knowledge creation is derived empirically (i.e., through research) and becomes refined through further experimentation in order to be more useful to the stakeholders. Within the model there are two action phases that can occur either simultaneously or sequentially. The two action cycles have different phases that allow for application of knowledge, for example identifying the problem, monitoring use and evaluating the outcomes of knowledge with the goal of sustained knowledge use (Graham et al., 2006). Taken together, the model can accommodate knowledge producers (e.g., researchers), knowledge implementers (e.g., community partners and policy makers) and stakeholders (e.g., breast cancer survivors) at different phases and at different time points (Graham et al., 2006).

Studies that employed the KTA process model less often report using the monitoring, outcomes and sustaining phases of the action cycle (Field, Booth, Ilott, & Gerrish, 2014). It is likely that these phases require additional funding and longer follow-up resources (Claude, Juvenal, & Hawkes, 2012). In addition, while Graham and colleagues (2006) clarified knowledge translation taxonomy and nomenclature, there are challenges to defining outcomes within the context of the KTA process model (Tugwell, Santesso, O'Connor, & Wilson, 2007). Tugwell and colleagues (2007) suggest defining intervention outcomes and then selecting a different knowledge translation theory as they encountered difficulty aligning with the KTA model. Finally, the model is not an appropriate framework for informing a future intervention as it does not allow for adequate, staged development of an intervention (Tugwell et al., 2007).

2.4.1.4 RE-AIM Framework

The Reach, Efficacy/Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework was developed to evaluate the overall influence of the intervention based on the combined effects of the five RE-AIM dimensions including: (1) *Reach* is the percentage (i.e., attrition rate) and characteristics of the sample that receives the program. (2) *Efficacy/Effectiveness* is the impact of the intervention for its intended purpose. (3) *Adoption* is the proportion and representativeness of settings that adopt a policy or program. It is assessed through direct observation, interviews, or surveys. (4) *Implementation* is the amount of the program that is delivered the way it was originally intended. This construct interacts with efficacy to determine effectiveness. This step is crucial in determining which interventions are pragmatic enough to be effective outside of a structured setting. (5) *Maintenance* is a measure of intervention stability when examining individual users and settings (Glasgow et al., 1999).

Using this framework fills a large gap in public health (Alfano et al., 2014) by evaluating programs to determine, which programs are effective in the community and thus, are worth the investment (i.e., time, money, and human resources; Glasgow et al., 1999). Programs that address the RE-AIM dimensions sufficiently are likely to be sustainable in the community (Glasgow et al., 1999; Glasgow et al., 2004). However, the model does not account for cost of evaluating an intervention. This is important for practical implementation of interventions into programs, as many community-based partners may not have the funds to maintain the program (Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004). There is a need for research that determines the characteristics of interventions which have vast reach, are widely adopted by different and representative settings, consistently implemented by staff and produce replicable and long-last effects at a reasonable cost (Glasgow et al., 2004; Sweet, Ginis, Estabrooks, & Latimer-Cheung, 2014).
2.4.1.5 PRECEDE-PROCEED Model

The PRECEDE (Predisposing, Reinforcing and Enabling Constructs in Educational/ Environmental Diagnosis and Evaluation)-PROCEED (Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) model was developed as a structured, planning and evaluating framework for health behaviour change programs. PRECEDE-PROCEED is conceptualized as a logic model, which links causal assessment, intervention planning and evaluation into one planning framework (Gielen & Green, 2015). The model consists of eight phases (Green & Kreuter, 2005). Phase 1 involves social assessment and engages the community to determine the community's needs and preferences. Phase 2 involves epidemiological, behavioural and environmental assessment. There are various assessments, which can be conducted including secondary analysis of epidemiological data, literature review of behavioural determinants and understanding environmental factors that can be modified to support the target behaviour. Phase 3 is an educational and ecological assessment, which involves identification and classification of predisposing, reinforcing and enabling factors and how these factors will collectively influence behavioural change. These factors can influence behaviour directly or indirectly through an environmental factor, for example people with diabetes may not have the skills to conduct glucose monitoring (enabling factor) due to availability of resources (environmental factor) and this will effect management of diabetes (health problem (Gielen & Green, 2015). Phase 4 involves alignment of the components of a proposed intervention with administration and policy. The purpose of this phase is to identify resources, organizational barriers and facilitators and policies that are needed for intervention implementation and sustainability. Phases 5 to 8 involve implementing the intervention (Phase 5), evaluating the process of implementation (*Phase 6*), evaluating the impact of the intervention (Phase 7) and evaluating the program for specific outcomes, for example physical activity behaviour (Phase 8) (Green & Kreuter, 2005).

This model is comprehensive and data driven, which allow for sustainable interventions to be implemented (Green & Kreuter, 2005). However, applying this model in practice may require additional funding, human resources and time depending on the scenario (Davies et al., 2010). Additionally, this model does not explicitly outline specific intervention development and methods; however the original authors (Green & Kreuter, 2005), suggest adding other theories, frameworks and planning guides to assist with intervention development (Bartholomew &

Mullen, 2011; Bluethmann, Vernon, Gabriel, Murphy, & Bartholomew, 2015). Moreover, the assessment phases can be streamlined through using the growing body of literature on community priorities, determinants (i.e., epidemiological and behavioural) and targets for change, for example, in breast cancer survivors, there have been numerous publications where survivors are not meeting physical activity guidelines, suggesting that this is a pertinent issue for this population (Lynch et al., 2010; Sabiston et al., 2014). Further, researchers have suggested that there are important social determinants of physical activity including goals, outcome expectations and social support (Phillips & McAuley, 2013). Thus, the current body of literature has assisted with streamlining assessment Phases I and II of the PRECEDE-PROCEED model. Together, this model provides a suitable roadmap for planning a sustainable intervention that addresses community needs and desires. As a result, the first three phases of the PRECEDE-PROCEED model will be used as the theoretical planning framework for this proposed program of research. It is beyond the scope of this program of research to align with administration and policy (Phase 4) and to implement an intervention (Phases 5 to 8), as a result these associated phases will not be addressed.

2.4.2 Addressing the Knowledge-to-Action Gap Using the PRECEDE-PROCEED Model

There is a growing body of literature that supports physical activity for managing symptoms related persistent effects of cancer and its related treatment in breast cancer survivors. Yet despite the information on the benefits, many survivors are not meeting physical activity guidelines. It is likely that survivors face many barriers to engaging in physical activity, including a lack of evidence-based physical activity information that can be easily disseminated, which implies a knowledge-to-action gap (Phillips et al., 2014). Some reasons for this gap include breast cancer survivors' unmet needs with regards to physical activity resources. It is important to understand breast cancer survivors' needs and perceptions of available resources to foster physical activity behaviour. Many of these needs may also reflect various forms of social support (Hodgkinson, Butow, Hunt, et al., 2007) thus, it is important to examine the role of different categories of social support (A. J. Fong et al., 2016). Additionally, the Ontario cancer centre environment may have a large role in facilitating physical activity in breast cancer survivors by offering information (Santa Mina, Alibhai, Matthew, Guglietti, Steele, Trachtenberg, Ritvo, et al., 2012). For instance, in school-based studies, questionnaires measure

prevalence of physical activity programs and policies, built-in physical activity programming (i.e., programming available on-site versus in the community) and availability of equipment or resources that enable physical activity (Leatherdale, Manske, Wong, & Cameron, 2009). A similar assessment of web-based resources has been conducted in cancer (Sylvester, Zammit, et al., 2017) and an examination of cancer centres is warranted. Finally, further examination of influential factors need to be analyzed in cancer care clinicians (Jones, Courneya, Peddle, & Mackey, 2005). Using Phases 1 to 3 of the PRECEDE-PROCEED model as a planning framework, this program of research will inform future knowledge translation strategies by examining contextual factors (i.e., individual, environmental and clinician) that influence physical activity levels and identify key areas for future work to increase physical activity levels in this population.

Phase 1: social assessment. Informational needs related to advice regarding physical activity, types of physical activity that are safe and appropriate for survivors, and access to information pertaining to physical activity are important for physical activity participation, yet are unknown among breast cancer survivors (Rutten, Arora, Bakos, Aziz, & Rowland, 2005). Also, oncologists and other primary health providers have been identified as important health messengers, but often report not discussing physical activity with survivors (L. W. Jones, Courneya, Fairey, & Mackey, 2004; Karvinen et al., 2010) and as such, survivors must rely on community-based resources. The effectiveness of this information for addressing breast cancer survivors' needs has yet to be assessed. Thus, a needs assessment strategy conducted with breast cancer survivors will articulate their unmet needs with regards to physical activity information. This assessment will also shed light on the predisposing, reinforcing and enabling factors that survivors have with regards to increasing current levels of physical activity.

Phase 2: epidemiological, behavioural and environmental assessments. Typically, Phase 2 entails epidemiological and behavioural assessment. However, this proposed program of research will streamline this phase by relying on the growing body of literature, which supports the benefits of physical activity and has examined the behavioural determinants (Rogers, Vicari, & Courneya, 2010) for breast cancer survivors and highlights pervasive inactivity in this population (Lynch et al., 2010; Sabiston et al., 2014). Specifically, that 70% to 90% of breast cancer survivors are not meeting the American College of Sports Medicine (Schmitz et al., 2010) or Cancer Care Ontario (Segal et al., 2017)physical activity guidelines for cancer survivors (i.e.,

engaging in 150 minutes of weekly moderate to vigorous physical activity with a resistance program and stretching program).

With limited information coming from oncology medical professionals, breast cancer survivors may receive physical activity information from printed sources from the cancer centre and community including pamphlets, posters, and other resources. Currently, these resources have yet to be systematically collected and evaluated. One way of evaluating these resources is to use an environmental scan. An environmental scan has roots in organizational behaviour and industry and is a tool that systematically collects and organizes information from different sources to design health-related programs that are tailored to community needs (Randolph Rowel, Moore, Nowrojee, Memiah, & Bronner, 2005). There are multiple methods for conducting an environmental scan, but they have the following common characteristics: (a) scans examine a broad range of issues from social (e.g., finding social support for physical activity), economic (e.g., cost of physical activity programs and equipment), political (e.g., health policies and guidelines related to physical activity for breast cancer survivors) and technological (e.g., tools for increase physical activity in breast cancer survivors); (b) information is gathered from a variety of sources, including literature reviews, interviews and site visits; (c) while conducting the scan, one should think "out of the box" in terms of studying trends from other industries (Choo, 2001). Combined with a tool that identifies and evaluates the unmet physical activity information needs in breast cancer survivors, these assessments have the potential to draw a detailed picture of the physical activity informational landscape and expose the predisposing, enabling and reinforcing factors that influence physical activity behaviour in this population.

Phase 3: educational and ecological assessment. Cancer care clinicians such as oncologists and nurses have been identified as important messengers of health-related information for physical activity (Jones, Courneya, Fairey, & Mackey, 2004; Karvinen et al., 2010), yet few report discussing physical activity with their patients (L. W. Jones et al., 2004; Nadler et al., 2017). Even though clinicians have a favourable attitude towards recommending physical activity information to cancer survivors (Jones, Courneya, Peddle, & Mackey, 2005), many report not having enough time to discuss physical activity (Karvinen et al., 2010; Nadler et al., 2017). Taken together, there are many factors and unmet needs that must be addressed in order for clinicians to be confident and competent to discuss physical activity with breast cancer survivors. Further research is needed to determine the salient predisposing, reinforcing and enabling factors

that clinicians have with regards to physical activity counselling in addition to their unmet needs from the environment (e.g., training, how information is passed through hospital channels, etc.).

2.4.3 Conclusion of Literature Review

Given the plethora of research on breast cancer survivors during the extended and permanent phases of survivorship and research suggesting that survivors during these phases are more attune to adopt health lifestyle behaviours (Sabiston & Brunet, 2012), the following dissertation will focus on breast cancer survivors who have completed primary treatment. In summary, an overwhelming number of breast cancer survivors are not meeting physical activity guidelines despite the evidence, which supports physical activity for attenuating the physical and psychological effects of cancer and its treatment. This highlights a knowledge-to-action gap, which may be the result of an over-reliance on structured, laboratory-based physical activity interventions (Victora et al., 2004) and less research attention on dissemination of findings (Phillips et al., 2014). In order to address this knowledge-to-action gap effectively, a systematic and integrated knowledge translation approach is needed. Using the PRECEDE-PROCEED model as a planning framework, this approach will allow for future interventions to be developed that map onto the unmet needs experienced by breast cancer survivors, environmental factors and needs of clinicians. Refer to Figure 2 for a conceptual diagram of the program of research. Moreover, integration of different ecological levels will allow for easier implementation of future interventions. The next three chapters will detail the respective studies (see Table 1).

Title	Objectives	Design	Sample
Identifying Unmet Needs and Preferences for Physical Activity Resources in Breast Cancer Survivors	The overarching purpose of the current study was to identify unmet needs and preferences for physical activity resource among breast cancer survivors living in Canada.	Cross-sectional design using survey methodology.	<i>N</i> =201 breast cancer survivors living in Canada
	There were two main objectives, including (1) describing confidence, difficulty, and preferences for physical activity resources and (2) identifying personal and cancer-specific factors that may associate with these unmet needs (i.e., low confidence and high difficulty) and preferences.		

Table 1 Summary of Studies within Dissertati
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Exploring Cancer Centre Physical Activity Opportunities for Breast Cancer Survivors	The primary purpose of this study was to identify physical activity information and infrastructure support within cancer centers. A secondary aim was to identify the behaviour change techniques used in the information that is available to breast cancer survivors in cancer clinics and evaluate this information for trustworthiness.	This study was a cross-sectional observation design targeting cancer centres in Ontario to identify physical activity information and infrastructure support. Furthermore, a cross- sectional content analysis was conducted on free and available textual materials collected from the cancer centres to identify any behaviour change techniques and assess trustworthiness.	N=14 regional cancer centres in Ontario N=58 textual materials
Exploring Oncology Clinician Experiences with Physical Activity Counselling and Breast Cancer Survivors	The purpose of this study was to explore the factors that influence cancer care clinicians' experiences when counselling on PA with breast cancer survivors.	Qualitative study using focus groups conducted with cancer care clinicians to assess factors affecting physical activity counselling.	<i>N</i> =27 cancer clinicians (i.e., oncologists, nurses and nurse practitioners)



Figure 2 Conceptual PRECEDE-PROCEED model with data sources from program of research.

Chapter 3 Identifying Unmet Needs and Preferences for Physical Activity Resources in Breast Cancer Survivors

3 Abstract

Almost 90% of breast cancer survivors report low levels of physical activity and may not be gaining health benefits. Given the well-known benefits of physical activity, this lack of physical activity engagement points to a clear knowledge-to-action gap. A potential reason for this gap may be related to unmet physical activity needs among breast cancer survivors, which are defined as factors that women perceive to have both low confidence and high difficulty of obtaining. Preferences for unique physical activity resources may also need to be better understood to intervene effectively. There were two main objectives, including (1) describing confidence, difficulty, and preferences for physical activity resources and (2) identifying some important personal and cancer-specific factors related to these needs and preferences. Breast cancer survivors (N=201, Mage=54.0, SD=13.4 years) completed an online unmet needs assessment questionnaire addressing confidence, difficulty and preferences for physical activity resources. An unmet need was operationalized as low reported confidence and high reported difficulty for obtaining physical activity related resources. Based on the findings, younger (≤ 64 years old) breast cancer survivors had unmet needs related to obtaining peer support and finding places to be active. Similarly, women who were not meeting physical activity guidelines had unmet needs related to finding an exercise partner, finding an exercise partner who understood cancer and finding social support from family, friends, peers and others for physical activity. Survivors who had been post-treatment for a shorter time (< 5 years) had an unmet need related to finding an exercise partner who understood cancer. Finally, only younger survivors preferred video tutorials, devices to track physical activity and advice from oncology-trained exercise professionals. There are salient unmet needs for breast cancer survivors that should be addressed through development of appropriate physical activity programs and resources.

Keywords: breast cancer, physical activity, unmet needs, preferences, needs assessment

3.1 Introduction

In Canada, breast cancer is the most prevalent cancer diagnosis affecting one in eight women per year. Consequently, there are approximately 25,000 new breast cancer diagnoses per year (Canadian Cancer Society, 2017). However, with increases in screening practices, improved treatment and technological advances, the five-year survival rate is approaching 90% (Canadian Cancer Society, 2017). Currently, approximately 32,000 Canadian women (Canadian Cancer Society, 2017) are living with the long-term and late effects of cancer and its treatments (Michael Feuerstein & Ganz, 2011). These effects, including but not limited to persistent pain, cardiac toxicity, depression symptoms, and fatigue, can lead to decreased quality of life and emotional well-being for breast cancer survivors (Stein et al., 2008) and strategies to mitigate these health challenges need to be identified.

Physical activity can ameliorate many long-term and late effects of cancer (see Sabiston & Brunet, 2012 for review). For example, physical activity at moderate and vigorous intensities improves cardiovascular functioning (Battaglini et al., 2014), decreases the severity and interference of cancer-related fatigue (Phillips et al., 2015), improves physical functioning (Demark-Wahnefried, Clipp, et al., 2006), helps with weight maintenance (Battaglini et al., 2014) and reduces symptoms of depression (Doering & Eastwood, 2011; Kim et al., 2008; Sylvester, Ahmed, et al., 2017). Consequently, breast cancer survivors who are active at moderate-to-vigorous intensities have a 71% decreased risk of all-cause mortality (Schmid & Leitzmann, 2014) and decreased risk of cancer recurrence (Urbscheit & Brown, 2014). Overall, physical activity can offset many of the late and long-term side effects from cancer diagnosis and treatment. For these reasons, guidelines have been developed to suggest that cancer survivors engage in 90 to 150 minutes of moderate-to-vigorous physical activity per week and strength training at least twice per week (Brunet et al., 2012; Schmitz et al., 2009; Segal et al., 2017).

Unfortunately, as many as 90% of breast cancer survivors report not meeting physical activity guidelines based on self-report and objective assessments (Lynch et al., 2010; Sabiston et al., 2014). Given the well-documented benefits of physical activity for breast cancer survivors, these low rates of activity suggest there is an apparent knowledge-to-action gap (Alfano et al., 2014; Phillips et al., 2014). To bridge this gap, informing knowledge translation strategies may be beneficial. Phillips and colleagues (2014) outline strategies for informing knowledge translation

strategies, by converting research findings from physical activity and cancer survivorship from the laboratory settings to the end user (i.e., breast cancer survivors). Understanding the individual and contextual factors that affect physical activity will assist in informing future knowledge translation research (Phillips et al., 2014). Therefore, it is important to limit this knowledge–to-action gap through rigorous evaluation and assessment aimed at improving knowledge translation strategies. An important avenue for evaluation and assessment is to identify key factors that affect survivors' ability to obtain physical activity resources, for example physical activity information (Vallance, Courneya, Plotnikoff, Yasui, & Mackey, 2007), equipment and exercise partners (Brunet, Taran, et al., 2013). These key factors can be broadly summarized as competence or self-efficacy and social support.

Self-efficacy is the belief than an individual is capable of successfully carrying out a course of action (Bandura, 1986). Within the context of physical activity, self-efficacy can be further described as either confidence in one's ability to overcome physical activity barriers (barrier selfefficacy) or confidence in one's ability to perform components of physical activity (task selfefficacy; McAuley, Lox, & Duncan, 1993). Self-efficacy is a significant predictor (Phillips & McAuley, 2013) and correlate of physical activity in breast cancer survivors both during (Rogers et al., 2005) and following treatment (Rogers, McAuley, Courneya, & Verhulst, 2008). Moreover, breast cancer survivors must also overcome many common barriers including lack of time and social support (Brunet, Taran, et al., 2013) and cancer-specific barriers, for example lymphedema (Courneya, Mackey, & McKenzie, 2002), to physical activity. Taken together, it is not currently known how confidence in one's own ability to find physical activity-related resources and how resource-related barriers, or difficulties accessing resources can impact physical activity engagement in breast cancer survivors. Similarly, understanding physical activity resource preferences in breast cancer survivors is of importance (Rogers, Courneya, Shah, Dunnington, & Hopkins-Price, 2007; Vallance, Lavallee, Culos-Reed, & Trudeau, 2013; Whitehead & Lavelle, 2009). Understanding physical activity confidence, difficulty, and preferences will assist with development of physical activity programs and resources that address unmet needs. Drawing on the physical activity self-efficacy and barrier theories, a main focus in the current study was to examine confidence and difficulty in obtaining physical activity resources and support among breast cancer survivors, and preferences for physical activity resources.

Many of the salient resource-related barriers may also reflect different forms of social support (Richman et al., 1993; Wurz et al., 2015). Social support, which includes all social interactions, functional support exchanges and perceptions of available support (Bianco & Eklund, 2001) is pertinent for coping with stressful life events including the diagnosis of breast cancer (McDonough, Sabiston, & Crocker, 2008). Drawing from research in social work (Richman et al., 1993), eight forms (herein referred to as types) of social support were distinguished. These types include listening (perception that an other is listening without giving advice or being judgemental), emotional support (perception that an other is providing comfort), emotional challenge (perception that an other is challenging the support recipient to evaluate his or her attitudes, values and feelings), reality confirmation (perception that an other who is similar to and who sees things the same way to confirm the recipient's view of the world), task appreciation (perception than an other is acknowledging the support recipient's efforts), task challenge (perception than an other is challenging the support recipient's way of thinking about a task or activity in order to motivate them), tangible assistance (perception that an other is providing the support recipient with financial assistance, products and/or gifts) and personal assistance (perception that an other is providing services or help). Through interviews with athletes, these eight types of social support have been modified within the context of physical activity to five types of support (i.e., listening, emotional, reality confirmation, task challenge and tangible assistance) in a self-report measure (Rees, Hardy, & Evans, 2007). Further, this modified questionnaire (Rees et al., 2007) has also been used to reliably assess social support in breast cancer survivors (A. J. Fong et al., 2016).

Social support appears to be an important predictor for physical activity among cancer survivors. In a systematic review, Barber (2012) identified that 50% of the studies in the review of 22 publications meeting the inclusion criteria showed a significant relationship between social support and physical activity participation. In particular, social support and perceived social support predicted physical activity frequency and participation (Barber, 2012). The majority of these findings were based on studies with breast cancer survivors, demonstrating the importance of social support for this target population. Similarly, in an observational study, support from a significant other was associated with greater walking for exercise (Coleman, Berg, & Thompson, 2014). Given these findings, social support may be an important factor for improving physical activity among breast cancer survivors. In spite of the strengths of social support in promoting physical activity, it is also deemed an important barrier. In the context of physical activity engagement, breast cancer survivors report specific social support-related barriers related to lack of support for physical activity, equipment and exercise facilities (Brunet, Taran, et al., 2013), which may serve as a proxy for lower perceived emotional and tangible assistance support for physical activity. Additionally, breast cancer survivors report engaging in and maintaining sports programs due to feelings of "being around like others" (McDonough, Sabiston, & Crocker, 2008), suggesting a need for reality confirmation support. Based on previous research, it is clear that specific types of social support (i.e., emotional, tangible assistance and reality confirmation support) may also reflect salient barriers and facilitators for physical activity in breast cancer survivors. While the types of social support require "an other" for provision (i.e., tangible assistance) it is possible that perceptions of access to the tangible resource itself may inform understanding of survivors' confidence and difficulty accessing physical activity resources and further research is needed. Within the study, tangible assistance support was operationalized as tangible resources for physical activity.

While understanding the physical activity resource confidence and barriers and preferences among breast cancer survivors is integral to future programming, it is also important to identify potential factors that differentiate these needs and preferences. Common sociodemographic and cancer-related variables which may influence physical activity are age, stage of breast cancer diagnosis, time since treatment, treatment type and body mass index (BMI; Charlier et al., 2011). For example, cancer-related factors such as treatment-related symptoms may be linked to physical activity behaviour early post-diagnosis (Charlier et al., 2011). Younger breast cancer survivors may have unique characteristics that affect physical activity levels and that are not clearly understood given that most research is with post-menopausal women (Battaglini et al., 2014; Sabiston & Brunet, 2012; Speck, Courneya, Mâsse, Duval, & Schmitz, 2010). Moreover, older breast cancer survivors (aged 59 to 86) who were one to five years post-diagnosis reported that they preferred a physical activity program that was tailored to their age and cancer-related abilities, gentle and with other breast cancer survivors (L. W. Jones & Courneya, 2002; Whitehead & Lavelle, 2009). Lastly, body composition and excess weight (as measured by BMI) have been associated with lower physical activity among breast cancer survivors (Sabiston & Brunet, 2012) and may also alter the physical activity needs and preferences. Thus, these age,

cancer, and weight factors may play a role in modifying physical activity resource unmet needs and preferences in breast cancer survivors.

In order to better inform knowledge translation strategies for physical activity, understanding physical activity-related resource needs and preferences may be important (Charlier et al., 2012). Vivar and McQueen (2005) discussed the concept of need as confusing when focused on social support needs. In general, a need is the circumstance where something is necessary, or requires action (Vivar & McQueen, 2005). However, in oncology, the definition of need becomes complicated as it is often used in tandem with problems or concerns (Vivar & McQueen, 2005). Thus, following Vivar and McQueen (2005), a need exists when there is a discrepancy between an individual's actual and optimal level of health. The authors further highlight that understanding a breast cancer survivor's needs is necessary for acquiring quality of life. Within the context of physical activity resources and breast cancer survivorship, an *unmet need* will be defined as the aforementioned discrepancy that has not been resolved through action, or a desire for physical activity resources that has not been fulfilled. While there are no known measures to assess unmet needs, there are two concepts that should be assessed to understand a discrepancy that has not been resolved. Drawing from the self-efficacy literature (Bandura, 1986; Phillips & McAuley, 2012), an individual's confidence is belief that they are able to successfully carry out an action. Having low confidence to obtain support and resources for physical activity would indicate that the individual feels that it is out of reach. Furthermore, difficulty is the perception that carrying out an action is hard or complicated. Perceptions of high difficulty may contribute to understanding access to support and resources for physical activity. Combined with low confidence, this confidence and difficulty grouping is illustrative of an unmet need.

Needs assessments have been used to identified unmet supportive care needs in breast cancer survivors by identifying specific areas where additional attention is needed (Knobf et al., 2012). Currently, there is a dearth of literature examining unmet needs related to physical activity (Charlier et al., 2012; Larsson, Jönsson, Olsson, Gard, & Johansson, 2008; Thewes, Butow, Girgis, & Pendlebury, 2004). Breast cancer survivors expressed unmet needs related to information on appropriate physical activity following surgery (Larsson et al., 2008) and expressed a desire for support related to lifestyle behaviours including physical activity (Thewes et al., 2004). Further, supportive care needs for physical activity are not associated with self-reported psychological distress in breast cancer survivors (Charlier et al., 2012). Based on these

few investigations, breast cancer survivors have unmet needs for physical activity information and support. However, the specificity of these are not well understood. As a result, further investigations are needed to identify types of informational and supportive unmet needs survivors experience related to physical activity.

Given that specific unmet needs related to physical activity are relatively unknown in this population and the potential influence of sociodemographic and cancer-related variables, the overarching purpose of the current study was to identify unmet needs and preferences for physical activity resource among breast cancer survivors living in Canada. There were two main objectives, including (1) describing confidence, difficulty, and preferences for physical activity resources and (2) identifying personal and cancer-specific factors that may associate with these unmet needs (i.e., low confidence and high difficulty) and preferences. Given that age, stage of breast cancer diagnosis, time since treatment, treatment type and BMI are commonly associated with physical activity among breast cancer survivors (Charlier et al., 2011; Sabiston & Brunet, 2012; Speck et al., 2010), these variables were tested in the current study as potential factors associated with needs. Informed by previous self-efficacy in physical activity literature (e.g., L. Q Rogers et al., 2011), it was hypothesized that breast cancer survivors would report lower confidence and experience higher difficulty (i.e., unmet need) related to accessing information from different sources and for social support related to physical activity. Furthermore given that there are important sociodemographic and cancer-related variables which affect physical activity (e.g., Charlier et al., 2011), it was also hypothesized that survivors who were younger, not meeting physical activity guidelines, diagnosed with later stages of breast cancer, had less time since treatment and higher BMI would identify more unmet needs and unique preferences for physical activity.

3.2 Methods

This study was a cross-sectional design using survey methodology to target a convenience sample of breast cancer survivors living in Canada in order to assess unmet needs and preferences related to physical activity and any associated factors.

3.2.1 Procedures and Participants

Following institutional research ethics board approval (REB #32094), breast cancer survivors were recruited using online and email advertisements sent to support groups and using social media. Advertisements were placed at community centres, hospitals and distributed at breast cancer charity events. Within the advertisements, participants were given an online link that enabled them to locate the study description and consent form. Following consent, the online questionnaire was available for completion. Data collection occurred between October 2015 and October 2016 until the appropriate sample size of N=201 was reached. Based on information provided in previous cohort studies on supportive care unmet needs (Hodgkinson et al., 2007; Knobf et al., 2012) and physical activity (e.g., Sabiston et al., 2014), a sample size calculation was conducted for the analysis exploring the predisposing and enabling factors associated with the unmet needs (multivariate analysis of variance (MANOVA)). With a power of 0.80 and alpha of 0.05 using a MANOVA model with two levels and three dependent variables, a sample size of N=197 was required to examine factors related to physical activity needs (G*Power, Dusseldorf, Germany). Inclusion criteria for this study included: (i) Canadian adult breast cancer survivor > 18 years old; (ii) at least one year post-treatment completion; (iii) identified as female; (iv) were able to read and understand English or French; and (v) had access to a device connected to the Internet to complete the questionnaire.

3.2.2 Measures

3.2.2.1 Demographics and cancer history

Women reported age (in years), ethnic background, number of children living in the home, and marital status. Cancer-related variables included stage of breast cancer diagnosis, time since diagnosis (in years), time since completion of treatment (in years), and types of cancer treatment(s) received. BMI (kg/m²) was calculated from self-reported weight (kg) and height (m).

3.2.2.2 Physical activity

Current physical activity was assessed using Godin-Shephard Leisure Time Exercise Questionnaire (GLTEQ; Godin, 2011). Participants were asked to recall the number of times in the last 7 days they performed mild (minimal effort), moderate (not exhausting) and strenuous (heart beats rapidly) activity. They were also asked to recall the average duration of these sessions in minutes. Within each exercise intensity category (mild, moderate and vigorous), average minutes per week were calculated (average duration multiplied by times per week) to gain a total weekly minutes of physical activity score. To calculate total weekly moderate-to-vigorous physical activity (MVPA), weekly total minutes of both moderate and vigorous intensities were added together. The GLTEQ is a common (N=212 articles between 1985 and 2014) and valid (rs=.31 to .57 compared to accelerometer data) measure of self-reported physical activity used among breast cancer survivors (Amireault, Godin, Lacombe, & Sabiston, 2015a, 2015b).

3.2.2.3 Unmet physical activity resource needs and preferences

3.2.2.3.1 Questionnaire development

A 26-item questionnaire was developed to identify unmet physical activity needs of breast cancer survivors. The items were centered on confidence in obtaining physical activity information (9 items), difficulty in obtaining information (9 items), and preferences for physical activity information (8 items). Item content was guided by the social support types outlined in the Social Support Survey (Richman et al., 1993) and commonly reported facilitators (Blaney, Lowe-Strong, Gracey, Rankin-Watt, & Campbell, 2011), barriers (Brunet, Taran, et al., 2013) and preferences (Vallance et al., 2013) for physical activity. First, *emotional support* was assessed by examining formal and informal sources of emotional support as outlined by Richman and colleagues (1993) including, friends, family and others. Additionally, drawing from the physical activity barrier literature (Brunet, Taran, et al., 2013), an item was added about access to an exercise partner. Similarly, breast cancer survivors report being around similar others as a common motivator or facilitator for physical activity and an item was developed about finding peer support and fulfills reality confirmation support. And, the operationalized concept of *tangible resources* (i.e., access to products instead of provision of products) was examined by listing common tangible needs of physical activity including attire, equipment and places to be active. Next, *informational needs* was assessed by identifying facilitators and preferences for physical activity information including medical team (L. W. Jones & Courneya, 2002) and exercise professionals (Blaney et al., 2011). Finally, physical activity resource *preferences* were developed from commonly reported preferences used in physical activity interventions in the literature.

The stem for the confidence items were developed based on the Exercise Barrier Self-Efficacy Scale (McAuley, 1992). Items for both confidence and difficulty items were developed based on the second item of the Social Support Survey, which assess difficulty accessing support (Richman et al., 2013). The questionnaire was pre-tested with two female cancer survivors (ovarian and brain) and two graduate students studying physical activity and cancer for questionnaire content and clarity. Based on their collective suggestions, the wording related to "finding" tangible physical activity resources was adjusted to "accessing" and the word "appropriate" was added to the item examining exercise attire.

3.2.2.3.2 Questionnaire

Confidence to obtain physical activity information (e.g., "Confidence in my ability to speak with my physician/medical team about physical activity") was reported on a scale from 0% (*No confidence at all*) to 100% (*Complete confidence*), which is consistent with an exercise self-efficacy measurement (McAuley, 1992). Consistent with the exercise barrier literature and to provide some context to the responses, low confidence was rated as less than 60% on this scale, somewhat confident at \geq 61% to 69.9% and confident at \geq 70% (McAuley, 1992). Since the main aim of the current study was to identify specific unmet needs, the items on the scale were explored separately. Nonetheless, the internal consistency reliability coefficient for the nine items used to assess confidence in obtaining information was α =.87.

Participants also rated the difficulty they had in obtaining physical activity support in the form of information (e.g., "How difficult is it for you to obtain advice from exercise professionals who are trained in exercise for breast cancer survivors?"), social support (e.g., "How difficult is it for you to find an exercise partner who understands cancer?"), and tangible resources (e.g., "How difficult is it for you to obtain access to place into places in my community to exercise?"). These items were anchored at 1 (*Very difficult*) to 5 (*Very easy*) to be consistent with the Social Support Survey (Richman et al., 1993). Since the main aim of the current study was to identify specific unmet needs, the items on the scale were explored separately. However, Cronbach's alpha for the items within this subscale was α =.85.

Participants were also asked for their physical activity resource preferences, rating items such as video tutorials, brochures or booklets, and tools or devices on a 5-point Likert type scale ranging

from 1 (*Not at all useful*) to 5 (*Very useful*). While all items were examined as separate preferences, the Cronbach's alpha for the subscale was α =.86.

3.2.3 Data Analysis

The needs assessment questionnaire data were screened for missing values. Given the descriptive nature of the current study, individual cases with $\geq 60\%$ missing data were deleted from the dataset (Buhi, Goodson, & Neilands, 2008). Missing item-level data points were imputed using median replacement. Sociodemographic and cancer history variables were dichotomized based on a median split including BMI (0= >25 kg/m² and 1= \leq 25 kg/m²), stage of breast cancer diagnosis (0= Stages 0 through II and 1= Stages III and IV), time since treatment (0= \leq 5 years and 1= >5 years). Physical activity was also dichotomized based on meeting guidelines of 150 minutes of moderate-to-vigorous physical activity per week (0=not meeting guidelines and 1=meeting guidelines). Consistent with previous research on unmet needs, age was dichotomized based on average reported post-menopausal age (0= >64 years old and 1= \leq 64 years old; e.g., Thewes et al., 2004).

Descriptive statistics, including means and standard deviations and/or frequencies were calculated. For the main analysis, MANOVAs were calculated for all items of each subscale of the needs assessment questionnaire (i.e., confidence, difficulty, and physical activity resource preferences) with sociodemographic, cancer history and physical activity variables.

3.3 Results

3.3.1 Descriptive Results

Two hundred and fifty breast cancer survivors initiated the questionnaire and N=201 women completed at least 60% of the questionnaire items. Of the 49 excluded surveys, n=48 were incomplete (<60%) and n=1 was a duplicate. Participants (N=201) identified as predominantly Caucasian (88%); aged M=54.0, (SD=13.4) years, were married or living with a partner (68%), and diagnosed with Stage II or III (70.6%) breast cancer that had been diagnosed an average of 6.5 years (SD=6.2) prior to the study. Current levels of MVPA were reported as M=177.9(SD=158.3) minutes per week (equating to approximately 25.4 minutes per day). Just over 53% of the sample was meeting physical activity guidelines. See Table 2 for complete sample description.

Based on preliminary t-test analyses, there were significant (p < .05) differences between women who completed the survey and those who were excluded based on age ($M_{completers} = 53.9$ versus $M_{excluded} = 47.3$ years of age; p=.02), time since breast cancer diagnosis ($M_{completers} = 6.4$ versus $M_{excluded} = 4.5$ years; p=.001), time since treatment completion ($M_{completers} = 5.8$ versus $M_{excluded} =$ 3.7 years; p=.001), and based on a chi-square analysis, stage of breast cancer diagnosis (completers vs. excluded participants: Stage 0=2.50 versus 3%, Stage I= 21.8 versus 26%, Stage II =43.7 versus 40%, Stage III =26.9 versus 25.2%, Stage IV= 5.1 versus 5.6%; p=.04).

3.3.2 Unmet needs and preferences

Table 3 summarizes the mean percentages and scores from the needs assessment questionnaire for this sample. Based on mean self-reported confidence, participants were not confident in their abilities to obtain advice from exercise professionals who have been trained in breast cancer, find an exercise partner, find an exercise partner who understands cancer, and find others to motivate them to be more active. Participants were somewhat confident ($\geq 61\%$ to 69.9%) in their ability to find support from family and friends to be more active. Participants were confident ($\geq 70\%$) in their ability to speak with their medical team on physical activity and to find attire, equipment and places for physical activity.

Participants found it neither difficult nor easy (3 on Likert scale) to obtain information from the various categories: advice from physicians/medical team, find an exercise partner, find an exercise partner who understands cancer, support from family and friends to be more physically active and peer support from someone who has gone through cancer. Participants found it very easy (5 on Likert scale) to access exercise equipment, access community places to be active and access comfortable, appropriate exercise attire. Lastly, participants found it difficult (1 or 2 on Likert scale) to find an exercise partner and an exercise partner who understands cancer.

Given the low variability and skewed distributions, and consistent with Nadler and colleagues (2017), items on the preferences scale were dichotomized *not as useful* (responses 1 to 3 were recoded as 0) and *useful* (responses 4 to 5 were recoded as 1). Cumulatively, participants (\geq 50%) reported that the following resources would be useful for maintaining or increasing current

levels of physical activity including physical activity or video tutorials, having a role model for physical activity information, physical activity monitoring tools or devices (e.g., Fitbit), physical activity trainers and professionals, and physical activity professionals to call or text for information.

3.3.3 Main Analysis: Factors Related to Unmet Needs and Preferences

3.3.3.1 Confidence in obtaining physical activity resources

Overall, there was a significant effect of physical activity, F(9,191)=3.73, p<.05, $\eta^2=.15$, on self-reported confidence for physical activity resources. Specifically, survivors who did not meet physical activity guidelines were less confident in their ability to speak to their medical team about physical activity, find an exercise partner, find an exercise partner who understands cancer, find support and others to motivate them to be more active, and access both equipment and places in their community to be active. Age did not have an overall effect; however, those who were younger had less confidence in their ability to find peer support and find places in the community to be active. Time since treatment did not have an overall effect; however, those who had been survivors for longer had more confidence in their ability to obtain advice from exercise professionals and find an exercise partner who had cancer. These findings are reported in Table 4. The overall models for BMI and stage of breast cancer diagnosis were not significant.

3.3.3.2 Difficulty in obtaining physical activity resources

There were overall effects of age, F(9, 190)=3.42, p<.05, partial $\eta^2=.14$; BMI, F(9, 190)=1.95, p<.05, partial $\eta^2=.09$; and physical activity, F(9, 190)=3.10, p<.05, partial $\eta^2=.13$, on self-reported difficulty in obtaining physical activity resources. Survivors who were younger reported a more difficult time finding advice from their medical team, finding advice from exercise professionals trained in exercise for breast cancer survivors, finding an exercise partner and one who understands cancer, peer support and finding comfortable exercise places. Women with higher BMI reported having a more difficult time finding an exercise partner, an exercise partner who understood cancer, appropriate exercise equipment and comfortable exercise attire. Survivors not meeting guidelines reported higher difficulty in finding advice from exercise partner, an exercise partner who understands cancer, support from others, peer-support, appropriate exercise equipment, places to be active and exercise attire. While the overall model for time since

treatment was not significant, univariate analyses revealed that women who had been survivors for longer found it easier to find an exercise partner, a partner who understood cancer and peer support from other survivors. These findings are presented in Table 5. The model for stage of breast cancer diagnosis was not significant.

3.3.3.2.1 Identified unmet needs

An unmet need was operationalized as perceived low confidence and high difficulty for acquiring a resource. Based on the definition of low confidence (e.g., scores of $\leq 60\%$) and high difficulty (e.g., scores < 2.9), the unmet needs included finding an exercise partner, finding an exercise partner who understood cancer, finding support from family, friends, peers and others for physical activity and finding appropriate equipment and community places to be active.

3.3.3.3 Physical activity resource preferences

There was an overall effect of age on physical activity resource preferences, F(8, 187)=2.56, p<.05, $\eta_p^2=.10$. Survivors who were younger (≤ 64 years) found that interactive tools including physical activity videos or tutorials, F(1, 194)=7.51, p<.05, $\eta_p^2=.04$ and tools or devices to monitor physical activity, F(1, 194)=4.93, p<.05, $\eta_p^2=.03$, were useful compared to older survivors. Younger survivors also found available physical activity trainers as a more useful resource, F(1, 194)=11.2, p<.05, $\eta_p^2=.05$, than survivors who were older. The models testing for effects of BMI, stage of breast cancer diagnosis, time since treatment and physical activity levels were not significant.

3.4 Discussion

The purpose of the current study was to identify unmet needs and preferences for physical activity resource among breast cancer survivors. There were two main objectives, including (1) describing confidence, difficulty, and preferences for physical activity resources and (2) identifying personal and cancer-specific factors that may associate with these unmet needs (i.e., low confidence and high difficulty) and preferences. In support of the first hypothesis, survivors had salient unmet needs (i.e., lower confidence and higher difficulty) related to finding an exercise partner, finding an exercise partner who understood cancer, finding support from family, friends, peers and others for physical activity and finding appropriate attire, equipment and community places to be active. There were also many sociodemographic factors, including

age and physical activity levels that were related to many of these unmet needs. In partial support of the second hypothesis, younger breast cancer survivors identified unique physical activity resource preferences for video tutorials, tools or devices to monitor physical activity and availability for physical activity trainers and professionals trained in breast cancer. However, younger survivors expressed unique unmet needs related to finding social support from others or peers and places to be active. Survivors not meeting physical activity guidelines had unmet needs related to finding an exercise partner, one who understands cancer, social support for physical activity exercise equipment and places to be active. Similarly, women had been survivors for less time (≤ 5 years) identified finding an exercise partner who understood cancer as an unmet need; however, there were no associations with resource preferences. In contrast to the second hypothesis, later stages of breast cancer diagnosis and higher BMI did have an association with unmet needs and preferences for physical activity resources. Taken together, the findings of the needs assessment offer guidance for future physical activity programming and resource development to help inform the knowledge-to-action gap.

3.4.1 Factors Related to Unmet Needs and Preferences

3.4.1.1 Age

Younger breast cancer survivors in this study reported an unmet need related to finding appropriate exercise places to be active. Following breast cancer treatment, many breast cancer survivors are navigating their altered bodies (Brunet, Sabiston, & Burke, 2013) and it is not uncommon for survivors to report decreased body image satisfaction. Decreased body image satisfaction has been associated with coping behaviours such as changing clothing (Falk Dahl, Reinertsen, Nesvold, Fosså, & Dahl, 2010). Similarly, survivors may also report social physique anxiety, which is a form of social anxiety experienced when one's physical appearance is being evaluated or perceived to be evaluated (Castonguay, Crocker, Hadd, McDonough, & Sabiston, 2015; Hart, Leary, & Rejeski, 1989). In the general adult population, social physique anxiety has been associated with exercise attire preferences for clothing that is loose and covers more of the body (Hausenblas, Brewer, & Van Raalte, 2004); however, this association has yet to be examined in a sample of breast cancer survivors. These concepts of body-related satisfaction may also affect other domains such as finding comfortable places to be active (Hausenblas et al., 2004). Further, many body satisfaction-related studies are conducted in samples of older breast cancer survivors (e.g., McDonough, Sabiston, & Wrosch, 2014; Sabiston, McDonough, &

Crocker, 2007). Based on the findings from the current study, younger breast cancer survivors may have unique body-related concerns that impact physical activity levels from their older survivor counterparts. Researchers are encouraged to examine associations between exercise place preferences and body image and apply findings when developing appropriate physical activity attire and programs, for example features for attire may include developing programs that minimize focus on body appearance.

Younger breast cancer survivors in this study had significant informational preferences, which included physical activity videos and tutorials, tools or devices to track physical activity (e.g., Fitbit) and access to physical activity professionals who have experience with breast cancer. Based on these findings, breast cancer survivors are looking for other resources that are not the traditional brochures or pamphlets. In one study pairing textual material and a pedometer, women increased their physical activity by over 57 minutes per week compared to the print-only group who increased by 39 minutes (Vallance, Courneya, Plotnikoff, Yasui, & Mackey, 2007). Web-based interventions have been rated as acceptable among cancer survivors, moreover webbased methods had broad reach and were easily implemented (Goode, Lawler, Brakenridge, Reeves, & Eakin, 2015). In a qualitative evaluation, a sample of rural-dwelling cancer survivors using a web-based intervention reduced feelings of guilt related to not meeting physical activity goals and increased perceived social support (Frensham, Zarnowiecki, Parfitt, King, & Dollman, 2014). The previous studies and the current research suggest that more interactive materials are needed for increasing physical activity behaviours among younger breast cancer survivors. Development of strategies to continue fostering social support for physical activity using novel methods is encouraged.

There were preferences for access to physical activity video tutorials in women who were younger, suggesting that information from a trustworthy source is important (Falzon, Radel, Cantor, & d'Arripe-Longueville, 2015). In a previous randomized controlled trial, breast cancer survivors who were asked to read a testimony of an active survivor rated the source as more trustworthy and had higher exercise self-efficacy than the survivors asked to read an information-equivalent recommendations sheet (Falzon et al., 2015). Understanding the source of knowledge is important to breast cancer survivors (Falzon et al., 2015). As a result, developing and implementing breast cancer-specific exercise videos and tutorials may assist with satisfying this support domain. Future work is encouraged to determine the feasibility and

effectiveness of such videos and tutorials for increasing physical activity levels in breast cancer survivors.

Further, younger survivors in this study preferred a physical activity monitoring tool or device (i.e., wearable technology) than traditional forms of self-monitoring, such as a journal. This reflects current trends in wearable technology, but also may be an artifact of the web-based nature of the needs assessment. A recent cross-sectional study describing preferences for a technology-support sedentary behaviour intervention in breast cancer survivors found that survivors would be interested and willing to use wearable technology (Lloyd et al., 2016). Future research strategies are needed to validate wearable technology for monitoring physical activity compared to accelerometer-measured physical activity and to determine acceptability among breast cancer survivors. Additional research is needed to determine prolonged self-monitoring and physical activity behaviour effects of wearable technology. In contrast, being an older cancer survivor was not associated with preferring technology-based tools such as wearable monitors and physical activity videos and tutorials. As a result, older survivors may not want these tools. It is important to continue to develop and refine "offline" tools such as printed physical activity how-to booklets and tracking journals that will facilitate physical activity in those who prefer these methods.

Younger breast cancer survivors wanted access to physical activity professionals trained in breast cancer; however, regardless of age, this particular resource was preferred above others (83.8% rated as useful). In previous research, cancer survivors reported preferring exercise information from exercise professionals (Fitzpatrick & Zizzi, 2012; L. W. Jones & Courneya, 2002). Similarly, exercise professionals have assumed a primary role in conducting physical activity stress tests in the asymptomatic and cardiac populations (Warburton et al., 2011) and there is an increasing demand for the role of qualified exercise professionals in cancer survivorship (Hayes, Spence, Galvão, & Newton, 2009; Santa Mina, Alibhai, Matthew, Guglietti, Steele, Trachtenberg, & Ritvo, 2012). As a result, clinical and academic organizations have developed specialized training programs for exercise professionals in oncology (e.g., American College of Sports Medicine Certified Cancer Exercise Physiology Cancer and Exercise module http://www.csep.ca/view.asp?ccid=551; Rocky Mountain Cancer Research Institute Cancer Exercise Specialist Training Course http://www.unco.edu/nhs/cancer-rehabilitation-institute/).

Unfortunately, it is unclear how many oncology-trained exercise professionals exist. Consequently, it is important to conduct an audit to identify any oncology-trained exercise professionals and where they train clients. Cancer survivors have reported a preference for visiting oncology-trained exercise professionals in a community-based environment rather than cancer clinic environment (Fitzpatrick & Zizzi, 2012). Future research is encouraged to conduct an audit of current oncology-trained exercise professionals and community-based programs that have these trained professionals and disseminate this information through avenues that are frequented by breast cancer survivors including oncology centres and community-based survivorship programs.

3.4.1.2 Physical activity

In contrast to the current body of literature (Bluethmann et al., 2015; Schmitz et al., 2010; Speck et al., 2010), breast cancer survivors in this study self-reported as being quite active, with slightly over half (53.2%) meeting physical activity guidelines. While this is surprising, current physical activity levels were not associated with supportive care needs for physical activity in a sample of breast cancer survivors (Charlier et al., 2012). It is possible that while meeting physical activity guidelines are important for gaining health benefits, barriers to maintaining these physical activity levels may result in unmet needs. Further, findings from the current study highlight that despite survivors meeting physical activity guidelines, there are other factors such as age and BMI which have an association with unmet needs related to physical activity.

Additionally, there is a subgroup of survivors in the current study who reported not meeting physical activity guidelines (46.8%). Inactive survivors in the present study had an unmet need related to finding an exercise partner who understands cancer and peer support, additionally, younger survivors had an unmet need related to finding peer support. These findings suggest that there is difficulty related to reality confirmation support as survivors are struggling to find a social support provider who is similar to them (i.e., breast cancer survivor) and shares their views (i.e., increasing physical activity levels) (Richman et al., 1993). Survivors who were younger and had completed treatment earlier also had difficulty accessing this type of social support. These findings are consistent with the literature where support from a peer trainer improves accelerometer-measured moderate-to-vigorous physical activity in inactive breast cancer survivors (B. M. Pinto & Stein, 2015). Similarly, from a qualitative perspective, shared

experiences of cancer and survivorship between team members of a breast cancer dragon boat team facilitate positive psychological growth (Sabiston et al., 2007). Overall, there are consistent findings that being around like-others may motivate breast cancer survivors to be more active (Sabiston et al., 2007). Reality confirmation is likely an important type of social support for breast cancer survivors (Pinto & Stein, 2015) and future research is encouraged to examine this type of social support in breast cancer survivors through both quantitative and qualitative methods so that development of appropriate resources to further facilitate social support aimed at promoting physical activity.

Moreover, support from family, friends and others to be more active and finding an exercise partner were identified as unmet needs in inactive breast cancer survivors. Similarly, younger survivors identified an unmet need for social support from others and from peers. These findings are unfortunate given that breast cancer survivors have identified social support as an important motivator for physical activity (Brunet, Taran, et al., 2013). And, the quality of this type of emotional social support from family and peers predicts emotional wellbeing in breast cancer survivors (Fong et al., 2016). Furthermore, family physical activity programs such as mother-daughter dyads have led to increases in objectively measured moderate-to-vigorous physical activity (Demark-Wahnefried et al., 2014). Social support from key individuals such as family, friends and important others may help to facilitate physical activity behaviours in inactive breast cancer survivors.

Additionally, inactive survivors reported unmet needs related to finding exercise equipment and places to be active. Again, while BMI did not have an overall effect on unmet needs; however, there was a univariate effect of women with higher BMI having difficulty accessing exercise equipment as well as attire. Access to attire, equipment, and places to be active may reflect perceived low tangible assistance social support (Richman et al., 1993) as breast cancer survivors in this study may perceive that a provider has not given them access to places to be active or access to appropriate attire and equipment. Following breast cancer treatment, many survivors must acquaint themselves with their changed bodies (Brunet, Sabiston, & Burke, 2013). During this time, survivors may not feel comfortable wearing exercise attire, for example due to impairments from surgery, or using exercise equipment, for example due to joint pain or neuropathy. Moreover, breast cancer survivors who are sedentary report less positive attitudes towards their physical conditioning and sexual attractiveness than active counterparts (B. M.

Pinto & Trunzo, 2004). This decreased positive attitude may have an impact on feeling comfortable in a physical activity space. As a result, future research is encouraged to use both qualitative and quantitative methods to identify features of comfortable and appropriate exercise attire, equipment and physical activity spaces for breast cancer survivors.

Time since treatment had no effect on physical activity resource preferences. On average, survivors in this study had reached the extended and permanent phases of the survivorship trajectory, where focus shifts to management of side effects from treatment (Mullan, 1985). Among long-term breast cancer survivors, at least 5-to-10 years post-treatment, time since treatment was not associated with meeting physical activity guidelines (Mason et al., 2013). Similarly, unmet supportive care needs and time since diagnosis were not associated in a sample of breast cancer survivors (Hodgkinson et al., 2007). In the current study, it is likely that since many of the survivors were in these later phases, they all had similar unmet needs, thus no association exists. Similarly, stage of diagnosis had no effect on any needs or preferences. Currently, the literature examining stage of diagnosis and associations with physical activity levels is inconsistent, given the individualized nature of breast cancer (McNeely et al., 2006; Sabiston & Brunet, 2012). As a result, more research is needed to examine any potential effects of cancer stage on physical activity-related resource needs and preferences.

3.4.2 Limitations

With regards to the limitations of this research project, a convenience sample of Canadian breast cancer survivors who have access to the internet were used in this study and limit the generalizability of the findings of the needs assessment. Similarly, using primarily online recruitment methods may have limited generalizability of the findings. Moreover, the study used a purpose-built questionnaire and as a result, validity of the findings cannot be confirmed. Also, there is an inherent assumption that all participants who completed the questionnaire desired the resources listed; however, this may not have been the case and it is possible that some low confidence or neutral difficulty scores may represent resources that are not applicable. Future research is encouraged to re-administer this questionnaire with "not applicable" added to the end of the Likert scales. The cross-sectional nature of the study does not allow for causal inferences to be drawn. An unmet need was operationalized by low confidence and high difficulty. Some difficulty scores within personal factors were statistically significant, but may not have been

clinically significant since the differences between scores were quite close (e.g., obtaining advice from medical team, social support for physical activity from family and friends and finding exercise equipment). As such, the current study design and methodology precludes exploring clinical implications of unmet needs for physical activity among breast cancer survivors.

Similarly, data on common barriers for physical activity (e.g., cost, lack of motivation) and other sociodemographic variables (e.g., education, income) were not collected and may have offered a greater detailed understanding of unmet needs and associated factors. For example, in the general population, lower socioeconomic status (i.e., less education and lower income) is associated with lower physical activity levels (Chen et al., 2015). In the current study, many of the items for unmet needs and preferences for physical activity resources may be influenced by a survivor's socioeconomic status and these needs may have been pronounced for survivors lower in socioeconomic status. For example, access to exercise professionals trained in breast cancer, equipment, attire and access to places to be active (e.g., gym memberships) can be costly. Furthermore, understanding physical activity information from health care clinicians may be more challenging for women who are not highly educated. Future research is encouraged to examine any associations between unmet needs and preferences for physical activity resources with common barriers and other sociodemographic variables.

3.4.3 Conclusions

The findings from this study highlight various unmet needs that breast cancer survivors are experiencing. In particular, there are salient unmet needs related to various types of social support. Specifically, social support from peers is quite important and thus, developing and evaluating programs that identify and connect peer exercise partners based on age and physical activity level would address this need. Next, unmet needs related to tangible needs should be addressed through identifying appropriate community-based physical activity programs and physical activity attire and equipment brands that accommodate needs of survivors. Finally, leveraging technology through web-based video tutorials and wearable technology may also help to facilitate social support for physical activity. In conclusion, this study highlights key areas for future interventions with breast cancer survivors to promote physical activity.

Characteristics	Mean (SD) or %	Range	
Age (years)	54.0(13.4)	22 - 86	
Younger (≤ 64 years)	73.0%		
Older (> 64 years)	27.0%		
Ethnic background			
Caucasian	87.8%		
Multi-ethnic	5.8%		
Chinese	4.8%		
South Asian, Black, Latina (combined)	<u><</u> 1.5 %		
Body mass index (BMI; kg/m ²)	26.7(5.7)	16 - 57	
Healthy weight ($< 25 \text{ kg/m}^2$)	54%		
Overweight (> 25 kg/m^2)	46%		
Marital status			
Married, or in a relationship	70.5%		
Number of children	1.58(1.39)	0-7	
Cancer History			
Stage of breast cancer diagnosis			
Stage 0 through II	68%		
Stage III and IV	32%		
Time since cancer diagnosis (years)	6.5(6.2)	1 - 30	
Treatments received			
Lymph node or axillary node dissection	75.1%		
Lumpectomy	50.7%		
Single or double mastectomy	58.2%		
Chemotherapy	76.1%		
Radiotherapy	76.6%		
Hormonal therapy	58.7%		
Time since treatment (years)	6.0(6.4)	1 - 27	
Earlier (<5 years)	57.7%		
Longer (> 5 years)	42.3%		
Physical Activity			
MVPA (weekly minutes)	177.9(158.3)	0 - 750	
Meeting guidelines	53.2%		
Not meeting guidelines	46.8%		

Table	2 Charac	teristics of	' the Sam	ple of Br	east Cancer	· Survivors	(N=201)
							· · · · · · · · · · · · · · · · · · ·

Note. MVPA= moderate-to-vigorous physical activity; PA= physical activity.

Table 3 Breast Cancer Survivors' (N=201) Self-reported Confidence Levels and Difficulty in Obtaining Physical Activity Information, and Physical Activity Resource Preferences

Items	Mean(SD)	Score
		Range
Confidence in Obtaining Physical Activity Resources (%)		
We would like you to rate your confidence levels from 0 to 10 ((0% is no confidence a	at all and
100% is complete confidence) in your ability to do the followin	g:	
1. Speak with my physician and/or medical team about	70.9(28.6)	0 - 100
 Obtain advice from exercise professionals who are trained in exercise for breast cancer survivors 	59.2(34.4)	0 - 100
3. Find an exercise partner	55.6(35.1)	0 - 100
4. Find an exercise partner who understands cancer	46.7(36.2)	0 - 100
5. Obtain support from family and friends to become	64.2(32.2)	0 - 100
6. Find others to motivate me to become more physically active	55.8(33.4)	0 - 100
 Access exercise equipment 	73.3(28.9)	0 - 100
8. Access places in my community for exercise	71.8(31.2)	0 - 100
9. Access appropriate and comfortable exercise attire	81.9(27.1)	0 - 100
Difficulty in Obtaining Physical Activity Resources (score) ^a		
We would like to know how difficult it is for you to obtain the	following:	
 Advice from my physician and/ or medical team about physical activity 	3.5(1.1)	1 – 5
2. Advice from exercise professionals who are trained in exercise for breast cancer survivors	2.8(1.2)	1 – 5
3. An exercise partner	3.0(1.2)	1 – 5
4. An exercise partner who understands cancer	2.7(1.2)	1 – 5
5. Support from family and friends to become more physically active	3.6(1.1)	1-5
 Peer support from someone who has also gone through cancer 	3.3(1.2)	1-5
7. Appropriate exercise equipment	3.8(1.2)	1 – 5
8. Access to places in my community to exercise	3.8(1.2)	1 – 5

9.	Appropriate, comfortable exercise attire	4.2(1.1)	1 - 5
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$\label{eq:physical-activity-resource} Physical Activity Resource \ Preferences \ (original \ score)^b$

We would like to know how useful the following resources would be to help you increase or maintain your physical activity levels:

1.	Physical activity videos featuring breast cancer survivors	2.99(1.30)	1 – 5
2.	Physical activity videos/ video tutorials	3.15(1.29)	1 – 5
3.	Having a role model for physical activity information	3.51(1.17)	1 – 5
4.	Brochures and booklets for physical activity material	3.07(1.14)	1 – 5
5.	Journals for keeping track of physical activity	2.99(1.19)	1 – 5
6.	Tools or devices to help monitor physical activity (e.g., Fitbit, Jawbone, Garmin, pedometers, etc.)	3.63(1.30)	1 – 5
7.	Physical activity trainers or professionals available to you	4.24(1.01)	1 – 5
8.	Physical activity professionals available to call or text for information	3.78(1.91)	1 – 5
Physic	cal Activity Resource Preferences (dichotomized score) ^c	%useful	
1.	Physical activity videos featuring breast cancer survivors	40.3%	0, 1
2.	Physical activity video tutorials	48.2%	0, 1
3.	Having a role model for physical activity information	61.3%	0, 1
4.	Brochures and booklets for physical activity material	41.5%	0, 1
5.	Journals for keeping track of physical activity	38.7%	0, 1
6.	Tools or devices to help monitor physical activity (e.g., Fitbit, Jawbone, Garmin, pedometers, etc.)	64.8%	0, 1
7.	Physical activity trainers or professionals available to you	83.8%	0, 1
8.	Physical activity professionals available to call or text for information	67.7%	0, 1

Note. Questionnaire items are as presented. ^aWhere 5=very easy and 1=very difficult. ^bWhere 5=very useful and 1=not at all useful. ^cWhere 0=not as useful and 1=useful.

Confidence Items	Speak with medical team	Advice from exercise professionals	Exercise partner	Exercise partner cancer	Family and friend support	Support from others	Exercise equipment	Places to be active	Exercise attire
Variables									
Age									
<u><</u> 64 years	69.2(28.2)	57.1(34.3)	54.3(34.3)	43.3(35.2)	62.7(31.8)	52.3(33.6)*	70.8(29.2)	68.9(31.2)*	80.6(28.2)
>64 years	74.6(30.0)	64.9(33.7)	56.2(37.9)	53.6(38.3)	66.6(34.1)	64.2(32.2)	78.6(28.7)	78.7(30.5)	84.4(24.5)
BMI									
<u><</u> 25	72.8(29.1)	61.3(33.1)	57.7(35.2)	49.6(37.2)	67.2(31.7)	60.4(32.4)	76.4(27.4)	76.5(28.0)*	84.4(25.0)
> 25	68.7(28.4)	57.3(35.4)	52.2(35.3)	43.0(35.2)	60.7(32.9)	51.2(34.1)	69.8(30.6)	67.2(33.5)	79.1(29.0)
BC stage									
0 to II	71.8(27.3)	60.4(33.7)	55.3(34.5)	47.3(36.2)	66.8(31.1)	57.0(32.6)	72.3(28.3)	71.2(30.7)	82.2(26.7)
III and IV	68.7(31.5)	56.0(35.3)	53.9(37.2)	43.2(36.6)	57.9(33.9)	52.5(35.2)	74.1(31.5)	73.3(32.2)	80.2(28.8)
Time since									
Treatment									
\leq 5 years	67.8(28.8)	53.4(34.3)	51.9(34.5)	40.1(34.4)	62.1(31.8)	51.6(33.1)	71.0(29.7)	68.7(31.2)	79.7(29.5)
> 5 years	74.5(28.3)	67.2(32.8)*	58.7(36.0)	54.4(37.3)*	66.0(33.2)	60.9(33.5)	75.5(28.6)	75.5(31.1)	84.1(23.7)
PA levels									
Meeting	77.4(25.7)*	62.5(33.8)	63.3(34.4)*	51.8(35.7)*	72.6(27.8)*	61.9(31.8)*	78.5(26.5)*	80.0(26.1)*	82.1(27.6)
guidelines									
Not meeting guidelines	63.2(30.1)	55.6(34.6)	45.4(33.9)	39.8(36.0)	53.9(34.5)	48.4(34.1)	66.7(31.0)	62.2(33.9)	81.1(26.9)

 Table 4 Associations Between Sociodemographic, Cancer History and Physical Activity and Confidence Items with Means and

Standard Deviations

Note. Degrees of freedom=1, 199; F-statistics ranged from .01 to 17.6; effective sizes (η_p^2) ranged from .001 to .08; **p*<.05. PA=physical activity.

Difficulty Items	Speak with medical	Advice from exercise professionals	Exercise partner	Exercise partner cancer	Family and friend support	Support from peers	Exercise equipment	Places to be active	Exercise attire
Variables	team								
Age									
<u><</u> 64 years	3.35(1.11)	2.67(1.13)*	2.88(1.10)*	2.48(.97)*	3.53(1.10)	3.11(1.26)*	3.64(1.21)	3.64(1.19)	4.05(1.19)
>64 years	3.76(.95)	3.26(1.17)	3.35(1.22)	3.31(1.30)	3.69(1.10)	3.76(1.06)	3.94(1.11)	4.06(1.11)	4.39(.81)
BMI									
<u><</u> 25	3.44(1.16)	2.94(1.22)	3.24(1.18)	2.93(1.20)	3.67(1.08)	3.37(1.22)	3.96(1.06)	3.92(1.12)	4.38(0.93)
> 25	3.48(1.01)	2.73(1.12)	2.79(1.07)*	2.50(1.11)*	3.49(1.12)	3.21(1.25)	3.60(1.22)*	3.60(1.22)	3.93(1.22)*
BC stage									
0 to II	3.49(1.10)	2.92(1.18)	3.04(1.14)	2.80(1.16)	3.62(1.10)	3.34(1.17)	3.64(1.17)	3.78(1.14)	4.12(1.11)
III and IV	3.41(1.07)	2.59(1.10)	2.90(1.16)	2.48(1.15)	3.51(1.12)	3.11(1.38)	3.89(1.19)	3.68(1.27)	4.19(1.12)
Time since Treatment									
\leq 5 years	3.37(1.11)	2.65(1.11)	2.96(1.15)*	2.51(1.10)*	3.52(1.12)	3.14(1.26)*	3.64(1.18)	3.66(1.24)	4.02(1.19)
> 5 years	3.58(1.04)	3.08(1.21)	3.07(1.15)	2.98(1.21)	3.65(1.07)	3.49(1.18)	3.85(1.19)	3.88(1.09)	4.32(.96)
PA levels									
Meeting	3.57(1.13)	2.99(1.11)	3.28(1.21)	2.87(1.24)	3.90(.99)	3.48(1.25)	3.95(1.10)	4.00(1.10)	4.35(1.00)
guidelines	3 34(1 13)	2 65(1 21)*	? 71(99)**	2 53(1 06)*	3 22(1 11)*	3 07(1 20)*	3 47(1 24)*	3 47(1 22)	3 92(1 18)*
guidelines	5.54(1.15)	2.05(1.21)	2.71(.77)	2.33(1.00)	3.22(1.11) [*] *	5.07(1.20)	5.47(1.24)	3.47(1.22) **	5.72(1.10)

Table 5 Associations Between Sociodemographic, Cancer History and Physical Activity and Difficulty Items with Means and Standard Deviations

Note. Degrees of freedom=1, 198; F-statistics ranged from .01 to 20.6; effective sizes (η_p^2) ranged from .001 to .09; **p*<.05; ***p*<.001. PA=physical activity.

4 Chapter 4 Bridging Text

A summary of the main findings of Study 1 (Chapter Three) is offered below:

- Descriptively, breast cancer survivors had salient unmet needs (i.e., self-reported low confidence and increased difficulty) related to finding an exercise partner, finding an exercise partner who understood cancer, finding support from family, friends, peers and others for physical activity and finding appropriate attire and community places to be active.
- Factors that influenced unmet needs in included being younger (≤ 64 years), not meeting physical activity guidelines, and, for one unmet need, time since treatment (≤ 5 years). Breast cancer diagnosis stage was not associated with any unmet needs.
- Only survivors who were younger (≤ 64 years) preferred video tutorials, tools and devices to monitor their physical activity levels and access to exercise professionals to help maintain or increase physical activity levels.

These findings suggest that there are salient unmet needs and preferences related to physical activity for breast cancer survivors. In order to develop effective resources (e.g., printed resources, online resources and physical activity programs) that meet these needs, it is important to examine what is currently available to breast cancer survivors and survey the built environment for physical activity opportunities. Information from an environmental perspective will shed light on current physical activity information that is being used and the quality of this information. Together, understanding the unmet needs from the survivor perspective and the quality of currently available resources, improved resources can be developed that are unique and meet these needs. Thus, the next chapter will examine the physical activity opportunities of the regional cancer centres in Ontario and the quality of the information found at these centres (i.e., free and available textual materials). An examination of modifiable areas within the centre and areas for improvement in textual materials will be discussed.

Chapter 4 Exploring Cancer Centre Physical Activity Opportunities for Breast Cancer Survivors

4.1 Abstract

In spite of the well-known benefits of physical activity for breast cancer survivors, as many as 90% of these women report low levels of physical activity. This lack of physical activity engagement suggests a clear knowledge-to-action gap, where breast cancer survivors may not be receiving information about health benefits of physical activity in the context of their cancer. The primary purpose of this study was to identify physical activity information and infrastructure support within cancer centers. A secondary aim was to identify the behaviour change techniques used in the information that is available to breast cancer survivors in cancer clinics and evaluate this information for trustworthiness. A built-environment scan of the 14 regional cancer centres in Ontario and an evaluation of the physical activity textual materials available at the cancer centres were completed. Data analyses included descriptive statistics, proportions, and inter-rater reliability. Based on the results, the infrastructure of the cancer centres provided few opportunities for dissemination of information related to physical activity through signs and printed notices. Televisions were in all waiting rooms, which may provide a unique opportunity for physical activity information dissemination. Textual materials gathered were rated as trustworthy, used some behaviour change techniques (e.g., information about consequences of lack of physical activity, barrier identification, and set graded tasks) and were aesthetically pleasing. Overall, these findings provide insight into environmental characteristics that can be used to modify the current environment to encourage physical activity.

Keywords: breast cancer, physical activity, environmental scan, textual materials, evaluation

4.2 Introduction

Upwards of 90% of breast cancer survivors, defined from the time of diagnosis until end of life (National Cancer Institute, 2015), report not meeting physical activity guidelines based on self-report and objective assessments (Lynch et al., 2010; Sabiston et al., 2014; Vallance et al., 2007). Thus, efforts are needed to help breast cancer survivors increase their physical activity levels.

Cancer survivor-specific physical activity guidelines (Schmitz et al., 2010; Segal et al., 2017) and evidence-based recommendations (Brunet et al., 2012) have been developed, but given the low rates of physical activity, there exists an apparent knowledge-to-action gap (Alfano et al., 2014; Phillips et al., 2014). Research to date in physical activity has primarily focused on scientific discovery rather than dissemination of scientific findings to survivors (Phillips et al., 2014). Understanding the context and factors that influence the implementation of physical activity guidelines may assist with developing effective intervention strategies that can be easily implemented (Phillips et al., 2014). Within cancer centres there are many opportunities for enabling physical activity including education classes for patients, advertisements and contact information for reliable physical activity and cancer groups in the community and printed resources specifically about physical activity for cancer survivors and supporting infrastructure for physical activity programming.

One key to addressing this gap is to understand the barriers and facilitators for physical activity. In emerging research findings, many women identify wanting support from their health care providers and quality information on physical activity methods and resources in their communities (A. J. Fong, Faulkner, Jones, & Sabiston, in preparation). This finding is consistent with unmet needs reported for supportive care more generally (Hodgkinson et al., 2007) and for physical activity (Charlier et al., 2012). For example, in a sample of 1,516 cancer survivors, needing up to date information (30.3%) and information provided in a way that is understandable (26%) were self-reported unmet needs related to environmental barriers for supportive care (Knobf et al., 2012). However, Nadler and colleagues (2017) reported that 80% of medical professionals were not aware of any physical activity guidelines to provide to their cancer patients, and identified poor physical activity-related knowledge as a barrier to provide physical activity counselling. Given these findings, it is important to examine the availability and quality of information for breast cancer survivors specific to physical activity, and the format of the
information. Some important information details include the readability (Horowitz et al., 2014), aesthetics and the format of the provided information (Hall & Hanna, 2004). Additionally, trustworthiness of information is important. Information providers (e.g., cancer care agencies) can adhere to quality assurance criteria (Commission of the European Communities, Brussels, 2002). Adhering to quality standards can assist breast cancer survivors with identifying quality information. For example, relevant indicators of quality include transparent reporting with regards to the purpose of a document, funding sources and responsible partnering (Sylvester, Zammit, et al., 2017). In this way, the information on adherence to quality standards (e.g., transparent reporting), details on readability and aesthetics of the materials can be used to evaluate the trustworthiness of information provided to breast cancer survivors.

Furthermore, information on physical activity should be evidence-based. Specifically, strategies that are critical to successful adoption and maintenance of physical activity should be integrated into the information sources (Sylvester, Zammit, et al., 2017). These strategies, referred to as the Coventry, Aberdeen and London–Revised (CALO-RE) taxonomy of behavior change techniques are the "active ingredients" that can be used to change behaviour (Michie, Ashford, et al., 2011). Some examples of behavioural change techniques used in physical activity interventions for breast cancer survivors include goal-setting (Floyd & Moyer, 2010), action planning (Vallance, Courneya, Plotnikoff, & Mackey, 2008) and barrier identification (Rogers et al., 2007). The extent to which physical activity resources offer evidence-based techniques for initiating and maintaining a more active lifestyle is currently understudied.

An environmental scan is a common strategy used in school-based health behaviour evaluations (Leatherdale et al., 2009; Rowel, Natalie, Nowrojee, Memiah, & Bronner, 2005) that could be used to assess the availability and quality of resources in cancer centers. For instance, in school-based studies, questionnaires measure prevalence of physical activity programs and policies, built-in physical activity programming (i.e., programming available on-site versus in the community) and availability of equipment or resources that enable physical activity (Leatherdale et al., 2009). These methods could be easily adapted for use in cancer centres to identify available physical activity-related resources. Within cancer centres there are many opportunities for enabling physical activity such as through on-site education classes for patients, advertisements and contact information for reliable physical activity and cancer groups in the community and printed resources specifically about physical activity for cancer survivors.

Currently, an evaluation of the infrastructure and materials in Ontario has yet to be conducted. Thus, the primary purpose of this study was to identify physical activity information and infrastructure support within cancer centers. A secondary aim was to identify the behaviour change techniques used in the information that is available to breast cancer survivors in cancer clinics and evaluate this information for trustworthiness. Given the observational nature of the current study, hypotheses are not offered. However, some research questions will be answered including

(1) What information is available within cancer centres and is the infrastructure conducive to physical activity?

(2) Which behaviour change techniques are present in the textual materials in cancer centres? Is this information rated as trustworthy in terms of adherence to quality assurance criteria (Commission of the European Communities, Brussels, 2002)?

4.3 Methods

This study was a cross-sectional observational design targeting cancer centres in Ontario to identify physical activity information and infrastructure support. Furthermore, a cross-sectional content analysis was conducted on free and available textual materials collected from the cancer centres to identify any behaviour change techniques and assess trustworthiness.

4.3.1 Sample and Procedures

For the environmental scan, a purposeful sample of n=14 regional cancer centers in Ontario were used. Ontario cancer centres treat approximately 38.5% of breast cancer survivors in Canada (Canadian Cancer Society, 2017). Within Ontario, there are 14 regional cancer programs responsible for cancer treatment and care. Each regional program consists of a network of hospitals including one regional cancer centre and partner hospitals. Regional cancer centres were identified using the Cancer Care Ontario website, which is the governing organization for cancer-related care (https://www.cancercare.on.ca/ocs/csoverview/systemmap/).

Following ethics approval (REB #31848) and the identification of the sample of cancer centers, a built-environment evaluation scan was developed drawing on school-based health evaluations (N. R. Jones et al., 2010; Leatherdale et al., 2014) and neighbourhood scans for physical activity

opportunities (J. F. Sallis, 2009; J. F. Sallis et al., 2006). A built-environment scan is an objective review of the current environmental factors that influence an organization and factors may include programs, policies and physical features (e.g., availability of visible, safe and clean stairs for walking) within an organization (Hatch & Pearson, 1998; Rosa Fortin et al., 2014; Randolph Rowel et al., 2005). Specifically, two raters (AF and a research assistant) rated 86% of the centers and one rater (AF) coded the remaining two centers. Ratings were completed by a walkthrough of the waiting room of the breast clinic or cancer centre waiting room, patient resource library and any information/bulletin boards. As part of the assessment, raters gathered (i.e., collected or took photos of) all printed materials related to physical activity including flyers, posters, handouts and information posted in the cancer centres. Where materials could not be gathered, photographs were taken. Furthermore, free and available textual materials related to physical activity for cancer survivors were collected and unique materials were evaluated using a purpose-built tool by the two raters.

4.3.2 Measurement Tools

4.3.2.1 Environment evaluation

A built-environment scan checklist was developed based on previous tools used by Leatherdale and colleagues (2014) and other physical activity audit tools used in school settings (N. R. Jones et al., 2010; J. F. Sallis, 2009). A total of 43 items were included on the checklist; however, only n=15 items were relevant to a majority of the cancer centres (n=13/14 centres) as the remaining items pertained to the on-site exercise facility, of which there is only one in Ontario. Items on the environmental scan checklist were rated as present (=1), absent (=0). Where appropriate, items were rated on aesthetic quality ranging from excellent quality (=5) to poor quality (=1) that were justified with field notes commenting on cleanliness, openness and general aesthetics of the infrastructure. Items were also rated on quantity (ranging from none=0, to some (1-10)=1, to many (≥ 11)=2). The environmental scan checklist was reviewed by expert team members (JJ, GF, CS) and pre-tested with two independent raters (AF and a research assistant) at a Torontobased clinic. The Toronto-based clinic was included in the final sample. The inter-rater reliability was κ =.96.

4.3.2.2 Textual material evaluation

A rating tool was developed to assess the quality of physical activity resources available to survivors from the cancer centres. Based on previous evaluations of health-related information on the Internet for people with a spinal cord injury (Jetha, Faulkner, Gorczynski, Arbour-Nicitopoulos, & Martin Ginis, 2011) and quality of health-related websites (Commission of the European Communities, Brussels, 2002), a total of 85 items were used to analyze the textual material as either present (=1), or absent (=0). Additionally, previous analyses of printed materials collected from dental clinics have used tallies of whether or not a feature was present and this has informed the current study (Horowitz et al., 2014). Two independent raters evaluated each resource and disagreement was abated with discussion. The items were included to rate transparency and disclosure (e.g., is it clear who the person or organization responsible for the document is?), authority (e.g., does the resource state where the information came from?), frequency of updating information (e.g., date of revisions), accountability (e.g., is there a statement ensuring responsible partnerships with reputable organizations?) and accessibility, including if information was easily understood, clearly presented and appropriate for the target audience (e.g., readability). For the purpose of this study, textual materials were rated as trustworthy if they had 50% or more of these features. Additionally, the evaluation tool was developed using behaviour change items drawn from the CALO-RE taxonomy of behavior change techniques (Michie, Ashford, et al., 2011). The CALO-RE taxonomy (N=40 behaviour change techniques) has been previously assessed in a study examining the validity of mobility applications for physical activity behaviour change (Conroy, Yang, & Maher, 2014). Behaviour change information was deemed important because the common strategies are important for initiating and sustaining physical activity. This rating tool was pre-tested with two independent raters who were two trained research assistants, one of whom did not conduct the environmental scan. The pre-test was conducted with two booklets that were found in at least half of the cancer centres and these pre-test analyses were included in the final analysis. The inter-rater reliability was $\kappa = .86$.

4.3.3 Data Analysis

Descriptive statistics were calculated as means with standard deviations and proportions (%). Inter-rater agreement for the environmental scan and textual material evaluation were assessed using kappa coefficient.

4.4 Results

4.4.1 Environmental Evaluation

The environmental scans of each cancer center were completed in an average time of M=20.8 (SD=8.4) minutes (range=8 to 35 minutes). The scores for the characteristics of the builtenvironment scans are reported in Table 6. All (100%) of the waiting rooms had televisions, computers or tablets available. Waiting rooms often had many people (>10) present and there were enough chairs for those present. There were a few posters (N=6) about cancer and physical activity present that were rated as fair (2 out 5). Five cancer centres had notices about off-site (i.e., community-based) physical activity programs about cancer centres. There was only one exercise facility specifically for cancer survivors within a cancer centre and one cancer centre did have a gym that paying members could access.

4.4.2 Textual Materials Evaluation

In total, n=86 relevant materials were collected from the cancer centres with an average of 6.1 (*SD*=3.0) documents (range=2 to 11 documents) collected per centre. After removing duplicates, n=58 unique materials were collected from the centres (24=pamphlets, 21=booklets, 8=flyers, 5=newsletters). Based on proportions, unique documents were rated as trustworthy as they were transparent about the provider responsible for developing the document (98%), the purpose of the document (98%), target audience (97%), date of publication (55%) and the affiliations associated with the document (e.g., cancer-related charities, research groups; 55%). Materials were generally rated as easy to read (98%), aesthetically pleasing (90%), and easy to use (97%).

The materials included some behaviour change techniques included within the CALO-RE taxonomy such as provision of information about consequences of lack of physical activity in general (39%), barrier identification or problem solving (29%) and provision of information about consequences of lack of physical activity to the individual (24%). Techniques that were not used included shaping, facilitate social comparison, fear arousal, self-talk, imagery, stress management or emotional control training, motivational interviewing, general communication skills training. Details of the review of the textual material are presented in Table 7.

4.5 Discussion

The primary purpose of this study was to identify any physical activity information and infrastructure support within cancer centers. A secondary aim was to identify the behaviour change techniques used in the information that is available to breast cancer survivors in cancer clinics and evaluate this information for quality. Only one centre in Ontario had a dedicated physical activity space for cancer survivors and the remaining centres did not have infrastructure for physical activity; however, had pleasing (e.g., *Mscore*=3.3 (*SD*=0.7) out of 5) waiting areas with televisions. Printed materials related to physical activity and breast cancer survivorship were readily available and accessible. Printed materials that were collected and reviewed were found to be trustworthy (e.g., transparent reporting of provider responsible for the document, purpose or objective, readability, usability, target audience defined and date of publication) and used some behaviour change techniques (e.g., provide information about consequences of lack of physical activity in general, barrier identification, set graded tasks; Michie, Ashford, et al., 2011).

The environmental scans found that Ontario cancer centres generally lack devoted infrastructure for physical activity programming for breast cancer survivors. For example, only one centre in Ontario had space for a physical activity facility specifically for cancer survivors. Cancer survivors should be offered support and programming for physical activity from the cancer centre in order to aid with transition to a non-cancer centre setting (Santa Mina, Alibhai, Matthew, Guglietti, Steele, Trachtenberg, & Ritvo, 2012). However, renovating cancer centre infrastructures to create space for physical activity would be expensive and complex. Nevertheless, there are avenues within the existing infrastructure that could be used for physical activity promotion. For example, using waiting rooms passive dissemination of physical activity information through existing cancer centre features. All scanned centres had televisions in the waiting areas. This would be an area to disseminate educational information related to physical activity to patients. Availability and additional provision of information is one method that could further facilitate increase physical activity levels in breast cancer survivors (Vallance et al., 2007). Longitudinal studies using tailored (i.e., breast cancer-specific) information have shown increased brisk walking immediately post-intervention (Vallance et al., 2007) and maintained self-report physical activity in mother-daughter dyads 12-months post-intervention (Demark-Wahnefried et al., 2014). Future research is needed to determine if a relatively passive

dissemination strategy, such as displaying physical activity information on televisions available in waiting rooms, would be effective for increasing knowledge related to breast cancer and physical activity in this population.

The review of the textual material found in centres revealed that materials were rated as trustworthy. However, date of revisions, funding sources, credentials of information providers, trustworthy partnering and editorial policy statements were not present in a majority of the materials, suggesting that further transparency and disclosure of this information is warranted. In research with another clinical population, persons with spinal cord injury, the messenger of physical activity information and trustworthiness of this messenger were important (Letts et al., 2011). For example, messengers that are perceived as untrustworthy may contribute to poor physical activity knowledge. Importantly, lack of knowledge is a salient barrier to increasing physical activity behaviour, especially for breast cancer survivors (Brunet, Taran, et al., 2013). Nevertheless, the overall aesthetics of the documents were rated as pleasing and legible.

The most common behaviour change technique used was providing information about consequences of lack of physical activity in general (39%), or loss-framed messaging. From a theoretical perspective, behaviours that serve as preventative (i.e., physical activity) are perceived as less risky than detection (e.g., mammogram) behaviours and are better presented as gain-framed messages to be persuasive (Rothman & Salovey, 1997). Consistent with this, a meta-analytic review (*N*=94 studies) found that for preventative behaviours, gain-framed messages were more effective than loss-framed messages (Gallagher & Updegraff, 2012). While this may suggest that gain-framed messages are inherently advantageous, it is important to consider the context of the message. Many of the studies included in this systematic review were conducted with apparently healthy individuals (Gallagher & Updegraff, 2012). However, when the context changes to breast cancer survivors, or individuals who are not apparently healthy, the effect of framed messaging is not as clear. Examining the effectiveness of loss- versus gain-framed messaging for physical activity information in breast cancer survivors is needed.

Barrier identification or problem solving was the second most commonly identified behaviour change technique (29%). Many of the documents included specific barriers for breast cancer survivors such as lymphedema, cancer-related fatigue and pain. Additionally, breast cancer survivors in a qualitative study reported unique barriers related to cancer including fatigue, pain

and lack of social support (Brunet, Taran, et al., 2013). Brunet and colleagues (2013) suggest that researchers should develop strategies that reduce cancer-specific and common barriers experienced by breast cancer survivors. It is important for these barriers and problem solving strategies to be addressed in this population as it may be a missed opportunity to increase task self-efficacy (i.e., engage in physical activity)and barrier self-efficacy (i.e., decrease barriers to physical activity; McAuley, 1992; Rogers, McAuley, Courneya, & Verhulst, 2008).

4.5.1 Limitations

The built-environment scan offers a general overview of the built-environment in the centres that likely had the most funding as they are the main cancer centres for the region. Scans were only completed in Ontario and not generalizable to the rest of Canada. The textual material evaluation was only conducted for materials that were freely available and likely does not reflect all materials given to survivors. Evaluation of textual materials used behaviour change techniques from the CALO-RE statement (Michie et al., 2011); however, other methods for characterizing behaviour change such as behaviour change technique taxonomy (v1) with 93 techniques (Michie et al., 2013) and behaviour change wheel (Michie, van Stralen, & West, 2011) exist. It is likely that using another characterizing method would yield different and perhaps more telling results. For instance, the current evaluation may have missed behaviour change techniques outlined in the updated 2013 taxonomy. Further, the behaviour change wheel identifies sources of behaviour and intervention functions, which may be useful for survivors to understand how to become more active (Michie et al., 2011). Additionally, following a set taxonomy to identify behaviour change tools may not have allowed unique tools not found within the taxonomy to be identified. Next, while data were collected on notices of offsite or community-based physical activity programs within cancer centres, the quality of these programs is not known. Future research is encouraged to conduct an environmental scan of community-based physical activity programs for cancer survivors to determine how many exist and any indicators of quality. Finally, the measures that were used in this study did not have a scoring system and interpreting beyond the reported proportions is not possible. Future research is encouraged to develop valid measures for conducting environmental scans in health settings in order to offer detailed and telling results. Similarly, the operationalization of trustworthiness may not have been as telling as more robust measures such as weighted scores.

4.5.2 Practical Recommendations

Taken together, there appears much room for growth in disseminating physical activity information within cancer centres in Ontario. This brings with it opportunities for the development and evaluation of novel knowledge translation strategies in collaboration with breast cancer survivors. The cancer centre waiting room is potentially an important setting for disseminating information about physical activity. Finally, available textual materials should include additional information related to barrier and problem solving strategies and consider gain-framed messaging for physical activity promotion. In conclusion, this study highlights key areas for future intervention and highlights the need for cancer centre administrators and practitioners to consider how to better incorporate messaging about physical activity into broader clinical practice.

Built-environment scan checklist item	Proportion of	n	Quality
	centres	(cancer	Scores
	(out of 14)	centre)	M(SD)
Waiting Room			
Television(s) in waiting room	1.00	14	
Computer or tablet in waiting room	1.00	14	
People in waiting room	0.79	11	
Chairs in waiting room	1.00	14	
Overall aesthetic quality of waiting room			3.3(0.7)
Signs			
Sign for an exercise facility	0.07	1	
Signs about PA	0.43	6	
Quality of signs about PA			2.2(1.3)
Notice of onsite exercise class	0.21	3	
Overall quality of notices for onsite exercise		—	2.0(0.7)
class			
Bulletins and Printed Notices			
Notice of offsite exercise class	0.36	5	
Overall quality of notices for offsite exercise		—	3.3(0.5)
class			
Posters about research trials related to PA and	0.14	2	
cancer survivors			
Quality of the research trial posters			4.0(1.2)
Posters about general health behaviours	0.57	8	
Brochures or pamphlets about PA	0.79	11	
Exercise facility present at cancer centre	0.07	1	

Table 6 Summary of Environment Evaluation of 14 Main Cancer Centres in Ontario

Note. PA=physical activity. No signs for exercise facility rules were found.

Textual Material Characteristic	n	Proportion
		(out of 58)
Transparency and Trustworthiness		
Provider responsible for document	57	0.98
Purpose or objective	57	0.98
Readability	57	0.98
Usability	56	0.97
Target audience defined	47	0.81
Date of publication	32	0.55
Affiliation (patient or community organization)	32	0.55
Service provision	28	0.49
Funding sources stated	18	0.31
Trustworthy partnering	18	0.31
Credentials of information providers	8	0.14
Editorial policy statement	7	0.12
Date of revisions	5	0.08
Exercise Information		
Links or contact information to resources in community	37	0.64
Exercise or PA information offered	33	0.57
Inclusion of general PA guidelines	4	0.07
Theory based information	2	0.03
Offered in more than one language	1	0.02
CALO-RE Taxonomy for Behaviour Change		
Provide information about consequences of lack of PA in general	23	0.39
Barrier identification or problem solving	17	0.29
Provide information about consequences of lack of PA to the	14	0.24
individual		
Set graded tasks	13	0.22
Relapse planning and coping	12	0.21
Provide normative information about other's behaviour	11	0.19
Provide information on where and when to perform the behaviour	11	0.19
Action planning	7	0.12
Goal setting	6	0.10
Provide instruction on how to perform the behaviour	5	0.08
Teach to use prompts or cues	5	0.08
Plan social support or social change	5	0.08
Model or demonstrate the behaviour	4	0.07
Environmental restructuring	4	0.07
Prompt self-monitoring of behaviour	3	0.05
Prompt rewards contingent on effort or progress towards behaviour	2	0.03
Provide rewards contingent on successful behaviour	2	0.03
Prompt generalization of a target behaviour	2	0.03
Behavioural contract	2	0.03
Prompt self-monitoring of behavioural outcomes	1	0.02
Prompting focus on past behavioural outcomes	1	0.02
Provide feedback on performance	1	0.02

Table 7 Summary of Frequency of Textual Materials Evaluation (N=58 documents)

Prompt practice	1	0.02
Use of follow-up prompts	1	0.02
Prompt identification as a role model	1	0.02
Prompt anticipated regret	1	0.02
Time management	1	0.02
Stimulate anticipation of future rewards	1	0.02
Overall aesthetics of document and images		
Font size (legible)	57	0.98
General look (pleasing)	52	0.90

Notes. PA= physical activity; BCS= breast cancer survivors.

5 Chapter 5 Bridging Text

A summary of the main findings of Study 2 (Chapter Four) is offered below:

- The current infrastructures of the 14 regional cancer centres in Ontario are conducive for dissemination of physical activity information. There are some avenues for dissemination including bulletin boards, areas for printed literature and televisions waiting rooms that could be used for further dissemination (environmental scan).
- 2. Textual materials found within centres (*N*=58) contained general information about cancer survivorship, but many documents had scant information related to physical activity. These documents were rated as trustworthy and aesthetically pleasing. The materials used few behaviour change techniques (textual materials analysis).

Based on these findings, the next steps are to gain further information related to the physical activity "landscape" in Ontario. With information from individual (Study 1) and environmental (Study 2) perspectives, it is necessary to examine the cancer care clinician (e.g., oncologists, nurses, nurse practitioners and others) perspective since they are considered important messengers who influence behaviour change in patients (L. W. Jones et al., 2005; Karvinen et al., 2010, 2012; Nadler et al., 2017). Thus, the next chapter will focus on the provider experience when conducting physical activity counselling with breast cancer survivors. This will include any facilitators and barriers to these discussions and explore potential methods to address barriers.

Chapter 5 Exploring Oncology Clinician Experiences with Physical Activity Counselling and Breast Cancer Survivors

5.1 Abstract

Few breast cancer survivors engage in sufficient physical activity (PA) to gain physical or mental health benefits. This may, in part, be due to a lack of appropriate PA information and support. Key messengers of PA information may be the cancer care clinicians; however, many clinicians do not consistently counsel their patients on PA. The purpose of this study was to examine the factors affecting PA counselling between clinicians and breast cancer survivors. Focus groups were conducted with clinicians (N=27) at four cancer centres to better understand the factors that affect PA-related counselling. The focus group discussions were transcribed verbatim and analyzed using inductive thematic analysis. Based on the results, clinicians perceived an overall lack of formal education on PA; however, discussed the importance of receiving cliniciancentred education related to PA for cancer survivors. This was also reflected in their desire for more continuing medical education credits, presentations at oncology rounds and lunch-andlearn sessions with a focus on PA for survivors. Similarly, clinicians found that the cancer centre administration and clinic flow negatively impacted PA counselling due to lack of time and availability of reliable resources and referral options. In order to facilitate PA counselling, clinicians wanted resources that are patient-focused and available on multiple platforms (e.g., printed documents, websites and smartphone applications). Considering these findings, resources that support clinician education related to knowledge of PA for breast cancer survivors need to be developed. Further, patient-centred resources should be developed and tested for effectiveness. Finally, developing an effective dissemination strategy, which will reach all cancer centres, is needed.

Keywords: breast cancer, physical activity, health care providers, PRECEDE-PROCEED model, knowledge translation

5.2 Introduction

There is strong evidence supporting the safety, feasibility, and effectiveness of physical activity (PA) for breast cancer survivors (see Battaglini et al., 2014; Sabiston & Brunet, 2012; Schmitz et al., 2010; Speck, Courneya, Mâsse, Duval, & Schmitz, 2010 for reviews). The benefits of PA have been identified as decreasing recurrence rates (Urbscheit & Brown, 2014) and all-cause mortality rates (Schmid & Leitzmann, 2014), managing treatment-related side effects such as fatigue (Cramp & Byron-Daniel, 2012) and lymphedema (Schmitz et al., 2009), improving physical functioning such as shoulder mobility, cardiovascular fitness (Battaglini et al., 2014), metabolic profiles (Emaus et al., 2010), and decreased depression symptoms (Trinh, Amireault, Lacombe, & Sabiston, 2015) all among breast cancer survivors. There are a number of additional physical, mental, and social benefits of PA among breast cancer survivors (Sabiston & Brunet, 2012; Sabiston et al., 2014). From this body of work, PA guidelines (Schmitz et al., 2010; Segal et al., 2017) and evidence-based recommendations (Brunet, Sabiston, & Meterissian, 2011) have been developed for breast cancer survivors suggesting that most benefits emanate from 150 minutes of moderate-to-vigorous PA. Unfortunately, upwards of 90% of breast cancer survivors report not meeting PA guidelines (Lynch et al., 2010; Sabiston, Brunet, Vallance, & Meterissian, 2014) and these women are therefore missing out on the multitude of health benefits of PA post cancer diagnosis. It is important to help increase the number of breast cancer survivors who engage in PA.

Physicians play an important role in motivating individuals to become more active (L. W. Jones & Courneya, 2002; Segar et al., 1998) and cancer care clinicians (including oncologists, oncology nurses and nurse practitioners) can also be key messengers and support systems for PA counselling (L. W. Jones et al., 2004, 2005; Nadler et al., 2017). Approximately 43% to 64% of oncologists (L. W. Jones et al., 2005; Karvinen et al., 2010) and 66% of nurses (Karvinen et al., 2012) in North America inquire about patients' PA levels. Overall, cancer care clinicians (herein referred to as clinicians) have favourable attitudes and opinions of PA for cancer patients (L. W. Jones et al., 2005; Nadler et al., 2017), and report that PA is safe and beneficial for cancer survivors (L. W. Jones et al., 2005; Karvinen et al., 2012). Nevertheless, oncologists and oncology nurses reported similar barriers to prescribing PA to cancer patients, such as insufficient time and uncertainty of what to recommend (Jones et al., 2005; Karvinen et al., 2010; Karvinen et al., 2017). However, researchers suggest that more

clinicians need to discuss PA in order to promote increased overall PA levels in breast cancer survivors (L. W. Jones et al., 2005). In this way, it is not understood what clinicians experience when attempting to PA counsel breast cancer survivors and the clinician-specific factors that facilitate PA counselling are not yet clear.

One way to evaluate clinician needs and build capacity in PA counselling among oncology clinicians is to use a knowledge translation framework such as the PRECEDE (Predisposing, Reinforcing and Enabling Constructs in Educational/ Environmental Diagnosis and Evaluation) – PROCEED (Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) model (Green & Kreuter, 2005; Porter, 2016). PRECEDE-PROCEED model is a planning model that provides scaffolding for applying theories to plan and evaluate health behaviour programs. As part of developing an effective PA behaviour change program for breast cancer survivors, it is important to examine aspects that influence PA, in this case, the role of clinicians in PA counselling. PRECEDE-PROCEED encompasses eight phases; the first four phases assess the individuals, environment and policy that will affect the health behaviour program. This assessment is key for planning a program that will "fit" the target audience and account for the contextual factors within the environment. The final four phases involve evaluating the program designed from the first four phases (Gielen & Green, 2015; Green & Kreuter, 2005). Specifically, in the educational and ecological assessments of Phase 3, factors (predisposing, reinforcing and enabling) are identified that may influence behaviour change. With regards to clinician behaviour, identified factors that affect PA discussions with breast cancer survivors could be used to inform development of future PA resources and tools to facilitate these discussions.

Further, this model has set a precedent for curriculum development in oral cancer prevention and early detection in health care professional students (Cannick et al., 2007) and has been used to identify and categorize barriers in evidence-based psycho-oncological care (Schofield, Carey, Bonevski, & Sanson-Fisher, 2006). Application of the PRECEDE-PROCEED model in the context of experiences between cancer care clinicians and breast cancer survivors regarding PA counselling would provide important insight and guide development of future resources and tools to facilitate these conversations. In order to understand clinician perspectives, examining the factors that influence their decisions to counsel on PA is crucial. As a result, the PRECEDE PROCEED model was used as a framework for understanding clinicians' experiences in PA

counselling for breast cancer survivors. Thus, the purpose of this study was to explore the factors that influence cancer care clinicians' experiences when counselling on PA with breast cancer survivors.

5.3 Methods and Methodology

This study was qualitative study using focus groups conducted with cancer care clinicians to assess factors affecting physical activity counselling.

5.3.1 Orientation

A constructivist paradigm was used to understand the experiences and views of clinicians who directly work with cancer patients (Guba & Lincoln, 1994). Using a constructivist lens, we acknowledge multiple realities and socially constructed knowledge (Guba & Lincoln, 1994) with a relativist ontology and a subjectivist epistemology. As a result, understanding of the interactions between clinicians and breast cancer survivors regarding PA will be constructed socially between clinicians and interviewer through discussions during the focus groups. Also, it is recognized that both the interviewer and clinicians cannot be separated from what they previously know about breast cancer survivorship and PA and vary depending on their setting (e.g., university, cancer centre in a rural setting and cancer centre in an urban setting). As such, the knowledge constructed will be relative to their previous experiences. Consequently, interpretations of the data are subjective due to the different contexts under which data were collected and analyzed.

5.3.2 Participants and Procedures

Following university ethics approval (REB #31848), clinicians (*N*=27; 70.3% female) who worked directly with cancer survivors were recruited to participate in this study. Clinicians were eligible if they were (a) currently practicing in Ontario; (b) participated in either a breast tumour board meeting or multidisciplinary cancer conference (these are meetings where various types of clinicians are present); (c) spoke and understood English; and (d) offered consent to participate in this study. To recruit participants, the executive directors of the regional cancer center for each of the 14 regional cancer programs in Ontario were contacted. Within this provincial cancer care system, regional cancer programs consist of a network of hospitals with a regional cancer centre (host hospital) and partner hospitals (https://www.cancercare.on.ca/cms/one.aspx?pageId=8958).

One centre was not able to participate due to self-reported lack of resources, two centres were not able to participate due to lack of time, three centres were not interested and four centres did not respond despite multiple contact attempts. The study materials were then forwarded to breast cancer clinicians in the four centers who supported the research. Focus group times were scheduled and took place in a board room within the hospitals. Recruitment and conducting of the focus groups began in December 2015 and was completed in September 2016. Recruitment occurred until data saturation was reached. Data saturation was operationalized as recurrence of similar or common quotations across all focus groups. Data saturation was reached after all four focus groups had been transcribed and each transcript read twice. Further, referring back to reflexive journal entries and field notes assisted with confirming data saturation as common quotes and potential themes were noted. All participants provided informed consent prior to their focus group involvement.

5.3.3 Study Tools

5.3.3.1 Role of researchers

Given the constructivist nature of this study, it is important to recognize the role of the researchers in this study (Guba & Lincoln, 1994). The researchers have all worked in PA, psychology, and health. AF is a graduate student with 5 years working in PA and cancer on interventions and cross-sectional data collections. She has working as an exercise leader for a community PA program and as a lead research assistant on an online PA program for women with cancer. AF conducted the focus groups and led the analysis of the data. JJ is a lead of a large cancer survivorship program and has been involved in a number of PA interventions while also guiding PA programming in the hospital setting. GF is a professor in exercise and health psychology and has led a home-based PA intervention for men with cancer. JJ and GF provided guidance from the study inception through to final revisions on the manuscript. CS is a professor in exercise and health psychology with over 15 years of experience in PA and cancer. She worked with AF to conceptualize the study, interpret the data, and frame the work within empirical evidence.

5.3.3.2 Interview guide

A semi-structured interview guide was developed and informed by previous research examining PA promotion in oncology nurses (Karvinen et al., 2012) (e.g., Is talking about PA and exercise

important to you and your patients?), oncology physicians' attitudes regarding PA counselling for cancer survivors (Jones et al., 2005) (e.g., Who are the people who should be discussing PA and exercise with breast cancer patients?) and guided by the PRECEDE-PROCEED model (Green & Kreuter, 2005) (e.g., In general, how would you describe your current level of PA/ exercise?). Further, specific questions were asked surrounding knowledge of PA guidelines for breast cancer survivors, or reinforcing factors (e.g., What training have you had regarding PA and exercise for breast cancer survivorship?), delivery of information in cancer centres (e.g., What programs, services, or resources are available at your hospital that help you discuss PA and exercise with your breast cancer patients?) and perceptions of need of PA services, resources (e.g., printed materials), and tools for breast cancer survivors, or enabling factors (e.g., What tools, materials or resources would make it easier for you to discuss PA and exercise with your breast cancer patients?).

5.3.3.3 Focus groups and reflexivity

Focus groups (n=4) were used as the interaction between participants themselves and participants and the researcher (AF) would be useful for understanding clinicians' knowledge and experience. Social interactions such as commenting on others' experiences and points of view, exchanging anecdotes and asking questions elicit additional information beyond the original interview questions (Braun & Clarke, 2006; Sparkes & Smith, 2014). Further interpersonal communication can shed light on group norms, which may offer deeper insight into the research topic (B. M. Smith & Sparkes, 2016). These interactions and norms are not as easily accessible via one-on-one interviews (Braun & Clarke, 2006). From a pragmatic standpoint, focus group allowed for more views to be gathered from as many clinicians as possible.

Following each focus group, the lead author noted her reflections about the focus group in a reflexivity diary, which was used to inform ongoing analysis. Reflections included information related to how the focus group was conducted including timing of focus groups (i.e., rushing through focus group questions) and visual cues (Faulkner & Biddle, 2001). A research assistant was also present at all focus group discussions to take notes on who was speaking and other relevant behavioural cues that would not be captured in a recording.

5.3.4 Data Analysis

Focus groups were audio recorded and transcribed verbatim by the lead author. Transcripts were checked against the recording to check of accuracy. While transcribing, identifying information was removed from the quotes and pseudonyms were used to ensure confidentiality. Pseudonyms beginning with an N denote a nurse, nurse practitioner or mammogram technician and pseudonyms beginning with a P denote a physician. Braun and Clarke's (2006) thematic analysis guide was used to analyze the data. Specifically, the transcripts were read multiple times to augment familiarity with the data prior to coding. The generation of the initial codes from the data began using an inductive approach to identify, code and organize themes from the raw data. Quotations served as the units of analysis (Coffey & Atkinson, 1996). Themes were then created using a thematic map to collate and connect initial codes (Braun & Clarke, 2006). This process of theme creation was informed by general knowledge in exercise and health psychology and knowledge translation. These themes were then reviewed and refined by collapsing, separating, or deleting. This review and revision of themes was also informed by the field notes and reflexive journal entries. For example, two subthemes ("resources available at centre" and "available resources in general") were developed. Upon reviewing reflections noted while analyzing the data, it was determined that the subthemes were too similar and could be collapsed into one subtheme.

5.3.5 Study Rigor

Overall, the study followed the 15-point checklist of criteria for conducting thematic analysis as outlined by Braun and Clarke (2006). For example, during coding, themes were check against each other and then back to the original data set. Themes formed were internally coherent, consistent and distinctive. The researcher (AF) took an active position during the research and as a result, the themes developed and did not simply "emerge."

To further ensure study rigor, the following steps were taken. First, the interview guide was pretested with a clinical counsellor who specializes in psycho-oncology and a post-doctoral fellow in physical activity and cancer survivorship. This provided the researcher (AF) with practice and confirmed question clarity. Next, several data collection techniques were used and triangulated: verbal discussion, field notes and reflexivity journal entries. Following this, debriefing with an expert in the field (CS) occurred during revision of themes and through writing of the manuscript. Finally, the researcher has offered detail related to her educational and research background and thus, has acknowledged the sources of potential bias in addition to accepting these biases.

5.4 Results

Clinicians were medical oncologists (n=10), radiation oncologists (n=2), a general practitioner in oncology (n=1), primary care physicians (n=2), registered nurses (n=8), a nurse practitioner (n=1), surgical oncologists (n=2) and a mammogram technician (n=1). Focus groups lasted between 23.6 to 43.5 minutes (M=33.2, SD=9.3).

The first focus group was composed of five participants (n=2 medical oncologists, n=1 general practitioner in oncology and n=2 registered nurses; 80% female). The second focus group was composed of nine participants (n=2 medical oncologists, n=3 registered nurses, n=1 radiation oncologist, n=2 surgical oncologists, n=1 mammogram technician; 78% female). The third focus group was composed of seven participants (n=2 registered nurses, n=2 medical oncologists, n=1 radiation oncologist and n=2 primary care physicians; 43% female). The fourth focus group was composed of six participants (n=4 medical oncologists, n=1 nurse practitioner and n=1 nurse; 83% female).

Three main themes with six total subthemes were identified. Specifically, associated skills and knowledge affecting PA counselling with breast cancer survivors were formed as PA knowledge and PA attitudes. Negative social and environmental influences included social norms within the cancer centre environment and the cancer centre environment itself. Finally, PA facilitators which aided clinicians with PA counselling were identified as resources, both available resources and descriptions of features of future resources to be developed, and clinician education. These themes and their subthemes are described below and presented in Table 8.

5.4.1 Associated Skills and Attitudes

Generally, clinician's perceptions of their PA-related skills and attitudes were coded as subthemes within the overarching theme of factors that influence clinician discussions with breast cancer survivors about PA.

5.4.1.1 Physical activity knowledge

There are two facets of PA knowledge which were discussed in the focus groups. The first main focus was that the current formal education that clinicians had received (i.e., medical or nursing school) did not adequately prepare them to consult on PA with their patients. A medical oncologist (Paula) reflected on her previous medical school education:

Part of it is education for our physicians, our colleagues, ourselves. If you think about going through medical school. How often do they teach you about how to actually counsel someone about weight loss and exercise and stuff?

This general lack of formal education and information was discussed as a barrier for the clinicians and there was consensus that education on counselling and specifics for PA should be integrated into formal academic programs. Also, the lack of knowledge was an impetus to seek out knowledge autonomously such as reading peer-reviewed journals and from their own experiences in PA. However, even though clinicians sought knowledge on their own, it did not increase their self-confidence to counsel on PA.

Combined, these knowledge-related experiences have led clinicians to perceive mentioning PA to their patients as simple, "I don't think it's difficult to discuss with a patient. I actually speak to everybody now, but I can't tell them very much." (Perry, radiation oncologist). This quote exemplifies that inquiring about patients' PA behaviour is easy; however, the follow-up questions related to PA specifics and prescription are the more challenging facets of the conversation.

I don't follow anything specific. I follow just the general [PA] guidelines – 150 to 180 minutes. And I give them some advice how to do that and what that means. The idea that you can spread it over [the week]. Some of the studies I looked at it doesn't matter how sustained it is, it's the number of minutes. So, I try to encourage them step by step. And I know of some research in older adults and the benefits. I encourage them to take the first step. (Paula, medical oncologist).

This follow-up facet is the "counselling" aspect of the conversation where clinicians feel inadequately prepared. Clinicians are unsure of how to offer specific advice to their patients

regarding PA prescription, for example exercise frequency, intensity, type and duration. In sum, clinicians have low self-confidence related to PA counselling, which stems, in part, from the lack of formal training in PA counselling.

5.4.1.2 Physical activity attitudes

While all clinicians understood that PA has important benefits for survivors, many of the clinicians believe that their primary role is strictly about the treatment of cancer. They perceive recovery and survivorship, wherein PA is categorized, as a separate focus of cancer care that is perceived to be the responsibility of another clinician or health care provider, a surgical oncologist (Peter) stated, "I don't see a specific point in me discussing that" meaning PA because the "process of the cancer [treatment is] probably exhausting for them" and that PA "part of the recovery part [sic]" which should be implemented following treatment. Similarly, a radiation oncologist (Peter) noted:

But I think this is really the golden exemplar of self-management. Where, really, my role is not to sit and spend 20 minutes developing an exercise prescription. I'm not an expert. My role is to have enough training to know what is safe.

Clinicians' attitudes towards PA have also been shaped by their experiences in clinics, where they discuss various aspects of care with breast cancer survivors. As a result, discussion on any issues that may arise during the survivorship period post-treatment completion, which includes PA concerns, are not addressed in-clinic. One medical oncologist (Patrick) mentioned that PA counseling should be routine and part of survivorship care because it is valuable, but they don't have the time to engage with the patient on PA: "The more it [PA counseling] can be built in, the less it relies on a physician to remember something in clinic."

Furthermore, clinicians are unsure of when during the survivorship trajectory to discuss PA with breast cancer survivors. There were differences that arose between nurses and doctors, where nurses felt that an earlier discussion was ideal for patients. In particular, during the patient education classes, where cancer patients learn about their treatment and the potential side effects of treatment, may be the best time to discuss PA:

From the start. It's in the original teaching package when they start chemotherapy. And we do discuss it with them in the teaching class. Some of them are quite active and they want to know if they can continue [being active] in their treatment. So, it is discussed up front with them as well as healthy eating. It's all done in the teaching package and in the class with them. (Nancy, registered nurse)

Nurses believe that early discussions about PA would expose the option of engaging in activity during and post-treatments when patients may be open to receiving this information. Within the focus groups, there was support for having PA counselling done early in the survivorship trajectory:

I think if you can start it right off the bat, you know because when they've had breast surgery they're given an information sheet [about safe exercises to do] for range of motion. Especially if they're beginning radiation because they have to be able to hold that position. So, building on that and saying, "Ok you need to do this as part of your recovery, but if you incorporate a little more every day that might help with your energy and your fatigue." Starting it [discussion about exercise] right from the beginning so that it's constantly being reiterated. (Nora, registered nurse).

Nurses believe that packaging PA information with treatment relevant information may ease information overload and streamline delivery. In contrast, doctors felt that patients would be too overwhelmed following diagnosis and during treatment to receive information related to PA:

Sometimes discussing exercise programs during chemotherapy is a bit much for them to be very honest it depends on the patient, how motivated they are. It is usually once they are done their treatment or starting their adjunct treatment or hormone therapies that they are kind of interested in finding out what other things can I do and that's usually when I kind of initiate a lot of it especially about exercise. (Patrick, medical oncologist). This temporal preference for PA information delivery between nurses and doctors demonstrates the importance of tailored materials for different health care team members, and perhaps the information within the materials should be unique to the timing of the delivery.

Together, there is a lack of formal education for physicians and nurses, which has led to decreased confidence related to their abilities to counsel on PA in breast cancer survivors. While many clinicians have sought out PA and cancer-related knowledge on their own, this has not increased their ability to confidently counsel on PA. Finally, clinicians have favourable attitudes towards PA for breast cancer survivorship, but are unsure of how to integrate survivorship into the treatment phases of cancer care and when to discuss PA with their patients.

5.4.2 Negative Social and Environmental Influences

From the focus groups, there were two subthemes that created negative social and environmental influences. The social norms of the cancer centres, which includes the hierarchy of power within the cancer centre, and funding and the environmental norms of the centres including the logistics of flow in-clinic and the size of the catchment area.

5.4.2.1 Social norms

Based on the focus groups, the most influential negative reinforcement came from lack of social support from hospital administration. When novel ideas were brought up in one focus group (e.g., regularly scheduled 15-minute PA break lead by a fitness instructor within the cancer centre lobby to engage all patients, staff and visitors), other clinicians quickly chimed in with, "you better clear that with hospital legal first" (Paulina, medical oncologist) and "it would be difficult to clear that with legal" (Nora, registered nurse). In particular, at one centre a randomized control trial was conducted examining exercise for cancer survivors and subsequently shut down because the administration did not support it, "It's simple, as the one who drove that, it was sustained through multiple research grants. But let's cut to the chase, the administration wouldn't support it. I think we can just leave it at that." (Patricia-Anne, medical oncologist). Further, Patricia-Anne had discussed a desire to run another trial, but was not supported by the hospital administration because of "old fashion thinking" where physical activity was perceived to be unsafe for cancer survivors. This lack of support from the administration has hindered the development of future PA trials and related health initiatives.

Similarly, lack of funding is a prevalent issue, "I think it would also be great for people in our community if there was something that was offered to patients free or at least subsidized and that was targeted for cancer patients, I think those would be great things and I would use them." (Perry, radiation oncologist). Additionally, support through funding for community-based programs is deficient for PA-related resources. For instance, breast cancer survivors were referred to a community-based PA program from one centre, but this quickly ended as the program became too expensive for the patients and those implementing the program:

There was one other program that was here and it's kind of gone and dissipated now. It was [Name of Community Program] [...] It was specifically for breast cancer. It was, just by the name, I guess, designed to be more intensive. Some of the kinesiology folks there had produced a lot of materials that were given to us. I had a couple of patients who went there and really liked it. The problem was that it had to be paid for, they had to charge for it. So, other people paid out of pocket, some people did have coverage because I think they can bill it through insurance, through physiotherapy billings. But that was pretty successful for people who wanted it [PA] to be intensive. It was the university so there were issues with the location, parking and that kind of stuff. Whereas at the Y and [another community-based program], parking is free. (Pedro, radiation oncologist).

Overall, the hierarchy of power within the cancer centre where the administration in a position of power and clinicians are below them and lack of funding, has hindered clinicians' ability and willingness to find innovative methods to integrate PA discussions in practice.

5.4.2.2 Environmental norms

The environmental norms related to logistics of clinic flow are another negative reinforcement for PA counselling between clinicians and breast cancer survivors, "These are the logistical challenges in clinics. I think part of the logistical challenge would be what is the venue, what is the best method of delivery and there are issues with clinic flow." (Paulina, medical oncologist). This suggests that PA counselling in-clinic would increase time spent with patients and disrupt clinic flow by allowing fewer patients to be seen and increasing clinic wait times. Further, this has consequences for both patients and clinicians; in particular, clinicians may feel rushed to complete appointments and patients may feel frustrated due to delayed appointments.

Other environmental norms include the effect of the cancer centre catchment area. Individuals who live in the catchment area can be treated at the main cancer centre. Further, catchment areas can be quite large and encompass both rural and urban settings, which creates unique needs for patients living in these respective areas. This is reflected by the oncologists feeling less confident about referring patients to peripheral community- based programs as they are unsure of the availability and quality of the programs. This is further reflected at another cancer centre:

I find one of the challenges is because our catchment area is quite broad. I can only speak to the resources here like [Program A], [Program B], the Y[MCA]. Some of the resources here. Sometimes struggling to say okay in some of the periphery in other area. Nothing that I don't think there are resources, I'm just not aware of them. So, having that in clinic sometimes involves a bit of a Google search. (Paulina, medical oncologist)

From this, it is important to identify, evaluate, and understand the quality of the resources that are available in the catchment areas of each of the regional cancer programs.

5.4.3 Physical Activity Facilitators

From the focus groups, clinicians identified three main areas that facilitated PA counselling between clinicians and breast cancer survivors, which included available resources, description of future resources to be developed, and clinician education. Resources were defined as any programs, services, printed documents, and web-based tools or devices.

5.4.3.1 Resources

Many clinicians were aware of the resources that are given to patients; however, it was primarily nurses who were able to identify centre-specific community resources, educational patient seminars, printed booklets and pamphlets given to patients. For example, "We give them a lot of resources to give them like for instance, breast prosthesis, so there's the stores that are available where they can go and get stuff like that. And we give them an exercise book through the cancer society, the Canadian Cancer Society." (Natalia, registered nurse). In contrast, a radiation

oncologist (Perry) from the same centre was only able to vaguely describe the resources that survivors receive, "...when they come in we give them an information booklet that carries all kinds of pamphlets about resources that are available in the community." Clinician awareness of resources and the specific information offered within the resources may assist with PA counselling.

Additionally, some clinicians were aware of the Exercise Guidelines for People with Cancer developed by Cancer Care Ontario (CCO), which is a provincial agency for cancer care. They were unaware of how to specifically implement the guidelines in their practice, "There is stuff out there for doctors, but that's not actually the real need. So, I don't know, I think it would be very important for CCO to have something online" (Perry, radiation oncologist). Thus, there is a need for patient-centred resources such as patient-facing PA guidelines for cancer survivors. Similarly, working alongside CCO and having both online and patient facings of the CCO PA guidelines would further assist clinicians with counselling.

From the focus groups, there were some features that clinicians wished to see in a future resource. This resource or resources would facilitate PA counselling between clinicians and breast cancer survivors. First, the content of the future resources would include PA in addition to other lifestyle behaviours, for example healthy eating and smoking cessation:

I think that's really important but I think it's important that whatever you produce should part of an integrative program of health promotion. You don't want to have one nurse come in and preach the gospel about smoking and say go to the health unit and they will give you some free patches, and then another nurse comes in, comes with you blessing and says and you got to get some exercise and here's your ticket to [a gym] and someone else comes and says well I am your dietician and you have got to lose some weight and so it needs to me integrated [...] (Perry, radiation oncologist).

Similarly, clinicians also wanted future resources to focus on self-management of PA and exercise, "And we want women to have a prescription-free process. A self-driven process." (Paul, medical oncologist). This is further reflected by another oncologist:

But I think it gets to the whole issue of self-management whether we're talking about patients or everybody as a whole because people are bringing in their own you know, whatever their behaviours were before their diagnosis. Do you take this diagnosis with all the bad that comes with it, but also take it as an opportunity to look at some of your lifestyle things and make some choices. (Paulina, medical oncologist).

Taken together, these combined content features suggest that clinicians are looking for a resource that simplifies the interactions with breast cancer survivors on PA and exercise. Perhaps clinicians believe that if a patient perceives PA as a self-manageable behaviour and that there are reliable resources (e.g., from CCO) available to the patient, then there will be less reliance on the clinician. This may help promote PA maintenance in breast cancer survivors.

Other important features that clinicians want to see in future resources include short, simple messaging, availability on multiple platforms and the ability to be easily integrated into the current cancer care system. Specifically, clinicians believe that the short time in clinic with breast cancer survivors does not allow for in-depth PA counselling, "I think you need a brief 'here's the salient points' version because you're going to have variable interest. So, the longer you make it you're not going to have anyone, right?" (Paulina, medical oncologist). Again,

But I think if you're going to deliver a message, the message should be simple. That exercise matters and why it matters. It's not that we're telling you to exercise; it's for all the other benefits. And specifically, if you're a breast cancer survivor. Just an explanation as to why [exercise is important for survivors]. (Paul, medical oncologist).

Features described by these clinicians suggest that speed is key, this may reflect time constraints within clinic. This may also be introspective of clinicians perceiving patients as being overwhelmed and not wanting to overload them with too much information ".... but they're overwhelmed, the focus is on care" (Patricia-Anne, medical oncologist).

Clinicians also understood that breast cancer survivors are of all different ages and abilities and would like to see resources that are available on multiple platforms from a printed resource, to technology-based to programs that are available at the cancer centre or in the community. For example, a radiation oncologist (Pedro) suggests, "I think multiple ways of getting at it. Again, there's been a lot of investment into [smartphone or mobile] apps for symptom management at the CCO, we have a whole menu. So, having something there for exercise would be great." Moreover, Paulina, a medical oncologist, believes, "The dilemma is that you have the age range where there are young people who are very comfortable with apps and whatnot. So, you probably have to look at a strategy that has many different methods. Some people still like paper." Finally, a medical oncologist (Pamela), thought about technology and believes that it could be used as a delivery method for future resources:

I think having some small and printed is great. But I think in this era – you know, why can we not leverage technology for some of that messaging. You see these catchy ads and things and why can we not leverage technology?

Another final feature that clinicians desire in future resources is for it to be integrated into the current cancer care system. This is not surprising as clinic flow is a barrier for PA counselling. A suggestion from a radiation oncologist best exemplifies this feature:

I would rather see it [future resource] integrated into a single document that we give our patients. It's another dimension of trying to help our patients to be well in the future. I think little fragmented bits are probably not useful, not as useful as if they were integrated. (Perry, radiation oncologist).

These features further reflect some of the PA attitudes and environmental norms such as limited time in clinic with patients and clinic flow in addition to current technology trends.

5.4.3.2 Clinician education

Clinicians also had suggestions on how to promote future resources and advised on dissemination strategies. Clinicians wanted promotion of future resources to use interactive methods. For example, a nurse suggested, "Another area to reach staff is a lunch 'n' learn or something. You could come in and do a lunch 'n' learn and expose more people to what you're doing." (Nora, registered nurse). Oncologists also reflected this notion:

Presentations or talks on, I can see, I know there are other areas in the province and the country where the Y[MCA] has partnered with cancer

centers to, so having somebody to set that up let's say in [City Name] or wherever come to centers like ours and do a grand roundup and say this the importance of exercise, this is how we implemented it. That's valuable. (Phillip, physician).

Interestingly, education of health teams was also important as part of a dissemination strategy of PA and breast cancer information:

It has to be multipronged. You gotta get in from everywhere. It's gotta start with the ground up. Advocate for getting it [PA] onto the curriculum and into training programs. Whatever the medical speciality is and yes you need CMEs [continuing medical education credits]. We gotta get onto agendas. You gotta get onto CME agendas. (Patricia-Anne, medical oncologist).

Similarly, other forms of dissemination included learning from other leaders in the field, "And yeah, that kind of thing that helps medical practice. That kind of having someone who is a leader in the field to talk in the community is very good for you." (Perry, radiation oncologist). This is reflected by other clinicians when they suggested specific dates and times at oncology rounds, nursing rounds and breast tumour board meetings where leaders in the field would be welcome to present their work.

In order to facilitate PA discussions between clinicians and breast cancer survivors, clinicians discussed the current resources available to them, but only nurses were able to describe specific resources and clinicians noted the importance of having a patient facing version of the newly developed PA guidelines. Clinicians highlighted that a resource developed in the future needed to integrate multiple lifestyle behaviours, be simple and not dependent on the clinician for implementation and available on different platforms including printed and web-based. Finally, clinician education was discussed in that education should be less formal and allow clinicians to learn from leaders in the field.

5.5 Discussion

Cancer care clinicians have been identified as important messengers of health information, such as PA, for breast cancer survivors (Eden, Orleans, Mulrow, Pender, & Teutsch, 2002). Advice

from a clinician can influence survivors to be more active; however, many oncologists and nurses do not counsel their patients on PA (L. W. Jones et al., 2005; Karvinen et al., 2010, 2012). As a result, the aim of the current study was to explore factors that influence clinicians to counsel on PA with their patients (i.e., breast cancer survivors). A constructivist paradigm was adopted for this study and using an inductive approach, three main themes with six subthemes developed from focus groups with clinicians. These main themes included associated skills and attitudes, negative environmental and social norms, and PA facilitators. These main themes map onto the predisposing, reinforcing and enabling factors as outlined by the PRECEDE-PROCEED model.

5.5.1 Predisposing Factors

These are innate factors which may influence clinicians to discuss PA with their patients (Green & Kreuter, 2005). From the associated skills and attitudes theme, two subthemes were formed including PA knowledge and attitudes. Consistent with previous research (Karvinen et al., 2010), clinicians in this study perceived that they lacked education to discuss specific details related to PA or exercise prescription. This is not surprising given that exercise prescription for clinical populations can be quite complicated (Karvinen et al., 2010). Additionally, some motivated clinicians have overcome this barrier by reading the literature so that they understand the benefits of PA and how to begin PA behaviour (e.g., starting slow, beginning a walking program); however, clinicians do not understand other aspects of PA counselling such as finding an appropriate program in the patient's community, addressing cancer-specific concerns and motivating the patient. Future research is encouraged to develop clinician education strategies on PA to address this barrier in clinicians. Interestingly, this education may not be formal, for example as a continuing medical education credit or part of the medical school curriculum, but built into oncology rounds or lunch-and-learn session as suggested by the focus groups in the current study. It is clear that clinicians are willing to learn, but the educational strategy must be integrated into current practice. This integration may stem from clinicians' common concerns related to time constraints (L. W. Jones et al., 2005; Karvinen et al., 2010; Nadler et al., 2017). Further research is needed to determine the effectiveness of integrating learning modules into current practice and clinicians' attitudes towards these modules. Further, understanding how to successfully discuss and encourage PA behaviours may encourage sustained behaviour change in breast cancer survivors (L. W. Jones et al., 2004).

Clinicians have a favourable disposition towards the benefits and importance of PA and an examination of the findings from the current study show that the largest barrier towards this is perception of their role in cancer care. Given the restricted amount of time in clinic with patients, many clinicians perceive that their chief responsibility is exclusively related to cancer diagnosis and treatment, whereas PA and PA counselling may fall under *survivorship*, wherein another health care provider is responsible. However, a main objective of the discussions between clinicians and their patients is to provide information related to prognosis and decisions about therapy. PA may impact both cancer prognosis and therapeutic outcomes and as a result, is relatively important. Further, patients are interested in receiving information related to PA and cancer outcomes from their oncologists and cancer care team. Evidence from early stage breast cancer patients has suggested patients are likely to comply with medical advice about PA if it comes from their oncologist (Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000). For this reason, there may be a discrepancy between clinical practice and patient preference, which may lead to decreased satisfaction with cancer care (L. W. Jones et al., 2005). Future research is needed to determine if the roots of patient satisfaction with cancer care are related to this discrepancy. After, development of appropriate strategies to education clinicians and maintain satisfactory cancer care can be developed to help promote PA in breast cancer survivors.

Interestingly, oncologists and nurses (both registered nurses and nurse practitioners) differed on timing of PA counselling with their patients. Oncologists believed that later, likely following treatment completion, was an ideal time. While nurses believed that discussion which occurred immediately were more effective. This may be a result of respective responsibilities as clinicians. Oncologists perceive their responsibilities surround diagnosis, prognosis and treatment. In comparison, nurses in this study often discussed patient education courses and thus; are also responsible for patient education. Patient education may involve increased interactions with patients compared to oncologists. As a result, nurses may perceive that integrating PA counselling into patient education (i.e., beginning of the cancer journey) may be beneficial. Nurse-led interventions have been shown to be effective for increasing PA behaviours in other clinical populations. Specifically, observed increases in lifestyle PA were seen in people living with Type II Diabetes following a nurse-led intervention (Bastiaens et al., 2009). Similarly, sustained increases in moderate PA were observed in patients with coronary heart disease up to

four years following a nurse-led intervention (Murchie, Campbell, Ritchie, Simpson, & Thain, 2003). In a prospective cohort study, a descriptive exploration in objectively measured moderate-to-vigorous PA suggest that 3-to-9 months post-primary treatment completion may be an optimal time to discuss PA with breast cancer survivors as PA levels remain low and survivors are motivated to make lifestyle changes (Sabiston et al., 2014). Future research is required to determine the ideal time to counsel on PA with patients for optimal effectiveness.

5.5.2 Reinforcing Factors

During the focus groups, clinicians discussed many environmental and social norms within the cancer centre. Collectively, these barriers formed negative reinforcements for PA counselling between clinicians and their patients. Importantly, the overall lack of support from the centre administration for PA-related initiatives, including programming and printed resources to guide counselling. In addition to hindering PA initiatives, this lack of support also hinders the development of novel ideas. Clinicians understand that they will not have support, which influences potential discourse on how to solve this problem and as a result, many clinicians "outsource" PA counselling to other health care professionals or the community, such as local gyms and wellness centres. This is further compounded by maintenance of clinic flow. Disruption to clinic flow has implications for quality of care in that other important aspects related to follow-up care, such as symptom management, may not be discussed (Roundtree, Giordano, Price, & Suarez-Almazor, 2011). Additionally, the catchment area of the cancer centre is a source of negative reinforcement. Main cancer centres in the province are responsible for many patients across a large area and in many cases patients drive upwards of two hours for care. Given the large area, clinicians feel inadequately prepared to discuss specific outlets for PA in the periphery of the catchment area. Future research is encouraged to develop and test a resource, for example a printed resource or website which has a list of available community resources in the centre-specific catchment area to determine its feasibility and effectiveness for increasing PA behaviour in breast cancer survivors.

5.5.3 Enabling Factors

Enabling factors were drawn from the PA facilitators theme. Throughout their experiences, awareness of available resources helped clinicians discuss PA with their patients. Nurses seemed to have a better grasp of the materials available for patients and this may be due, in part, to the patient educational aspect of their role as a health care provider. Again, this has implications for increasing PA in breast cancer survivors as nurse-led interventions have been previously shown to be efficacious in other clinical populations (e.g., Bastiaens et al., 2009). In contrast, all clinicians interviewed were aware of the CCO Exercise Guidelines for People with Cancer (Segal et al., 2017). Although this is promising, clinicians had expressed concern over how to implement the guidelines in their practice. Further, there were requests to develop a patient version of the guidelines that clinicians could refer to. Future research is encouraged to develop a patient-facing version of the CCO exercise guidelines and determine the effectiveness of these guidelines for increasing PA behaviours in breast cancer survivors. Next, future research is needed to determine clinician uptake of using these guidelines in their practice and potential burden.

Given their experiences throughout their practice, clinicians had developed an idea of close-toideal resources that would facilitate PA counselling with breast cancer survivors. Key features included integrating PA and other lifestyle behaviours (e.g., health eating, smoking cessation), focusing on self-management of PA behaviours, availability on multiple platforms, integrating this resource into current practice and a simple method, such as presentations at grand oncology rounds or tumour board meetings, for informing clinicians about new evidence and resources. These features suggest that clinicians would like to take a passive role in PA promotion as a messenger for reliable PA information, but do not wish to take an active role. This may be problematic as breast cancer survivors are influenced by advice from clinicians. However, selfdirected PA is more sustainable than intervention-based PA (Brunet, Taran, Burke, & Sabiston, 2013). Development of resources which contain these features may offset pressure on clinicians to provide this information and fulfill an unmet need in breast cancer survivors for reliable PA information from clinicians. Future research is needed to develop and test resources with these features for feasibility and user uptake.

5.5.4 Limitations

This study is not without its limitations, for example themes created from clinician experiences with PA counselling were explored and critiqued based on the PRECEDE-PROCEED model. Using a model to understand and map themes may have decreased a sense of continuity and contradiction through details of individual accounts, which may have been revealing (Braun &

Clarke, 2006). While this is an inherent disadvantage of thematic analysis, a rigorous thematic approach was used and similarities and differences were highlighted throughout the data. Since the focus groups were conducted with some regional cancer centres in urban city centres of Ontario, these accounts are not indicative of the clinician experience of the entire province. Further, some centres were not able to participate or were not reached. Future research is encouraged to examine experiences of clinicians in more rural or mixed (combined urban and rural) settings. Focus groups primarily included cancer care clinicians (i.e., oncologists and nurses); however, there are other members of usual care, for example radiation therapists, allied health professionals (dietician, physiotherapists, occupational therapists, and social workers) who may have met the inclusion criteria, but were not recruited in this study. Understanding experiences related to physical activity counselling from the remaining professionals in usual care could help to better understand unique barriers and facilitators for the implementation of physical activity counselling in cancer care. For example, a quantitative analysis of oncology care professionals suggested that nurses and radiation therapists report lack of knowledge and training for physical activity counselling as pertinent barriers (Nadler et al., 2017). Future research is encouraged to examine the experiences of professionals in usual care in relation to physical activity counselling and determine the roles that these professionals in physical activity counselling. For example, physiotherapists, occupational therapists and registered kinesiologists have training in physical activity and may be better suited for physical activity counselling (Nadler et al., 2017). Finally, we acknowledge that the interpretations from this study represent knowledge that is partial and situated (Stake, 1994).

5.5.5 Clinical Implications

Despite these limitations, there are implications that can be drawn from this study. While conducting this study, the Exercise Guidelines for People with Cancer was released for clinicians (Segal et al., 2017). Clinicians discussed being aware of the guidelines; however, were not able to recite verbatim what the guidelines entailed beyond "I follow just the general [PA] guidelines – 150 ...minutes" (Paula, medical oncologist). Based on this finding, they needed additional education related to PA that should include understanding the PA guideline. Developing a summary document for clinicians and a short presentation on how to use these guidelines may be useful for clinicians. Further, a reinforcing factor that emerged included lack of time within clinic to counsel on PA. To accommodate this, clinicians discussed developing PA strategies and
initiatives that would be initiated by the clinician, but not dependent on the clinician to follow-up with the breast cancer survivor. In this regard, clinicians could be viewed as a vehicle for disseminating PA-related information to breast cancer survivors (Thornton et al., 2016).

5.5.6 Practical Implications

From the themes that developed, further clinician training is needed in order to educate them on strategies to counsel and motivate their patients to be more active. Less formal education strategies may include presentations at oncology rounds and tumour board meetings as suggested by the clinicians. While, clinicians did not want formal education related to PA and PA counselling, including PA in medical and nursing school would be helpful for developing basic knowledge around PA and increase self-efficacy for PA (O'Brien et al., 2017). Additionally, interactive workshops on PA counselling and PA prescription may assist to increase confidence to provide information and advice regarding PA and assess patient readiness for PA (O'Brien et al., 2017). Further, development of continuing medical education credits or online training modules centred around PA may motivate clinicians to counsel on PA by increasing confidence in PA knowledge and developing counselling skills such as assessing readiness of patient for PA and providing referrals to appropriate community-based PA programs (O'Brien et al., 2017) and to qualified exercise professionals (Thornton et al., 2016).

To assist with developing clinician-initiated strategies for PA counselling, it is necessary to develop and test tools that clinicians can utilize. A similar strategy, where physicians are relying on allied health professionals, exercise professionals and other PA facilitators is currently being applied in primary health care settings (O'Brien et al., 2017; Thornton et al., 2016). For example, developing a resource repository of community-based PA programs (e.g., Livestrong at YMCA), a list of known oncology-trained exercise professionals including oncology-trained personal trainers (e.g., Canadian Society of Exercise Physiologists – exercise and cancer advanced training) and registered kinesiologists (Fitzpatrick & Zizzi, 2012; Thornton et al., 2016), and online resources (Sylvester et al., 2017) would be beneficial. This tool would assist clinicians with PA counselling by allowing them to recommend reliable resources and decrease the amount of time spent on counselling. Implementation of any clinician-initiated strategies should involve working closely with clinicians and administration to understand how a potential strategy could impact current work- and clinic flow (Swinburn et al., 1997). Additionally, educating clinicians

on how to integrate strategies into current practice is needed so that clinic and work flow are not implicated (Bauer, Damschroder, Hagedorn, Smith, & Kilbourne, 2015).

5.5.7 Conclusion

In conclusion, the present study identified factors that influence PA counselling between cancer care clinicians and breast cancer survivors. Using a planning model, such as PRECEDE-PROCEED, allows for examination of all levels of influence, which may elucidate otherwise overlooked factors. Importantly, this study has identified key factors of the clinician experience which can be assessed in order to facilitate PA promotion in breast cancer survivors. And as Patricia-Anne reflected about this study, "This is great, you gotta keep pushing it [PA] from every which way."

Theme or Subtheme	Example Quotations
1. Associated knowledge and at	titudes
1a. PA knowledge	Physicians and nurses, it's [PA counselling] not part of our standard education. If you know anything about exercise, it's because you got the information from elsewhere. And you taught yourself something. There's no formal [education] in nursing and in medicine, it doesn't matter which branch. Underestimate what we don't know. (Patricia-Anne, medical oncologist)
1b. PA attitudes	There's a time issue. There's only so many things we can talk about in the time with them. And there's certain aspects that only we can talk about like the very specifics of chemotherapy and the side effects that they're not going to hear from elsewhere. So, it's the issue of prioritizing what we're going to talk about in those 5 or 15 minutes. (Pamela, medical oncologist).

Table 8 Themes and subthemes developed from clinician-based focus groups

2. Negative social and environmental influences

2a. Social norms	Even now there's people approaching me for more exercise studies. They have dollars in hand and my very concern is the same logistics. And logistical concerns we had a couple of years ago. We don't have administration behind you. It's hard enough anyways, but when you don't have the administration behind you it's even more of a challenge. And it's unfortunate, it truly is. (Patricia-Anne, medical oncologist).
2b. Environmental norms	[It] depends on the patients, where they live. We get a lot of patients from outside of [City] as well, we get them they have traveled far distance and a lot of times those programs are not available necessarily for them there. (Patrick, medical oncologist)
3. PA facilitators	
3a. Resources	So, there is the summary plan or synoptic plan and part of it about lifestyle. Most of them [care plans] do reference, I know that ours was updated recently to include the CCO

	[PA Guidelines] guidelines in that cancer patients document. I don't know that it [CCO PA guidelines] has a cancer patient facing yet. There is a full document and summary which is a bit cumbersome. I would say is that if someone was able to create a patient, or parallel document to the exercise guidelines that was patient-friendly. I don't think CCO is going to do it at this point. That would be helpful. (Pedro, radiation oncologist).
	It would have to be short and sweet and very specific, these are the things you can do. Sort of step by step. (Nanette, nurse practitioner)
3b. Clinician education	I think part of your thing might be to also develop a counseling package and a travelling show for physicians who work with cancer patients to teach it. But teach it efficiently. We don't have time to run a consultation. (Paul, medical oncologist).

Chapter 6 Discussion

6 Summary of Studies

A breast cancer diagnosis may be a teachable moment where women are open to change and potentially adopt healthier lifestyle behaviours including healthy eating habits and physical activity (Demark-Wahnefried, Aziz, Rowland, & Pinto, 2005). It is important to foster healthy habits such as physical activity since breast cancer survivors who meet physical activity guidelines (i.e., 150 minutes of moderate-to-vigorous physical activity per week) have improved physical, emotional, and social health and well-being (Battaglini et al., 2014; Galiano-Castillo et al., 2014; McDonough et al., 2014; Mock et al., 1997; Schmid & Leitzmann, 2014; Trinh et al., 2015; Urbscheit & Brown, 2014). While research evidence regarding the benefits of physical activity for breast cancer survivors is clear, it is disheartening that approximately 70% to 90% of breast cancer survivors report not being active enough to harbour the health benefits (Lynch et al., 2010; Sabiston et al., 2014). This has led to a knowledge-to-action gap, where there is ample research support for the benefits of physical activity for breast cancer survivors, but few survivors are active enough to gain these benefits.

In order to bridge this gap, employing knowledge translation strategies are needed to refine research into a useable form for the knowledge user (Pollack, Hawkins, Peaker, Buchanan, & Risendal, 2011). This is further supported by a recent research push for more translational research in oncology according to the Translational Science Process model (Khoury et al., 2010) with a focus on real world relevance and shortage of collaboration between researchers and stakeholders (Phillips et al., 2014). Moreover, research guided by an appropriate knowledge translation planning framework (PRECEDE-PROCEED model) will assist with development of future physical activity programs that take into account the local context of Ontario and allow for easier uptake of research findings. The initial phases include a social assessment (Phase 1), epidemiological, behavioural and environmental assessments (Phase 2), educational and ecological assessments (Phase 3) followed by the latter phases (4 through 8), which examine how the planned program will align with the current policies and evaluate the program. Following the three initial phases of the PRECEDE-PROCEED model, three studies were developed to address the gaps in the literature:

Study 1 aimed to identify the unmet needs that breast cancer survivors experience and identify physical activity resource preferences. Breast cancer survivors who completed the online needs assessment questionnaire revealed that the most salient unmet needs were related to finding an exercise partner, an exercise partner who understands cancer, finding support from family, friends and others for physical activity and finding appropriate community places to be active, equipment and attire. Sociodemographic factors associated with these needs included age, physical activity levels and time since treatment. Further, survivors who were younger preferred PA video tutorials, wearable technology to track physical activity (e.g., Fitbit) and access to physical activity professionals trained in breast cancer. These findings highlight the survivor-level predisposing and enabling factors associated with needs and preferences.

From Study 1, it is clear that peer-support and information from reliable sources are key unmet needs. Building on Study 1, examining the external or environmental factors that could influence physical activity levels in breast cancer survivors was needed. Study 2 aimed to evaluate cancer centers for physical activity information and infrastructure. A secondary aim was to evaluate the information (i.e., textual materials) that is accessible to breast cancer survivors in cancer clinics. Through the built-environment scan of the 14 regional cancer centres in Ontario environmental factors that was uncovered included limited areas that could be modified in the builtenvironment for physical activity. Adding or adjusting current space for cancer-specific exercise or stretching classes may not be possible. There were avenues for passive dissemination of physical activity information such as displaying information on the televisions in the waiting room, which may assist with communicating physical activity strategies and exercises to breast cancer survivors during times when they are waiting for their appointments. Moreover, the free and available textual materials (N=58) from the cancer centres were rated as trustworthy with clear provider and objective statements, which was an enabling factor. Few behaviour change techniques from the CALO-RE statement (Michie, Ashford, et al., 2011) were used and thus, this was a reinforcing factor. Strategies included information about the consequences of lack of physical activity in general, barrier identification, consequences of lack of physical activity to the individual, setting graded tasks and relapse planning and coping. Findings from Studies 1 and 2 have provided information on the individual- and environmental- level factors that may influence physical activity in breast cancer survivorship. Although obtaining advice from one's medical

team was not identified as an unmet need in Study 1, cancer care clinicians can still have an impact on physical activity levels of cancer survivors through inquiring and counselling on physical activity (Eden et al., 2002) and it is important to examine factors that facilitate physical activity counselling.

Given the influencing role of primary care clinicians for patients' physical activity levels (Eden et al., 2002; O'Brien et al., 2017), cancer care clinicians may also influence physical activity levels in breast cancer survivors. Therefore, it is important to examine the elements that affect physical activity discussions between survivors and clinicians. As a result, the aim of Study 3 was to examine the factors affecting physical activity counselling between clinicians and breast cancer survivors. Through four focus groups with 27 clinicians, it was observed that predisposing factors included clinicians perceive a lack of formal education for physical activity for cancer survivors. For this reason, clinicians discussed the importance of clinician-centred education delivered in a less formal manner (enabling factor). Within the cancer centre itself, there were reinforcing factors from a lack of social support from the administration for physical activity and barriers from the catchment area. To facilitate physical activity counselling, clinicians wanted resources (e.g., printed materials, web-based platforms, programs to refer patients) that are clinician-initiated, but patient-focused. Considering these findings, developing future resources that support clinician education related to knowledge on physical activity for breast cancer survivors are required. Further, patient-centred resources, for example a patientfacing version of the Cancer Care Ontario physical activity guidelines for cancer survivors and printed and online resources that have short messaging about physical activity should be developed and tested for effectiveness for increasing physical activity levels and knowledge retention.

Across all three studies, predisposing, reinforcing and enabling factors that have an impact on physical activity in breast cancer survivors were identified from survivor, environmental and clinician perspectives. *Predisposing factors* for survivors included meeting physical activity guidelines, time since treatment and age and for clinicians included physical activity-related knowledge and attitudes. *Reinforcing factors* included textual materials using few behaviour change techniques and cancer centre social and environmental norms. Finally, *enabling factors* included available textual materials and resources for clinicians in addition to features that

clinicians wanted in resources for patients. Figure 3 summarizes the application of PRECEDE-PROCEED model in this program of research.

6.1 Implications

6.1.1 Theoretical Implications

The studies within this dissertation highlight the possibilities of integrating behaviour change theories with knowledge translation frameworks. PRECEDE-PROCEED is an example of a logic model, where causal assessment, intervention planning and evaluation are linked into one framework (Gielen & Green, 2015). This framework provides a "roadmap" for applying theories in a systematic manner (Green & Kreuter, 2005). Green and Kreuter (2005) suggest using interpersonal theories of behaviour change because of the emphasis of interactions between the individuals and their environment. As shown in Study 1, Social Cognitive Theory (Bandura, 1986), specifically the concept of task and barrier self-efficacy, was used to develop and guide the measurement of salient unmet needs (i.e., low confidence and high difficulty). Furthermore, the measurement of the specific needs and difficulty and preference items was informed by the Social Support Process model (Richman et al., 1993). Definitions of social support types from the Social Support Process model were used to understand the unmet needs. The use of theories in Study 1 highlight the utility of integrating models and theories within a planning knowledge translation framework of PRECEDE-PROCEED. Furthermore, the PRECEDE-PROCEED model was used as an integration within the Translational Science Process model to address research needs as outlined by Phillips and colleagues (2014) including contextual assessment for implementing physical activity programs in the community, multilevel analysis of factors that influence physical activity participation and influence the success of an intervention and implementation.

Guided by previous research (Alfano et al., 2014; Phillips et al., 2014), this current program of research applied the Translational Science Process model (Khoury et al., 2010). Phillips and colleagues (2014) outline potential strategies for applying the model within the context of physical activity and cancer survivorship. As a result, the overarching research question of the current program of research was developed to align with the third phase (T3) of the model. This is where strategies and methods are investigated to increase uptake and implementation of evidence-based recommendations into practice (Khoury et al., 2010). Moreover, many strategies

for applying the model are outlined; however, there is lack of detail for planning these strategies and authors suggest applying the RE-AIM framework to design future investigations (Alfano et al., 2014; Glasgow et al., 2004; Phillips et al., 2014). RE-AIM has been used in public health (e.g., Jilcott, Ammerman, Sommers, & Glasgow, 2007; Sweet, Ginis, Estabrooks, & Latimer-Cheung, 2014) and is an informative planning and evaluative framework. Yet, RE-AIM is not straightforward on indicators of effectiveness or efficacy when there are multiple sources of data, for example individual, contextual and provider (Green, Glasgow, & Colorado, 2006). In order to adequately plan appropriate strategies following the Translational Science Process model, applying specific knowledge translation planning frameworks are needed (Green et al., 2006). Thus, this program of research addressed this by applying the PRECEDE-PROCEED model to design studies and identify key areas for future research efforts (i.e., predisposing, reinforcing and enabling factors). Taken together, the theoretical contributions of the current program of research include the integration of a knowledge translation planning framework (PRECEDE-PROCEED model) with the knowledge translation model (Translational Science Process model) to better understand individual, environmental, and provider perspectives on physical activity. While many researchers turn to models such as the social ecological model (J. F. Sallis, Owen, & Fisher, 2008) as a guiding overarching model for this tiered or multiple level analysis, the benefit of using the current approach is the advancement for knowledge translation strategies and integration of behaviour change theory.

6.1.2 Measurement Implications

A questionnaire was developed to assess unmet needs and preferences related to physical activity resources in breast cancer survivors (Study 1). Item were developed from the social support types outlined in the Social Support Survey (Richman et al., 1993), the adapted social support questionnaire for sport and exercise (Rees et al., 2007) and previous literature on physical activity facilitators (Blaney et al., 2011), barriers (Brunet, Taran, et al., 2013) and preferences in breast cancer survivors (Vallance et al., 2013). To date, there is little evidence of multi-item questionnaire that examines unmet needs for physical activity resources from different social support domains (i.e., informational, tangible resources, emotional and reality conformational types of social support) and this is a novel contribution to the literature. Previous literature has used a single-item measure to assess information needs for physical activity ("To what extent do you want information or support for physical activity, sport and exercise?") that has also yet to

be validated (Charlier et a., 2012). While the questions in Study 1 asked for specific types of needs, there was an inherent assumption in how questions were asked in Study 1 where it was assumed that all survivors desired these types of resources. Future recommendations are to retest this measure by adding a "not applicable" to determine if a resource is desired. Subsequent testing is needed with a larger sample of breast cancer survivors to determine content clarity and examine test retest reliability.

In Study 2, an environmental scan checklist was developed to audit the cancer centres in Ontario for physical activity opportunities and information. This tool was developed based on previous environmental scans of school environments for physical activity infrastructure and resources (Leatherdale et al., 2014). Findings from the environmental scan highlight areas in the centres for physical activity information dissemination and communication, which is likely the first conducted in Ontario. Leatherdale and colleagues (2014) have developed a smartphone application to conduct environmental scans, augmented with direct observation through the smartphone camera. This application allows for longitudinal analysis of the environment as archived scans can be compared to newer scans (Leatherdale et al., 2014). Future research is encouraged to use this application in the context of cancer care to examine potential associations between a changing cancer care environment and breast cancer survivors' physical activity levels.

Textual materials gathered from the regional cancer centres (Study 2) were evaluated using criteria derived from the CALO-RE taxonomy for behaviour change (Michie, Ashford, et al., 2011) and quality criteria of health-related websites (Commission of the European Communities, Brussels, 2002), which examined both salient behaviour change techniques (BCTs; important for physical activity) and transparency and disclosure of materials (important for trustworthiness). While the materials were coded as trustworthy, there is a lack of well-established BCTs (e.g., action planning) used. Consequently, survivors may form an intention to be active, but not bridge the intention-behaviour gap and thus, may not increase physical activity levels (Conroy et al., 2014). Additionally, implementation of the BCTs across all collected materials was not examined and future research is encouraged to examine this and any potential associations on physical activity levels.

6.1.3 Practical Implications

Across the three studies within the program of research, three areas where practical implications can be drawn.

6.1.3.1 Individual

At the individual level, while breast cancer survivors were active they still experienced salient unmet needs (Study 1). Specifically, survivors had unmet needs related to emotional and reality confirmation types of social support. From this, researchers and physical activity program implementers should consider these dimensions of support when developing physical activity interventions and programs. For example, quality of social support predicts increased psychological well-being in breast cancer survivors (A. J. Fong et al., 2016) and within a physical activity context, social support has been shown to influence physical activity participation in long-term breast cancer survivors (Phillips & McAuley, 2013). Breast cancer survivors in Study 1 identified an unmet need for support from peers and close others for being physically active. Considering these findings, development and testing of an exercise partner matching system for women diagnosed with cancer is needed (Sabiston, Amireault, Tamminen, Fong, & Jones, 2015). This system was designed for women to find their close-to-ideal exercise partner and provide social support for physical activity. Women are matched based on integral characteristics including age, interest in exercise, and severity of cancer. Further evaluation of the system's effectiveness for changes in social connectedness, social support and physical activity levels over time are needed (Sabiston et al., 2015).

Moreover, breast cancer survivors in Study 1 identified access to exercise professionals who were trained in breast cancer as an unmet need. Similarly, clinicians in Study 3 discussed barriers with respect to referring patients to community-based programs due to lack of perceived program availability, especially in the periphery of the catchment area. Exercise professionals have assumed a primary role in conducting physical activity stress tests in the asymptomatic and cardiac populations (Warburton et al., 2011) and there is an increasing demand for the role of qualified exercise professionals in cancer survivorship (Hayes et al., 2009; Santa Mina, Alibhai, Matthew, Guglietti, Steele, Trachtenberg, & Ritvo, 2012). As a result, clinical and academic organizations have developed specialized training programs for exercise professionals in oncology (e.g., Canadian Society for Exercise Physiology Cancer and Exercise module http://www.csep.ca/view.asp?ccid=551). Unfortunately, it is unclear how many oncology-trained exercise professionals exist. Consequently, it is important to conduct an audit to identify any oncology-trained exercise professionals across Canada. This list of oncology-trained exercise professionals would address an unmet need in breast cancer survivors while simultaneously relieving a barrier in clinicians and allow them to offer a referral for physical activity.

6.1.3.2 Environmental

Further, at the environmental level, there were some opportunities for physical activity. Additionally, textual materials available at cancer centres in Ontario were rated as trustworthy and used some behaviour change techniques (Study 2). To address environment-level factors that influence physical activity, using the current infrastructure may be a novel avenue for a lightintensity physical activity program. In particular, the cancer centre waiting room could be used to implement a light-intensity physical activity intervention (e.g., doing exercises that require no equipment including chair sit-to-stands). However, the effects of light-intensity physical activity on breast cancer survivors are not clear (Sylvester, Ahmed, et al., 2017) and there is evidence from the asymptomatic population, which suggests light-intensity physical activity could have health benefits, including being associated with decreased obesity and all-cause mortality (Füzéki, Engeroff, & Banzer, 2017). From a knowledge transfer perspective, the televisions that are present in all main cancer centres could be used for passive dissemination of physical activity knowledge. Provision of information has been shown to increase physical activity levels in breast cancer survivors (Vallance et al., 2007). Further, textual materials found within the cancer centres may be more effective for increasing physical activity levels in breast cancer survivors if salient, evidence-based behaviour change techniques such as self-monitoring are used (Michie, Ashford, et al., 2011; Presseau et al., 2015). Additionally, survivors in Study 1 had an unmet need related to finding places to be active, cancer centres could address this need by highlighting reliable community-based programs for physical activity both within the centre and through their centralized websites (Sylvester, Zammit, et al., 2017). Within centres, a designated area with printed materials from reliable community-based programs and resources that the medical team could direct survivors to would be helpful. This could be further augmented by housing reliable resources and community-based program information on the cancer centre's websites, which will allow for easier updating of information (Sylvester et al., 2017).

6.1.3.3 Provider

Finally, clinicians were identified as key motivators for physical activity (Jones et al., 2005); however, survivors in Study 1 did not identify obtaining advice from their medical team as an unmet need related to physical activity. While the findings from Study 1 are in contrast to the literature, it is still important to optimize clinicians' time with patients to offer quality health-related information (L. W. Jones et al., 2005; Karvinen et al., 2010, 2012; Nadler et al., 2017) Within Study 3, clinicians had expressed desiring less formal education on physical activity for breast cancer survivors. As well, clinicians discussed developing physical activity initiatives that were clinician-initiated, but not dependent on the clinician (Study 3). While conducting this study, the Exercise Guidelines for People with Cancer was released for clinicians (Segal et al., 2017). Clinicians discussed being aware of the guidelines; however, they needed additional education related to physical activity that could include understanding how to implement the physical activity guidelines. Further, clinicians discussed developing physical activity strategies that would be initiated by the clinician, but not dependent on the clinician to follow-up with the breast cancer survivor. Possible strategies are detailed in the future recommendations section.

6.2 Limitations and Strengths

Overall, there are some limitations of this program of research. From a sampling standpoint, this program of research was restricted by convenience samples to breast cancer survivors who had access to the internet (Study 1) and clinicians who practiced in the main cancer centres in Ontario (Study 3). There may be some nuanced unmet physical activity resource needs for survivors who do not regularly access the internet in addition to factors that affect counselling for clinicians who practice in smaller cancer centres. Similarly, only regional cancer centres in Ontario were visited during the environmental scans (Study 2) and as a result, findings are only generalizable to centres that are well-funded in this province. From a methodological standpoint, the cross-sectional nature of the needs assessment does not allow for causal inferences to be drawn. While conducting the environmental scans, only free and available textual materials were collected and any materials that are handed to patients from their medical team were missed. Additionally, the thematic analysis used in the clinician-based focus groups was critiqued using the PRECEDE-PROCEED model and this may have decreased development of unique factors experienced by clinicians.

In addition to the implications of this program of research, there are some notable strengths. The main strength is the use of a comprehensive knowledge translation planning framework, which allowed for various perspectives related to breast cancer survivorship and physical activity to be examined. While measures used were not validated (Study 1), they were developed based in theory, thereby ensuring that significant findings could be described. Finally, various theories and frameworks were integrated within this program of research, which allowed for a better understanding of the findings.

6.3 Future Recommendations

From this program of research distinct, yet related recommendations were identified: (1) Province-wide administrative and policy assessment and continued application of the PRECEDE-PROCEED model; (2) using technology to create a resource centre, facilitate social support among breast cancer survivors; (3) continued education for clinicians; and (4) application of methods to the asymptomatic population. Proposed strategies for these recommendations are described below.

6.3.1 Administrative and Policy Assessment

The current program of research used the first three phases of the PRECEDE-PROCEED model to identify the predisposing, reinforcing and enabling factors that impact physical activity in breast cancer survivors from individual, environmental and clinician perspectives (see Figure 3 for a summary). The next step in the model is to assess the current policies within the context of cancer and physical activity in Ontario. This will allow for any future interventions to align with policies and increase likelihood of uptake (Green & Kreuter, 2005). Previous public health assessments of administration and policy in nursing and community-based settings (e.g., Cole & Horacek, 2009; Leatherdale et al., 2009; Tramm, McCarthy, & Yates, 2012) have used a combination of interviews and questionnaires with key informants. Key informant questionnaire will be developed to examine any physical activity programs (that may have been missed during the built-environment scan in Study 2) and policies within the 14 regional cancer care Ontario to gain insight on the current policies related to physical activity and shed light on

administrative-related barriers at the provincial level (Leatherdale et al., 2009). These data may also provide researchers and stakeholder with a better understanding of the types of interventions that will be effective, in which context and thus inform the implementation and evaluation phases of PRECEDE-PROCEED (Green & Kreuter, 2005). Based on the findings within this program of research, future interventions should be developed to accommodate the age, time since treatment and physical activity level of breast cancer survivors (Study 1), physical activity knowledge and attitudes of clinicians (Study 3) and accounting for the environmental and social norms of the cancer centre (Study 3). Further, the interventions should develop improved printed materials with evidence-based behaviour change techniques (Study 2).

Understanding the current policies in Ontario and the alignment of a future intervention will highlight policies that could potentially be altered to further facilitate physical activity in breast cancer survivors. For example, an altered policy could involve every regional cancer program in Ontario identifying at least one oncology-trained exercise professional that survivors could access and clinicians could offer a referral. There is a caveat in that, to conduct this at a national level would be quite expensive. Perhaps the methods used for the environmental scan (Study 2), clinician-based focus groups (Study 3) and proposed methods for a policy audit and alignment in Ontario could be adapted for other provinces and allow for the development of appropriate interventions.

6.3.2 Leveraging Technology

Across all three studies the use of technology was highlighted as a resource preference (Study 1), resource to be leveraged by clinicians (Study 3) and web-based resources could augment printed resources (Study 2; Sylvester et al., 2017). Based on these findings, it is important to develop technology-based strategies to further facilitate physical activity. Technology can be leveraged to develop an online resource centre for physical activity and breast cancer survivorship, to facilitate social support for physical activity and to educate clinicians.

Poor availability and accessibility of reliable resources within the Ontario cancer care system was a consistent finding across all studies. Survivors had unmet needs related to tangible resources (attire, equipment and places to be active; Study 1), few printed resources were found per centre (M=6.1, SD=3.0; Study 2) and clinicians discussed being unsure of where to refer patients for physical activity (Study 3). These findings combined with the need for technology

(Study 1) and online resources (Study 3) suggest developing an online resource centre would be useful. The resource centre would feature community-based physical activity programs, oncology-trained exercise professionals, and online physical activity information for breast cancer survivors based on the findings from Studies 1 and 3. Preliminary evidence suggests that breast cancer survivors enrolled in a web-based intervention increased frequency resistance training and rated the web-based platform as acceptable (Short et al., 2017). While this is promising, research is needed to examine survivors' acceptability of an online resource centre and physical activity knowledge retention. Further, changes in physical activity could also be measured in addition to evaluating the website for quality.

A salient unmet need identified by breast cancer survivors (Study 1) related to finding an exercise partner who understands cancer. Social support is both a barrier for and facilitator of physical activity for this population (Brunet, Taran, et al., 2013; Sabiston et al., 2007). Breast cancer survivors experience barriers related to finding similar individuals and may also benefit from the social support of shared experiences (Burke & Sabiston, 2012). Taken together, innovative strategies that facilitate social support among breast cancer survivors are needed. Women diagnosed with cancer discussed being open to using an online platform that would match them with their close-to-ideal exercise partner (peer) and outlined key characteristics required for matching including age, personality, interest in physical activity, cancer severity and proximity (Sabiston et al., 2015). Based on these previous findings, ActiveMatch (activematch.ca) was developed and launched (Sabiston et al., 2015). It is being piloted to determine efficacy for changing physical activity levels, perceived social support, feasibility and acceptability. Similarly, since survivors in Study 1 were open to video tutorials and using wearable and mobile technology, developing a smartphone application based on ActiveMatch to further facilitate social support and provide additional physical activity information would be a novel development. The application would be another potentially feasible method for affecting physical activity levels in this sample.

6.3.3 Continued Clinician Education

Clinicians discussed lack of formal education related to physical activity (Study 3). While clinicians in this study did not desire formal education, preferring informal and passive methods, there is a need to educate clinicians as clinicians have low physical activity and breast cancer

survivorship knowledge. Findings from Study 3 are in contrast to the current literature (Nadler et al., 2017) and it is important to educate and train clinicians in physical activity counselling (Karvinen et al., 2010). Previously, primary care providers have reported increases in confidence to use physical activity counselling methods (e.g., inquiring about patient's physical activity levels using "Exercise as a Vital Sign" method and physical activity prescription) and physical activity knowledge (e.g., understanding the physical activity guidelines) following an interactive workshop (O'Brien et al., 2017). Similarly, Nadler and colleagues (2017) suggested that developing an education intervention on how to use the physical activity guidelines for oncology providers were needed. Clinicians in Study 3 had also discussed using presentations built into their current practice for increasing dissemination of physical activity related knowledge. Developing a series short, interactive workshops that could be presented at oncology rounds and similar meetings would allow for dissemination of knowledge without disrupting clinic and work flow. The workshops would address utilization of the physical activity guidelines, review updated research and offer simple physical activity counselling methods (e.g., inquiring about physical activity levels and offering a referral to an oncology-trained exercise professional). Further, to test the effectiveness of these workshops, questionnaires examining physical activity knowledge retention would be administered pre- and post-workshop. An implementation strategy that involves key stakeholders (e.g., clinicians, administration and researchers) is needed to effectively increase uptake of the workshops in current practice.

6.3.4 Application of Methods to the General Population

The Canadian Physical Activity Guidelines (Canadian Society of Exercise Physiology, 2012) and physical activity guidelines for cancer survivors (Schmitz et al., 2010; Segal et al., 2017) are the same. Similarly, approximately 50% to 80% of asymptomatic (i.e., those who have not been diagnosed with cancer) adults are not meeting physical activity guidelines (Statistics Canada, 2015). As a result, the methods used in all three studies may also be applied to understanding a framework of knowledge translation for physical activity in the broader population and potentially people living with other chronic conditions. For example, understanding unmet needs and preferences for physical activity resources (Study 1) along with associated personal factors (e.g., age, BMI, physical activity levels and socioeconomic status variables) would inform the development of appropriate resources in the broader generally healthy population or potentially people living with other chronic conditions. Similar to breast cancer survivors, primary care

physicians are important motivators for physical activity in the general population (Study 3); however, primary care physicians do not often counsel on physical activity even though advice from a physician has been shown to increase patients' physical activity levels (O'Brien et al., 2017). While studies have been conducted examining barriers to physical activity counselling (e.g., Din, Moore, Murphy, Wilkinson, & Williams, 2015), it would be novel to examine the effect of a series of workshops focusing on physical activity counselling that would be built into practice as outlined in the previous section. Finally, conducting an environmental scan of primary care clinics (Study 2) for resources related to physical activity would be a novel contribution to the literature.

6.4 Conclusions

The studies within this program of research contribute to the understanding of the factors that affect the knowledge-to-action gap that currently exists between the translation of findings from physical activity literature to affecting current physical activity levels of breast cancer survivors. Guided by a knowledge translation framework, the PRECEDE-PROCEED model, three unique yet interrelated studies were conducted. Specifically, breast cancer survivors in this study had unmet needs related to social support and had preferences for wearable technology and access to physical activity professionals trained in cancer. Factors that impacted these needs and preferences were age, physical activity levels and time since treatment in years. The cancer centre environment provided some opportunities for physical activity and printed materials found within the centres were good quality, aesthetically pleasing and used some evidence-based behaviour change techniques. Finally, cancer care clinicians disclosed that they lacked physical activity knowledge for breast cancer survivors and discussed the importance of developing clinician-centred education delivered in a less formal manner. As a result, to bridge the knowledge-to-action gap, it is important to address these domains through future research that aligns with province-wide and centre-specific policy and uses technology in order to reach as many breast cancer survivors as possible.



PRECEDE

Figure 3 Application of PRECEDE-PROCEED model (Phases 1 through 3) to physical inactivity of breast cancer survivors with data sources. BCTs=behaviour change techniques.

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Appendix A: Ethics Approval Notices

Study 1



OFFICE OF THE VICE-PRESIDENT, RESEARCH AND INNOVATION

PROTOCOL REFERENCE # 32094

September 25, 2015

Dr. Catherine Sabiston FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION

Dear Dr. Sabiston,

Re: Your research protocol entitled, "Increasing physical activity and reducing sedentary behaviour: MOVING research into practice Part 2: An assessment of physical activity needs for Canadian breast cancer survivors"

Expiry Date: September 24, 2016 Continuing Review Level: 1	ETHICS APPROVAL	Original Approval Date: September 25, 201: Expiry Date: September 24, 2016 Continuing Review Level: 1
---	-----------------	---

We are writing to advise you that the Health Sciences Research Ethics Board (REB) has granted approval to the above-named research protocol under the REB's delegated review process. Your protocol has been approved for a period of **one year** and ongoing research under this protocol must be renewed prior to the expiry date.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events in the research should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your current ethics approval. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry.

If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Yours sincerely,





OFFICE OF RESEARCH ETHICS McMarrich Building, 12 Queen's Park Crescent West, 2nd Hoor, Toronto, ON M55 158 Canada Tel: +1 416 946-3273 @ Fax: +1 416 946-5763 @ ethics.zeview@atoronto.ca % http://www.zesearch.atoronto.ca/for-researchers-administrators/ethics/

Study 2



OFFICE OF THE VICE-PRESIDENT, RESEARCH AND INNOVATION

PROTOCOL REFERENCE # 31848

August 4, 2015

Dr. Catherine Sabiston FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION

Dear Dr. Sabiston,

Re: Your research protocol entitled, "Increasing physical activity and reducing sedentary behaviour: MOVING research into practice Part 1: An environmental scan of physical activity resources for cancer survivors in Canada"

ETHICS APPROVAL	Original Approval Date: August 4, 2015
	Expiry Date: August 3, 2016
	Continuing Review Level: 1

We are writing to advise you that the Health Sciences Research Ethics Board (REB) has granted approval to the above-named research protocol under the REB's delegated review process. Your protocol has been approved for a period of **one year** and ongoing research under this protocol must be renewed prior to the expiry date.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events in the research should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your current ethics approval. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry.

If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Yours sincerely,





OFFICE OF RESEARCH ETHICS

McMarich Building, 12 Queen's Park Crescent West, 2nd Hoor, Toronto, ON M55 158 Canada Tel: +1 416 946-3273 Fax: +1 416 946-5763 ethics.zeview@utoronto.ca http://www.sesearch.atoronto.ca/for-researchers-administrators/ethics/



OFFICE OF THE VICE-PRESIDENT, RESEARCH AND INNOVATION

PROTOCOL REFERENCE # 31848

March 14, 2016

Dr. Catherine Sabiston FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION

Dear Dr. Sabiston,

Re: Your research protocol entitled, "Increasing physical activity and reducing sedentary behaviour: MOVING research into practice Part 1: An environmental scan of physical activity resources for cancer survivors in Canada"

We are writing to advise you that a member of the Health Sciences Research Ethics Board (REB) has granted approval to an amendment (Received February 9, 2016) to the above-referenced research protocol under the REB's delegated review process. This amendment approval letter only applies to what was outlined in the request form under section 5.a) or otherwise marked in the revised protocol.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events should be reported to the Office of Research Ethics as soon as possible.

Best wishes for the successful completion of your research.

Yours sincerely,



Elizabeth Peter, Ph.D. REB Chair

Research Oversight and Compliance Office - Human Research Ethics Program McMurrich Building, 12 Queen's Park Crescent West, 2nd Floor, Toronto, ON M55 158 Canada Tel: +1 416 946-3273 Par: +1 416 946-5763 chics.seview@atoronto.ca http://www.zesearch.atoronto.ca/for-researchers-administrators/ethics/

Appendix B: Recruitment Materials

Study 1

Recruitment postcard (front and back)



HELP US UNDERSTAND YOUR PHYSICAL ACTIVITY NEEDS BY COMPLETING THIS SHORT SURVEY:

www.icanBEactive.com

Appendix C: Consent Forms and Questionnaires

Study 1 Letter of Information and Consent Form



55 Harbord Street, Toronto, Ontario M5S 2W6

INFORMATION AND CONSENT FORM

Title of Study: An Assessment of Physical Activity Needs for Canadian Breast Cancer Survivors

RESEARCHERS: Faculty of Kinesiology & Physical Education, University of Toronto

Dr. Catherine Sabiston, Ph.D.	Angela Fong, M.A.	Sylvie Moisan, M.A.
416-978-5837	647-965-8635	514-654-3391
catherine.sabiston@utoronto.ca	aj.fong@mail.utoronto.ca	sylvie.moisan@utoronto.ca

INTRODUCTION:

You are invited to participate in this research study that will identify the unmet needs related to physical activity in breast cancer survivors in Canada. You are receiving this invitation because you are a Canadian adult woman who is a breast cancer survivor.

BACKGROUND:

Research findings show that physical activity is beneficial for cancer survivors as it helps to alleviate some of the symptoms associated with cancer and its treatment. Unfortunately, cancer survivors consistently report lower physical activity rates than the general public. We need to better understand the existing physical activity resources available to cancer survivors, and unmet needs related to physical activity opportunities in order to better develop appropriate policies and programs that encourage cancer survivors to be more active.

PURPOSE OF THE STUDY:

This research study will identify the unmet needs related to physical activity experienced by Canadian breast cancer survivors.

STUDY PROCEDURE:

We are inviting you to participate in this study and your participation would involve one (1), brief 20 to 25 minute online questionnaire to be completed at your convenience.

Once you have completed the questionnaire you will be entered into a draw to win one (1) of ten \$20 Tim Horton's e-gift cards. Your odds of winning an e-gift card are 1 in 100.

POTENTIAL BENEFITS:

You may not directly benefit from participating in this study. However, we hope that the information from this study may improve the current programs available to cancer survivors and appropriately meet the needs of current survivors in Canada. We hope that this study will help to build research-community links that will help develop improved physical activity programs and policies to benefit cancer survivors.

POTENTIAL RISKS AND/OR DISCOMFORTS:

As with any research study, there are risks that are not known. While we do not anticipate any negative responses to questions, it is possible that some questions may be interpreted in a negative manner.

CONFIDENTIALITY:

All information collected for this study will be kept strictly confidential. Survey data will be stored at SurveyMonkey in the United States of America and as such, it is subjected to the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (USA PATRIOT Act). Once the survey information is downloaded, it will be encrypted and stored on a password-protected computer by the main researcher, until it is permanently destroyed. Your responses will be anonymous, as we will generate a unique identification code for your responses. However, we will only collect personal information (i.e., first and last name, telephone number and e-mail) for the e-gift card draw at the end of the questionnaire, if you chose to participate in the draw. The results from this study may be published and presented at scientific conferences, however your identity will not be revealed in the combined results. By signing this consent form, you give us permission to use your data in the preparation of published articles and research presentations.

VOLUNTARY PARTICIPATION AND/OR WITHDRAWAL:

Your participation in this study is strictly voluntary. Your may refuse to participate or may choose to discontinue your participation at any time without explanation, and without penalty or consequence. Withdrawal from the study after completion of the questionnaire will not impact any compensation you may receive. However, please note that after you have submitted your questionnaire answers online, we will not be able to identify your data and as such you will not be able to withdraw from the study after you have responded to the questions. You will be informed of any new findings that may affect your willingness to continue your participation.

QUESTIONS AND CONTACT INFORMATION:

Once the study is completed, you can find out about the general study results by visiting: http://physical.utoronto.ca/health-behaviour-and-emotion-lab. Participants can contact the Office of Research Ethics at the University of Toronto at ethics.review@utoronto.ca or 416-946-3273, if they have questions about their rights as participants in research.

DECLARATION OF CONSENT

Your signature indicates acceptance to complete this study and indicates that

- You are being asked to participate in one 20 to 25 minute online questionnaire at one time;
- Your name or contact details will not be recorded and your responses will not be directly linked to you; all data will be summarized;
 - You consent to participate in this research study.
- Identifying your consent will open the online questionnaire.

Your Name:		Signature:	
	(print)		
		Date:	
Researcher Signati	ure:	Date:	

Study 1 Questionnaire DEMOGRAPHIC INFORMATION

- 1. What is your age? _____(years)
- 2. People living in Canada come from many different cultural and racial backgrounds. Are you (check all that apply):
 - Caucasian
 Chinese
 South Asian (e.g., East Indian, Pakistani, Sri Lankan)
 Black
 Filipino
 Latin American
 Southeast Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese)
 Arab
 West Asian (e.g., Afghan, Iranian)
 Japanese
 Korean
 Other (please specify) _________
- 3. What is your marital status?
 - Single
 - Married or living with a life partner
 - In a relationship, but not living with partner
 - Separated
 - Divorced
 - Widowed
- 4. Please indicate how many children you have.
- 5. If you do not have children, please indicate "0" for each category.

Daughter(s)	
Step-Daughter(s)	
Son(s)	
Step-son(s)	

Breast Cancer History

6. What was the date of your most recent diagnosis for breast cancer?

Diagnosis date (MM/YYYY) _____

7. Are you currently being treated for breast cancer, not including hormonal therapies?



8. If your cancer treatments have finished, approximately what was the month and year of your last treatment, not including hormonal therapies?

If you are currently being treated for breast cancer, not including hormonal therapies, please skip this question.

(MM/YYYY) _____

- 9. What stage of breast cancer were you diagnosed with?
 - Stage 0
 Stage I
 Stage II
 Stage III
 Stage III
 Stage IV
- 10. How many cancer diagnoses have you had? _____
- 11. Indicate which medical treatments you have received for breast cancer (check all that apply)
 - Lymph or axillary node dissection
 - Lumpectomy
 - Single Mastectomy
 - Double Mastectomy
 - Reconstructive surgery
 - Chemotherapy
 - Radiotherapy
 - Hormonal therapy
 - Other (please specify): _____
- 12. What was your usual weight, in pounds, before breast cancer diagnosis? Please enter a whole number.

____lbs

13. What is your current weight, in pounds? Please enter a whole number

____lbs

14. What is your height, in feet and inches?

Feet:_____ Inches:____

Physical Activity History

15. Please describe your physical activity levels during the following times in your life. If your current age is in the middle of an age range, complete the question for that particular range.

For example, if you are 42 years old, you would still offer a response for the age range 40-49 years.

	Not active at	A little active	Very active	Not
	all			Applicable
In the last year	1	2	3	4
During	1	2	3	4
<pre>treatment(s) for</pre>				
breast cancer				
Childhood (up	1	2	3	4
to 12 years of				
age)				
Adolescence	1	2	3	4
(12 to 18 years)				
19 to 29 years	1	2	3	4
30 to 39 years	1	2	3	4
40 to 49 years	1	2	3	4
50 to 59 years	1	2	3	4
60 to 69 years	1	2	3	4
70 to 79 years	1	2	3	4
80 to 89 years	1	2	3	4
90+ years	1	2	3	4

16. During a typical week (7-day period), how many times on average do you do the following kinds of exercise during your free time and for how long? Indicate in the

space provided the number of times per week and the average duration in whole numbers:

	Times Per	Average
	Week	Duration Per
		Session
		(minutes)
a) STRENUOUS EXERCISE		
(HEART BEATS RAPIDLY)		
(e.g., running, jogging, hockey, football, soccer, squash,		
basketball, cross country skiing, vigorous swimming, vigorous		
bicycling)		
b) MODERATE EXERCISE		
(NOT EXHAUSTING)		
(e.g., fast walking, easy bicycling, easy swimming, downhill		
skiing)		
c) MILD EXERCISE		
(MINIMAL EFFORT)		
(e.g., yoga, taking the stairs, bowling, housework, easy walking)		
d) SEDENTARY ACTIVITY		
(NO EFFORT)		
(e.g., TV/video watching, video/computer games, computer use).		

17. During a typical 7-day period (a week), in your leisure time, how often do you engage in regular activity long enough to work up a sweat (heart beats rapidly)? Please check one answer.

OFTEN
SOMETIMES
NEVER/RARELY

18. Is there anything else you would like to add about any conditions that list your opportunities to be physically active? Please describe below:

19. What are your goals for physical activity, if any:

Increase my current level of physical activity

Maintain my current level of physical activity

Decrease my current level of physical activity

I do not currently have goals related to my physical activity levels

Physical Activity Resources Preferences

20. In this section, we would like you to rate <u>your confidence levels from 0 to 10</u> (0% is no confidence at all and 100% is complete confidence) in your ability to do the following:

	Percent confidence										
	0	10	20	30	40	50	60	70	80	90	100
Obtain information on how much physical activity I should do each day	0	10	20	30	40	50	60	70	80	90	100
Obtain information on the types of physical activities and/ or exercises that are safe for breast cancer survivors	0	10	20	30	40	50	60	70	80	90	100
Obtain information on how to correctly do an exercise or exercises	0	10	20	30	40	50	60	70	80	90	100
Obtain information on the benefits of physical activity for breast cancer survivors	0	10	20	30	40	50	60	70	80	90	100

Obtain information on how sedentary I should be	0	10	20	30	40	50	60	70	80	90	100
during the day	U	10	20	20	10	20	00	70	00	70	100
Obtain information on how											
to be physically active when	0	10	20	30	40	50	60	70	80	00	100
I feel too tired, fatigued or	U	10	20	50	40	50	00	70	00	90	100
sick											
Speak with my physician											
and/ or medical team about physical activity	0	10	20	30	40	50	60	70	80	90	100
Obtain advice from exercise											
professionals who are	0	10	20	30	40	50	60	70	80	90	100
trained in exercise for	U	10	20	50	40	20	00	70	00	70	100
breast cancer survivors											
Find an exercise partner	0	10	20	30	40	50	60	70	80	90	100
Find an exercise partner	0	10	20	30	40	50	60	70	80	90	100
Obtain support from family											
and friends to become more	0	10	20	30	40	50	60	70	80	00	100
physically active	U	10	20	50	40	50	00	70	00	70	100
Access exercise equipment	0	10	20	30	40	50	60	70	80	90	100
Access places in my	0	10	•••	20	40		60	=0	0.0	0.0	100
community for exercise	U	10	20	30	40	50	60	70	80	90	100
Motivate myself to become	0	10	20	30	40	50	60	70	80	90	100
more physically active	U	10	20	50	40	50	00	70	00	90	100
Find others to motivate me											
to become more physically	0	10	20	30	40	50	60	70	80	90	100
active	_										
Access appropriate, comfortable exercise attire	0	10	20	30	40	50	60	70	80	90	100
Other (please specify)											
	A	10	20	30	40	50	60	70	80	00	100
	U	10	40	30	40	30	UU	/0	ov	90	100

	Very Difficult	Diffic ult	Neither difficult nor eas y	Easy	Very Easy
Advice from my physician and/ or medical team about physical activity	1	2	3	4	5
Advice from exercise professionals who are trained in exercise for breast cancer survivors	1	2	3	4	5
An exercise partner	1	2	3	4	5
An exercise partner who understands cancer	1	2	3	4	5
Support from family and friends to become more physically active	1	2	3	4	5
Peer support from someone who has also gone through cancer	1	2	3	4	5
Appropriate exercise equipment	1	2	3	4	5
Access into places in my community to exercise	1	2	3	4	5
Appropriate, comfortable exercise attire	1	2	3	4	5
Other (please specify):					

21. In this section, we would like to know how difficult it is for you to obtain the following:

22. In this section, we would like to know how useful the following resources would be to help you increase or maintain your physical activity levels:

	Not at all useful	Somewhat useful	Neither useful nor useless	Useful	Very useful
Physical activity videos featuring breast cancer survivors	1	2	3	4	5
Physical activity videos/ video tutorials	1	2	3	4	5
Having a role model for physical activity information	1	2	3	4	5
Brochures and booklets for physical activity material	1	2	3	4	5
Journals for keeping track of physical activity	1	2	3	4	5
Tools or devices to help monitor physical activity (e.g., Fitbit, Jawbone, Garmin, pedometers, etc.)	1	2	3	4	5
Physical activity trainers or professionals available to you	1	2	3	4	5
Physical activity professionals available to call or text for information	1	2	3	4	5
Other (please specify)					

Study 2 Environmental Scan Checklist

Environmental Scan Checklist of Physical Activity Resources for Cancer Survivors in Canada

Thank you for helping the University of Toronto complete this research study.

Please complete the following environmental scan checklist by walking through the BREAST CLINIC of the cancer centre. Identify features of the built environment and record and rate the items accordingly.

Part A. Cancer Centre Information

Cancer Centre Name:							
Main/ Provincial Cancer Agency:							
City: Province:							
Part B. Rater Contact Information							
Name:							
Position:							
Supervisor: Dr. Catherine Sabiston							
University or Health Agency: <u>University of Toronto</u>							
Department: Faculty of Kinesiology and Physical Education							
Signature: Date:							
I loop submission, the researcher will remove this cover page and the responses will							

Upon submission, the researcher will remove this cover page and the responses will remain anonymous.

Environmental scan checklist begins on the next page.

Scan Start Time:	<u>AM / PM</u> (circle)	Scan End Time:	<u>AM / PM</u> (circle)
Part C. Waiting Area			
Quantity coding scheme 0 = None 1 to 10 = Some 11+ = Many		Definitions of quality ratings: Excellent (5) – facility, equipme are clean, safe or clear. Good (2 to 4) – facility, equipme are somewhat clean, safe or cle Poor (1) – facility, equipment ar at all clean, safe or clear.	ent and signage ent and signage ear. nd signage are <i>not</i>

Many 2 C1 Television None Some 1 0 C2 iPads/ tablets and/or computers Briefly describe purpose: [0] None Some Many 2 0 1

Please collect any materials that are available in the waiting areas

ltem

Description

C3	People (e.g., patients and their support) in waiting room	Nor 0	ne	Some 1		Many 2
C4	Chairs in waiting room	Nor 0	ne	Some 1		Many 2
C5	Overall aesthetic of waiting room	Poor 1	2	3	4	Excellent 5

Quantity or Quality

Part C. Waiting Area

Comments:

• Please describe <u>why</u> you've rated the overall aesthetic of waiting room as such:

Part D. Signs, Bulletin Boards and Brochures

Please take photos of all posters and postings and collect any materials that are available in the waiting areas.

Definitions of quality ratings:

Excellent (5) – facility, equipment and signage are clean, safe or clear. Good (2 to 4) – facility, equipment and signage are *somewhat* clean, safe or clear. Poor (1) – facility, equipment and signage are *not at all* clean, safe or clear.

ltem	Description	Presence or Total Please circle or tally			Overall rating of all items, if present Please circle			
D1	Signage – hours of operation of the exercise facility	Yes	No	Poor 1	2	3	4	Excellent 5
D2	Signage – facility rules	Yes	No	Poor 1	2	3	4	Excellent 5
D3	Signs or posters to encourage physical activity	Yes Total:	No	Poor 1	2	3	4	Excellent 5
D4	Notices about onsite exercise classes	Yes Total:	No	Poor 1	2	3	4	Excellent 5
D5	Notices about <u>offsite</u> exercise classes/physical activity/sports	Yes Total:	No	Poor 1	2	3	4	Excellent 5
D6	Physical activity/ exercise brochures or pamphlets are available in the waiting area	Yes Total:	No	Poor 1	2	3	4	Excellent 5
D7	Posters about health, and/or nutrition and/or physical activity	Yes Total:	No	Poor 1	2	3	4	Excellent 5
D8	Were the brochures and pamphlets easy to find?			Very difficult 1	2	3	4	Easy 5

D9	Research studies related to exercise	Yes Total:	No	Poor 1	2	3	4	Excellent 5
D10	Other (specify):	Yes	No	Poor 1	2	3	4	Excellent 5



Taken pictures of all signage and posters Collected all brochures, pamphlets and booklets

Comments:

• Please describe rationale for your quality ratings
Part E. Exercise Equipment

Quantity coding scheme	Definitions of quality ratings:
0 = None	Excellent (5) – facility, equipment and signage are clean, safe or
1 to 10 = Some	clear.
11+ = Many	Good (2 to 4) – facility, equipment and signage are somewhat
	clean, safe or clear.
	Poor (1) – facility, equipment and signage are not at all clean, safe
	or clear.

□ No exercise facilities located at this breast clinic → SKIP ahead to the last page

ltem	Description		Quantity						
E1	Free weights	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E2	Resistance bands	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E3	Cardiovascular machines	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E4	Other fitness equipment. Specify:	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E5	Exercise or yoga mats	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E6	Sports equipment. Specify:	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E7	Chairs	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E8	Empty floor space that could be used for exercise	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E9	Empty wall space that could be used for exercise	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5
E10	Other (specify):	None 0	Some 1	Many 2	Poor 1	2	3	4	Excellent 5

Part E. Exercise Equipment

Comments:

• Please describe rationale for your quality ratings

Part F. Fitness Amenities

Quantity coding scheme 0 = None

0 = None 1 to 10 = Some 11+ = Many

ltem	Description		Quantity	
F1	Television	None 0	Some 1	Many 2
F2	Music	None 0	Some 1	Many 2
F3	Windows	None 0	Some 1	Many 2
F4	Water fountain or water station	None 0	Some 1	Many 2
F5	Mirrors	None 0	Some 1	Many 2
F6	Other (please specify):			

Comments:

Part G. Exercise Facility (-ies)

* Take photo if there are no people in the space!

ltem	Description	Preser Tot Please or ta	ace or al circle ally		esent			
G1	Is the centre off-site from the main cancer hospital?	Yes	No			N/A		
G2	If the centre <u>is</u> off-site from the main hospital, how far away is it? (Estimate)	kn	n away			N/A		
G3	Total floors/levels of exercise facility	Total:				N/A		
G4	Number of floors to access exercise facility	Total:				N/A		
G5*	Dedicated aerobics room/studio	Yes	No	Poor 1	2	3	4	Excellent 5
G6*	Dedicated resistance room/studio	Yes	No	Poor 1	2	3	4	Excellent 5
G7*	Dedicated multipurpose room/studio	Yes	No	Poor 1	2	3	4	Excellent 5
G8*	Cancer-specific physical therapy, rehabilitation, or massage room/ area	Yes	No	Poor 1	2	3	4	Excellent 5
G9*	Indoor swimming pool or therapy pool (circle one)	Yes	No	Poor 1	2	3	4	Excellent 5
G10	Changing room(s)	Yes	No	Poor 1	2	3	4	Excellent 5
G11	Overall aesthetics of facility and equipment	N//	Ą	Poor 1	2	3	4	Excellent 5
G12	Other (specify):	Yes	No	Poor 1	2	3	4	Excellent 5
Part G.	Exercise Facility (-i	es)						

Comments:

• Please describe rationale for your quality ratings

Study 3 Letter of Information and Consent Form (refer to Study 3 for interview guide)



55 Harbord Street, Toronto, Ontario M5S 2W6

INFORMATION AND CONSENT FORM

Title of Study: An Environmental Scan of Physical Activity Resources for Cancer Survivors in Canada

RESEARCHERS: Faculty of Kinesiology & Physical Education, University of Toronto

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INTRODUCTION:

You are invited to participate in this research study that will examine the existing types of physical activity resources available to cancer survivors in Canada. You are receiving this invitation because you are an adult who is employed by a main cancer centre in Canada and have knowledge about the physical activity programs and policies at your centre.

BACKGROUND:

Research findings show that physical activity is beneficial for cancer survivors as it helps to alleviate some of the symptoms associated with cancer and its treatment. Unfortunately, cancer survivors consistently report lower physical activity rates than the general public. We need to better understand the existing physical activity resources available to cancer survivors in order to better develop appropriate policies and programs that encourage cancer survivors to be more active.

PURPOSE OF THE STUDY:

This research study examines the existing physical activity resources available to cancer survivors in Canada and identifies any possible gaps in the available services.

STUDY PROCEDURES:

Part A: Focus Group

We are inviting you to participate in this study and your participation would involve one (1), brief **20 to 30 minute focus group** scheduled at one of your breast tumour board/breast disease site/educational rounds/ or similar meeting. The focus group will be audio recorded and the audio files will be typed out for analysis and evaluation. All

information you provide is considered completely confidential and anonymous as pseudonyms will be used (e.g., Clinician #1, Clinician #2, etc.). The purpose of the pseudonym is to ease transcription. Alternatively, you may also answer these questions in a written format if you wish. The questions will be emailed to you in a Word document and you may answer them at your convenience.

Prior to the scheduled focus group date and time a researcher who is part of this study, will send you a reminder email. If you are willing to participate in this research, you will be asked to sign this consent form.

To compensate you for your time, you will receive lunch during the focus group.

Part B: Environmental Scan

Your centre may be selected for an environmental scan. An environmental scan is an objective review of the current built-environment (physical space).

The environmental scan will involve a researcher walking around the cancer centre looking at the physical space for physical activity resources for cancer survivors (e.g., exercise equipment, a space designated for exercise, presence of exercise experts etc.). Researchers will also complete a checklist of these resources as they walk through the cancer centre.

POTENTIAL BENEFITS

You may not directly benefit from participating in this study. However, we hope that the information from this study may improve the current programs available to cancer survivors and appropriately meet the needs of current survivors in Canada. We hope that this study will help to build research-community links that will help develop improved physical activity programs and policies to benefit cancer survivors. You will receive a summary report of the findings from this study.

POTENTIAL RISKS AND/OR DISCOMFORTS:

As with any research study, there are risks that are not known. While we do not anticipate any negative responses to questions, it is possible that some questions may be interpreted in a negative manner. If you feel uncomfortable answering a particular question during the telephone interview, you may decline to answer this question without any negative consequences. You are under no obligation to answer every question during the interview.

CONFIDENTIALITY:

All information collected for this study will be kept strictly confidential. The information will be encrypted and stored on a password-protected computer by the main researcher, until it is permanently destroyed. There will be no identifiable information in the transcript, recording or environmental scan checklist as your responses will be anonymous as we will use participant-specific identifier (using your centre's province and a number). The results from this study may be published and presented at scientific

conferences, however your identity will not be revealed in the combined results. By signing this consent form, you give us permission to use your data in the preparation of published articles and research presentations.

VOLUNTARY PARTICIPATION AND/OR WITHDRAWAL:

Your participation in this study is strictly voluntary. You may refuse to participate or may choose to discontinue your participation at any time without explanation, and without penalty or consequence. Withdrawal from the study after completion of the interview will not impact the compensation you will receive. You will be informed of any new findings that may affect your willingness to continue your participation. Please know that after the data from this study has been analysed, it will not be possible to remove your data from the study and thus, you will not be able to withdraw from the study after this point.

QUESTIONS AND CONTACT INFORMATION:

Once the study is completed, participants can find out about the general study results by visiting: <u>http://physical.utoronto.ca/health-behaviour-and-emotion-lab</u>. Participants can contact the Office of Research Ethics at the University of Toronto at ethics.review@utoronto.ca or 416-946-3273, if they have questions about their rights as participants in research.

DECLARATION OF CONSENT

Your signature indicates acceptance to complete this study and indicates that

You are being asked to participate in one 20 to 30 minute focus group at one	
time;	

- You accept that the focus group will be audio-recorded and transcribed verbatim;
- Your name or contact details will not be recorded and your responses will not be directly linked to the cancer center; all data will be summarized;
- You understand that an environmental scan may be conducted on your cancer centre;
- You have the ability to save or print a copy of this letter for your records;
- You consent to participate in this research study.

Your Name:	Signature:
(p	rint)
	Date:
Researcher Signature:	Date:
Researcher Olghatare.	Date

Focus Group Interview Schedule with Clinicians

Thank you for agreeing to be part of this research study. We would like to remind you that this session is being recorded for transcription purposes. Please remember that you may choose to withdraw at any point during or after this focus group and that your responses will remain anonymous once transcribed and analyzed. To ease the transcription process, please state your first name prior to making a statement or comment. You may choose to use a pseudonym if you wish.

Engaging Questions

- 1. In general, how would you describe your current level of physical activity (PA)/ exercise?
 - What types of activities do you enjoy?
 - How often do you engage in them per week?
- 2. Is talking about PA and exercise important to you and your patients?
 - Why? Why not?

Main Questions

- 3. What programs, services, or resources are available at your hospital that help you discuss PA and exercise with your breast cancer patients?
 - Program examples: Cancer Transitions, Wellspring, YMCA
 i. Can you describe the programs at your hospital?
 - Are you given any materials or tools to help discuss PA and exercise with your breast cancer patients?
 - i. Do you use them? How do you use them? Which part do you find most helpful?
 - ii. Can you describe these tools? What part is most helpful for you?
 - Are there any resources that you would like to have so you can discuss PA and exercise with your patients?
- 4. What tools, materials or resources would make it easier for you to discuss PA and exercise with your breast cancer patients?
 - What tools, materials or resources would you like to see developed?
 - What are your thoughts on a podcast to help you discuss PA and exercise with breast cancer survivors?
 - i. Would you use it? Why? Why not?
 - *ii.* How long of a podcast would be ideal?
 - iii. What information would be important to you?
 - iv. Who do you want to hear this information from?
- 5. What training have you had regarding PA and exercise?
 - For example, online training modules, CME credits, workshops, conferences

- Where was it? When did you acquire this training? Do you feel it was enough?
- What type of training would you like to see?
- 6. Who are the people who should be discussing PA and exercise with breast cancer patients?
 - Who would be the best person if you had to pick? Why this person/ why these people?
 - Who would be the least qualified person? Why this person/ why these people?

Closing Question and Remarks

We're just about to wrap here, but before we do I wanted to thank everyone today for contributing to this discussion.

I wanted to let you know that these are all the comments and questions we have – is there anything that you'd like to add? Is there anything we missed?

• If $\underline{no} \rightarrow$ stop recording and thank everyone again

Appendix D: Additional Analyses and Raw Transcripts

Study 1

Table 1

Complete Sociodemographic and Cancer History Variables of the Breast Cancer Survivors (N=201) completing the needs assessment self-report survey.

	Mean(SD) or %
Age (years)	54.0(13.4)
Province	
Ontario	50.5%
Quebec	9.5%
Alberta	8.9%
Manitoba	8.9%
Nova Scotia	6.8%
British Columbia	6.3%
Saskatchewan	3.7%
Prince Edward Island, Newfoundland and New Brunswick	<u><</u> 4.1%
Ethnic background	
Caucasian	87.8%
Other or Multi-ethnic	5.8%
Chinese	4.8%
South Asian, Black, Latina	<u><</u> 1.5 %
Marital status	_
Single, separated, divorced or widowed	29.5%
Married, or in a relationship	70.5%
Number of children	1.58(1.39)
Post-treatment completion status	90%
Breast cancer stage diagnosis	
Stage 0	2.5%
Stage I	21.8%
Stage II	43.7%
Stage III	26.9%
Stage IV	5.1%
Time since cancer diagnosis (years)	6 5(6 2)
Number of cancer diagnoses	1 22(0 5)
Time since treatment (years)	6.0(6.4)

Table 2

Correlations Between Sociodemographic and Physical Activity and Sedentary Behaviour Data for Breast Cancer Survivors (N=201)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age	—	.50**	14	.01	.06	01	29**	08	07	.01	.15*	.15*	.06	.06	.01	05	.08
2. Time since diagnosis		—	16*	.02	.01	.02	13	30**	21**	02	16*	.09	.08	03	01	.04	02
3. Cancer stage diagnosis			—	.04	20**	.46**	.13	.27**	11	02	.02	14*	04	.01	11	.05	10
4. Lymph or axillary node dissection				—	.08	.14*	.06	.06	.15*	.09	02	05	05	07	12	.02	.10
5. Lumpectomy					—	69*	13	.35**	.02	03	04	02	.06	.06	02	07	.15*
6. Single or double mastectomy						_	32**	.20**	.10	21**	.03	.03	.05	.07	04	05	03
7. Chemotherapy							—	.21**	.01	.05	03	25**	23**	09	05	01	.10
8. Radiotherapy								—	.06	04	05	03	13	01	01	10	.03
9. Hormonal therapy									—	.02	12	.02	15*	09	08	06	01
10. Current BMI										—	19**	18*	10	14	12	04	.01
11. PA last year											—	.16*	.28**	.15*	.29**	.27**	06
12. PA during treatment												_	.44**	.05	.25**	.10	09
13. PA after treatment													—	.13	.22**	.21**	10
14. Weekly light PA minutes														_	.18**	.03	.09
15. Weekly moderate PA minutes															_	.07	.02
16. Weekly vigorous PA minutes																_	02
17. Weekly sedentary minutes																	_
		*	04														

Note. PA= physical activity. **p*<.05, ***p*<.001.

Study 3 – Raw Transcripts

Focus Group for ON4

Facilitators: AF and SSK

Transcriber: AF with editorial notes in square brackets

Numbers represent participants.

Acronyms: PA = physical activity; BC = breast cancer; BCS = breast cancer survivor(s)

Attendees: 1 medical oncologists (BD); 1 GP in oncology (TD); 1 rad onc (JS) 2 nurses (PC, PH)

[AF introduces topic, will not transcribe this section since it's not important and JS had questions about receiving the information from this study later]

AF: Here at the JCC, what sort of resources, tools or programs are available to speak with your patients about PA?

JS: Do you want me to start?

laughter

AF: Don't be shy.

JS: So we, umm, we have had for the last few years an active physiotherapist here. So, again you want to separate exercise from rehab, yes?

AF: Ideally, yes.

JS: Because there's a little bit overlap in that way. They certainly have space here on the rehab floor for conditioning and one on of the hospital ward as well. It's a small space mostly for in-patients. There's nothing at the cancer centre. What happened, about close to 10 years ago now. A special relationship was made with the Y[MCA]. And there's a program in Hamilton called Can-Well and basically, its run by the Y. There was a little bit of start-up funding for it. And it's a place where individuals will be able to participate in a fairly generic, but somewhat customized exercise program. Supervised by individuals there. Minimum cost to patients, it's sort of given as a free service.

The other is in Hamilton, if you talk to places in the GTA you know about Well*spring*. In Hamilton we have something called Well*wood*, which is community-volunteer. They will on occasion have things there. Most of it is more so yoga as opposed to full-on exercise. This individual has been doing some research and survey work here. We do actually have an exercise prescription that he created. So in some of the clinics there is a little pad that we can actually fill out and give to patients as well.

Others can comment on whether they see it in clinic or if they see it being used. It's sort of variable, but it's here.

BD: Yeah, it's in Clinic D because we've used it in our breast clinics there. But it's not in Clinics A or B. But I think it reflects the volume of who's here. Can I clarify, are we just discussing breast cancer patients?

AF: Yes we are, because the grant is coming from the CBCF so we have to stick to breast cancer.... Sorry, Clinic D is specifically for breast cancer?

BD: It's where many of our BC patients are seen in follow-up or will be followed-up. Quite honestly I'll see them in Clinic E when they are in chemotherapy and that's often where the discussion will happen. Where women discuss weight gain they're having on treatments and what they can do. And we'll discuss strategies at this point, what they can do what they have done up to this point. What they could potentially take part in. And lot of it dependent on the side effects of the treatment. If they feel well enough.

So, certainly we're going to mention the Wellspring program. The restorative yoga is one that a lot of patients seem to catching onto. I think it allows people to come in and participate to their ability levels, which they like. So if they're super-duper people they can do one thing as opposed to someone who might able to do some of the light aspects of it.

I find one of the challenges is because our catchment area is quite broad. I can only speak to the resources here like Can-Well, ENCORE, the Y. Some of the resources here. Sometimes struggling to say okay in some of the periphery in other area, Brantford, Welland, etcetra. Nothing that I don't think there are resources, I'm just not aware of them. So having that in clinic sometimes involves a bit of a Google search.

AF: If I were a patient coming in from Welland or Thorold, what would you tell me in that situation? If I were asking for exercise resources.

BD: I'll get back to you on that...*laughter* We will look into that...no. We talk about Y or some of the local resources.

TD: I think getting a history of what they are using and get them to continue to get what they're using instead of starting something new. It's really important. The other thing is that Wellwood does have an office in the hospital even though the centre is removed. People can go in while they're waiting during the wait time and go into check out resources. And that's really helpful to have something onsite.

AF: The Wellwood centre that's here, is that for questions? They're not conducting an exercise program?

JS: They have some space here, it's more so for psychosocial. They do some mindfulness work. They don't really have enough space to do exercise as a group. So I wouldn't say exercise per se.

There was one other program that was here and it's kind of gone and dissipated now. It was MacWarriors. The School of Rehab Sciences, Cathi's colleague there I think, probably started this up. It was specifically for breast cancer. It was, just by the name, I guess, designed to be more intensive. Some of the kineisiology folks there had produced a lot of materials that were given to us. I had a couple of patients who went there and really liked it. The problem was that it had to be paid for, they had to charge for it. So other people paid out of pocket, some people did have coverage because I think they can bill it through insurance, through physiotherapy billings. But that was pretty successful for people who wanted it [exercise] to be intensive. It was the university so there were issues with the location, parking and that kind of stuff. Whereas at the Y and Wellwood, parking is free.

AF: So what I'm hearing is that there are pretty good resources. But in the greater Hamilton area, it's difficult to know what sort of resources are available.

Are there any sort of materials that are given to patients. Perhaps in their discharge papers or any sort of pamphlets that are your go-to?

BD: In Clinics, there are the Wellwood pamphlets. But I think when people are discharged from clinic, there is a one line blurb that says to eat right and exercise without any specific discussions. But I think there is a link to a website.

[Many voices at the same time]: Yeah there is.

JS: It's on the care plan. So we do a transition care plan here. So for people who stay with us they don't get that which is another interesting discussion. But for the population, a lot of cancer centres have been actively looking at identifying people who have completed treatment well enough to not really have to see us and go back to their family physicians. So there is the summary plan or synoptic plan and part of it about lifestyle. Most of them do reference...I know that ours was updated recently to include the CCO [PA] guidelines in that cancer patients document. I don't know that it [CCO PA guidelines] has a cancer patient facing yet. There is a full document and summary which is a bit cumbersome.

PH: Exercise though is discussed up front. From the start. It's in the original teaching package when they start chemotherapy [educational classes]. And we do discuss it with them in the teaching class. Some of them are quite active and they want to know if they can continue [being active] in their treatment. So it is discussed up front with them as well as healthy eating. It's all done in the teaching package and in the class with them.

JS: That's interesting. We don't have anything like that in radiation because we don't really do classes like that so that's really interesting.

BD: Those [educational classes] are just people going on chemotherapy. Those who are hormonal therapy alone, or radiation aren't getting that [educational class and materials].

JS: And with fatigue being a huge issue. I've started to wonder how to get that systematically put in place.

[some whispering that AF can't make out]

AF: It's interesting to know that in the chemo classes they are discussing it. I guess it means that there are some women who are not captured in that. So if we were to then design some sort tool or program or stepwise system that would hopefully capture a bunch of different BCS, what would that look like?

PC: You know the Look Good Feel Good program? There is always lots of positive feedback about that program. People enjoy going. Part of feeling good is exercising too, right? It's not just hair and make-up. Maybe that's an area that you can get it on. Or at least start the discussion.

JS: There's different ways. You'll know because of how you ask people. Do you make it a traditional toolkit or do you market it because it's wellness. Usually most of the stuff we give, particularly patient[-centred] stuff. It's boring, usually a form with titles. Part of it is constrained by what the hospital says we can use, but one thing I would say is that if someone was able to create a patient, or parallel document to the exercise guidelines [CCO] that was patient-friendly. I don't think CCO is going to do it at this point. That would be helpful. And I think the other thing, is that we as providers can talk about the general recommendations. But people are asking for specific things like how much walking. Like, what should I do? Having something that has graphics on it. Like this much walking, or this much biking. Like, we say 150 minutes, moderate and you're supposed to spread it about three times per week and a couple times you're supposed to add resistance. But what does that mean? For example, an older person it's like you know, go to Fortino's and carry the shopping bags. Stuff like that, that's pragmatic. Because the other thing I wonder about is the issue of making exercise something separate and an event. Versus strategies for incorporating it into everyday life where people are doing it without even thinking about it. Stuff like you know, use the stairs instead of taking the elevator. Little things. So having something that is interesting to look at that gives that story would be helpful.

AF: So would that be a document type thing or an app?

JS: I think multiple ways of getting at it. Again, there's been a lot of investment into apps for symptom management at the CCO, we have a whole menu. So having something there for exercise would be great.

TD: Maybe having something that is tailored to the individual. If you give them this is what you should be doing, you know reaching 150 minutes per week, they're so overwhelmed. They might have arthritis and they can't get up and do anything. Then having something as a starting point is reasonable. I don't know if that's been done.

JS: Is there anyway someone can sit a computer and say here's how old I am, here are my medical problems, here's what I can do now and they get a menu and they can click on you know...

BD: Here's an exercise prescription.

JS: But you know I can do this, this and this. And it [exercise menu/ computer program] says at the bottom it tells you that "you would've done this many minutes of moderate to vigorous."

AF: So it gives them an idea of where they are right now.

JS. Yes and then they can look at what the gap to what the recommendation is. It's like a retirement planner. Where you put in how much you've saved and I have this much saved a month. And they [retirement planner] say this is where you're at and you're on track and this is how much you need to save. And here's what you can choose from in terms of what to do, like walk more, swim.

AF: Do you think patients would patients would fill that out. Whenever I walk into a cancer centre I always see the ESAS and things like that would that be something additional that patients would want to do?

BD: These are the logistical challenges in clinics. I think part of the logistical challenge would be what is the venue, what is the best method of delivery and there are issues with clinic flow. You know if patients have a top heavy, if they have to fill out all this stuff then you can't get them into the clinic to discuss all this stuff and actually see us. So I wonder if some of this stuff should be done before they actually get here. Some things could be mailed out and recognize that some of our age group may not be as web savvy and do this. I think trying to do it in the cancer centre is asking a lot and the likelihood is that you might not get the completion rates. And you might not get them outside either, but there's too many other things that factor in. The dilemma is that you have the age range where there are young people who are very comfortable with apps and whatnot. So you probably have to look at a strategy that has many different methods. Some people still like paper. Some people still like this is what you're going to do, you're going to take the stairs.

JS: But I think this is really the golden exemplar of self-management. Where, really, my role is not to sit and spend 20 minutes developing an exercise prescription. I'm not an expert. My role is have enough training to know what is safe from the menu that's in front of me. And use it to your own design and I will encourage you. From an oncologist perspective, I know it's an important adjunct for sure, but there's a lot work being done around empowering individual patients and patient self-management. Patients are always asking, what can I do? What can I do? The easy answer is take a pill, everyone wants to hear that. The hard ones are figure out how to get proper sleep, you know and the mindfulness issues, the dietary issues, the exercising issues.

AF: So there are a lot of lifestyle behaviours that need to be tackled.

PC: I think if you can start it right off the bat, you know because when they've had breast surgery they're given an information sheet [about exercises to do] for range of motion. Especially if they're beginning radiation because they have to be able to hold that position. So building on that and saying, ok you need to do this as part of your recovery, but if you incorporate a little more every day that might help with your energy and your fatigue. Starting it [discussion about exercise] right from the beginning so that it's constantly being reiterated.

And even linking them with the apps out there. There's lot of exercise apps. You can do 7 minutes and it's on your phone and it's not so overwhelming.

[Many voices agreeing with her statement]

BD: But I think it gets to the whole issue of self-management whether we're talking about patients or everybody as a whole because people are bringing in their own you know, whatever their behaviours were before their diagnosis. Do you take this diagnosis with all the bad that comes with it, but also take it as an opportunity to look at some of your lifestyle things and make some choices.

At that first visit, you know, I'll say you'll be tired during chemotherapy and whatnot and one of things I want you to do is try to walk everyday as much as you can. You try to determine how much you can do. The worst thing you can do is lie there on the couch because your muscles are going to atrophy. And studies show that people who are exercising even a little bit do seem tolerate their treatments better. So it's tying in from the get go that this is part of the expectation. Then the whole family hears it, "mama isn't supposed to be sitting on the couch the whole six months of chemotherapy."

AF: So I'm hearing that people need to hear it from the beginning and that there needs to be iterations throughout the various treatment points. And I like that there's a sentence about lifestyle behaviours in their discharge kit or package. That's really good to hear.

TD: I think we don't want to be writing the specifics of exercise. The idea that of a generic prescription for exercise is important because it shows that it's all part of the treatment. It has the same seriousness and just like smoking. [can't understand this one sentence]. It's important.

PC: And if they get hooked up with insurance, like the MacWarriors program or whatever, I know that insurance only has so much, like \$300 or whatever, but at least that's a start. It gets them there and maybe that'll continue. You don't have to have a membership or a physio to make you do exercise. But it's a good start.

When we ask them about insurance for drugs we could tap into that for physio or exercise.

AF: We were also discussing in the lab, developing a podcast for health care providers to give them scripts and tools to talk about exercise. What do you guys things about that? Would it be something that's useful or not useful? What would you like to see?

PC: Would it be for staff?

AF: Yeah, it would be for staff. For example, it would tell you what is safe for a BCS. Maybe have some things like here's a distilled version of the CCO guidelines. For oncologist, we can say here's a script of an oncologist who's had a discussion with their patients so that you now have the words.

BD: I think you need a brief here's the salient points version because you're going to have variable interest. So the longer you make it you're not going to have anyone right? It's like the guidelines, you have the 5-page summary and the 78 page document.

JS: I also think there are sort of natural ways to group individuals who are interested. For example, you're getting people at the end of a multidisciplinary case conference and you could do little educational updates. So I could see us doing a 15-20 minute thing, so I could see us at one of our MCC rounds, because conditioning is such an issue and intolerance of chemotherapy. I could see us getting thinking more about it. If we had something like that we could get a mix of individuals, watching something like that to get us thinking about it.

PC: What about something at the Bright Run. Some sort of advertisement or...

JS: Although you're preaching to the converted there...

[Many voices talking and discussion about the Bright Run that's mostly just funny banter. Will not transcribe]

PC: It might be the first time they've' conquered the 5K. And they're bringing their family and their other people and the other people who are going to encourage them.

AF: Well there are usually an audience, spectators at the run. So maybe for someone who is going to watch, it could be an encouragement if we had an ad.

TD: Life After Breast Cancer is another conference that we could sit in.

JS: When you're talking about a podcast, would you think of doing one that could be looked at. Is it something you could see doing one that could either work for both providers and patients. Or do you think you kinda need to do two different ones? AF: From what I've been hearing we need to do two. That's not to say that a BCS downlaod the health care provider version.

BD: What would be the different information? It's like the information on the website, you've got the one patient version and the health professional version. A lot of patients click on the health professional version because it has a lot more details and the references and the data to back it up.

JS: I guess the only other thing, we did a survey of all the providers with attitudes, beliefs, comforts and barriers. And one of the things that came was that no one is going to argue about the benefits of exercise, it's the safety. And in particular, as you move through the spectrum of providers, there's less of a concern on from nursing and physicians. But one group we talked to was radiation therapists. Because people come to radiation and spend a lot of time with the radiation therapists. Like a guy with prostate cancer will spend 40 minutes with their radiation therapist. So we started asking, why can't those people be encouraged to exercise. And get them to exercise. But they [r. therapists] were a little concerned. Do they have clearance? If so, how do I get clearance? I think on the provider-facing one [referring to podcast], again see what you can get. It's not so much that I need to see the evidence that it's effective. We know that there's nuances about how to do it. It's more... how to get people to do it and showing that it is safe. Even about which providers can recommend it.

AF: I'm hearing safety concerns from patients. What's proper or allowed within their limitations, but also protecting the provider themselves from perhaps saying incorrect or for thinking that it's too outside their scope of practice.

JS: And the other thing is even if there's a way how to assess somebody. Is there a way to test them and a checklist that we can go through. For example, if they want to be active but they have a lot of problems, maybe they are better off on a recumbent bike. You could say lower extremity problems and you can't walk. So here's how you assess. That kind of thing would be very helpful.

BD: I think you have to also look at treatments. I think this is very important for people who are only in one aspect of care. For people who are on aromatase inhibitors we worry about bone loss and mineral density. We want to specifically talk about weight-bearing exercises. We might talk to them about swimming for range of motion, in terms

of maintenance of the upper extremities, but that's not good for the maintenance of bone mineral density. How much weights. Or what qualifies as a weight-bearing exercise. So those are some of the nuances that are very patient-specific to the therapy. To their diagnosis.

JS: It would be helpful to us because the we know the menu.

AF: I keep hearing this idea of a menu. So maybe something that has different abilities of what they're able to do prior to their diagnosis, or around the time of Dx. And what their limitations are and the medication that they're on. So a menu that says my age, I'm a survivor, it's stage 1 and I'm on chemotherapy so here the exercises I can do with those three factors. Something like that?

PC: The other professional service I'm thinking of too is social work. Are they preaching that too? Do you know the benefits that can help with depression? It's just another avenue.

BD: But then the patient says, "if one more person tells me about exercise... My family doctor is always telling me to lose weight" There's a reason for that.

PC: And that's why they're depressed.

JS: But you should be exercising. Even if you don't lose weight, you're still healthier, right?

AF: Yes, exactly.

PC: You're right, it's just one more thing to hear.

AF: Maybe that's a good thing to hear it from many people. Just to kind of summarize, I'm hearing that everyone hear is more or less talking about exercise. Patients are hearing about exercise at various time points of their cancer journey. But we're looking for more specific resources about types of exercises, where patients are at the moment and where they need to be to get them to gain health benefits that we see in the research. That might look like a multi-platform menu-like, checkbox here's what you should be doing. Essentially what we're looking for is more of a direct here's what you need to do and we're hoping that spawns more habitual and continual behaviour. Is that a distilled summary?

PC: Like take away things, right? Take away and read on their own.

[Many voices agreeing and "mmhmm"ing]

PC: Or a list of websites they can go on or something.

AF: What I've heard from previous focus groups is that some individuals feel that health care providers might not be the best providers of this message. What are your thoughts on this?

BD: I would agree with that because we don't have the training. There's a time issue. There's only so many things we can talk about in the time with them. And there's certain aspects that only we can talk about like the very specifics of chemotherapy and the side effects that they're not going to hear from elsewhere. So it's the issue of prioritizing what we're going to talk about in those 5 or 15 minutes. Not that this isn't important, but where should that messaging be coming in, I think that we should still be reinforcing it and making sure that people see the importance of it. And point them out to the resources that are available.

AF: Ok, so you're like a messenger in a way, but you direct them to a resource.

BD: This is important, you need to follow up on this and this is how you're going to do that [follow up].

AF: Another thing we were grappling with in the lab was say, having a registered Kinesiologist sit in the waiting room. How would you feel about directing patients to the R. Kin.

BD: It's quite resource heavy and it depends on the interest and is it cost-effective.

TD: What about the screens in the waiting room?

BD: Yeah. We've got our TVs.

JS: Can I throw a cheesy idea out? Everyday we have someone in the atrium playing the piano. What if someone did a 10 or 15 minute exercise blitz. And anyone just standing around including staff. And we just do something. You'd have to think about it in a less cheesy way. But it really is a let's get moving thing.

BD: You'd have to clear it through hospital legal.

JS: Part of it just raising our awareness.

PC: There's a lot of groups, like a Zumba class. The lady who did my Zumba class does a lot of community service type stuff. Someone like that could come in and do a 15-minute [session].

JS: Part of it is it just makes it fun. Again, I don't know how to explain it. It's just like changing our rhythm, changing our culture, changing the way we think. If it were something that were... if you have staff and patients. Ok, step outside myself for a bit,

instead of being the guy who's there talking about radiation and now being the guy who's doing something cheesy with them, it's good for me too.

What's interesting was our survey was we did the Godin scale [explains the scale]. The strongest association to knowing about, recommending and feeling comfortable about recommending exercise was in people who scored higher on the Godin scale. So in a way, if we exercise more we can get people exercising more too. It's like thinking about should part of the intervention be directed at us.

[Voices of agreement]

PC: And with that venue, you're going to get patients, you're going to get staff, family. You're going to get everyone exposed to it.

BD: It's a good idea.

JS: Even if it's not physiological, even if it's just 5 minutes.

TD: The new cardiovascular guidelines are saying basically get up and move around. There's apps that say it's time to stand up and move around your office.

JS: Yeah, drop your sugars, right?

AF: Are there any sort of last minute points that you maybe...

PC: Another area to reach staff is a lunch 'n' learn or something. You could come in and do a lunch 'n' learn and expose more people to what you're doing.

AF: Great, I like that idea.

PH: Or the nursing meeting, Tuesday at 8:30.

BD: Or give Oncology Grand Rounds on Thursday so there's lots of broad audience.

Focus Group for ON8

Facilitators: BS and SSK

Transcriber: AF with editorial notes in square brackets

Numbers represent participants.

Acronyms: PA = physical activity; BC = breast cancer

BS: We're trying to do study to understand what physical activity resources are available to you to help discuss PA and exercise with breast cancer patients (BCPs). So this is one arm of a multi-phase study. We're looking at the actual pamphlets and paper materials that are available to people and looking at websites. And an important piece of it is what you feel is available to you and to see what resources are available and what you would like to see to make it easier to discuss breast cancer and exercise with BC patients.

[goes into consent process- did not transcribe it]

BS: Is exercise and PA an important conversation topic is it even worth it for us to research and examine further. Is this something that you see as in important to discussing with BC patients.

3: I think it's incredibly important and I support it. And I think we need resources for discussing it.

BS: What resources are available to you to ease that conversation and discuss exercise and PA with your patient.

[Discussed who would be which pseudonym – not transcribed]

1: there aren't any resources. I've never seen a single pamphlet, poster, anything. It's just not part of...

6: Umm actually

1: Which doesn't make it right

6: There is something we handed into the patients. That is a booklet for...with information about BC and every day, some exercise instructions within that booklet.
1: To have around... "azula" [I'm not sure what she's saying here] and post-operative or this around general cardiovascular...

3: No, no it's full stop exercise.

BS: Ok, so...

1: So I think in the post treatment – be it surgery, chemo, radiation, any combination of the above. There, I cannot think of any literature that exists. So the survivorship program that uh...recommend those we just heard a little about last week, admittedly for me, for the very first time. And I think there are a list of resources perhaps in the community that people may be able to look up themselves

BS: So if that exists it's not used extensive by any means. Ok.

1: You talk about general cardiovascular exercise as opposed to specific physio exerciseSSSS [emphasized the end of the word].

BS: No, so any movement of the body to maintain or improve health. Not just gym-going or anything so uh...

2: So, umm we have a counseling transition program which does include bringing in exercise into their 8 week program. I dunno, XXX, you're here.

5: Yeah, so that's where some breast cancer patients who decide to go they have uh, a 2 hour session on exercise with a physiotherapist.

BS: Ok and that's offered to all BC patients?

5: Completing therapy here.

BS: Completing therapy...

3: The only actual number that register per year is probably 36 total so it's not....

5: Yeah, 36 per year. The general patients are told to get about 3-5 hours of moderate exercise per week and that's about the main part of the guidelines.

BS: I see, ok

3: That's part of our general education to breast cancer patients who complete treatment.

1: Except that we also discovered that it's a portion of those patients who got chemo therapy were going to be followed through you.

3: Who were seeing the medical oncologist.

1: Those who have only seen a medical oncologist from an outside centre are not getting the same information. So number 9 has recently come out of residency right? You're the most recent out of residency.

9: Not in the uh... not in my residency program, no. There was nothing said from the onset. And as a surgeon I don't ever get to discuss the significance of exercise after surgery because that's the main part that is dealing with the cancer. And that it's so overwhelming that the focus is on the care. And then surviving that and then going the rest of the treatment which would be chemo, radio, and it's...that part of PA is so far from the surgery that I don't get to talk... I don't know if there are any resources. And I really don't know how to implement that in my [emphasis] practice. I know in the whole system it should probably be involved. And it should be included somewhere.

BS: Mmhmm... and would you to? Or do you see that as someone else's role. It seems like that the resources already are kind of giving them the information or giving them a program. But it's not the people in this room that is specifically talking about the...

9: I don't see a specific point in me discussing that in the patient. Because they are so around in the process of the cancer that probably they are exhausting them. That is...I think that's part of the recovery that should be implemented in that part. Usually when the patient, when they get there they don't see me on that um... regular basis for me to be involved in...to actually encourage PA.

BS: Ok, so what would you like to see if they wish to have a program to be referred to and get at exercise information elsewhere? Yeah?

8: I do personally discuss with my patients after they complete their treatment...uh BS: Great.

8: But typically they are going on with ACE-inhibitors, but generally I talk to them about importance of exercise and the fact that there are many observational studies that have shown the decrease in recurrence rate in people who tend to exercise more, but I uh don't have any resources to refer them to.

BS: Ok...do you...do you want resources?

8: Absolutely.

BS: Do you think that will help to facilitate

8: I think that will be very helpful.

BS: What do you think that will look like? Like what should we look to develop that will help you.

8: I think you know sss...sss I don't know the extent of how much we could give them in the survivorship program. But it's something educational. And uh, maybe uh, places where they can do to and give feedback to us about how they are doing with their exercise programs.

BS: Ok uh, maybe community programs uh... is there a patient resource library? [Many voices that I can't discern]: Yes.

BS: So uhh... send them that. What about something like a podcast. Would that be something that you would want or that patients might want?

[According to the notes during the focus group, 3 members are shaking their heads]

8: I don't know how effective a podcast would be. If there was some research to show that it is really effective in motivating to get into an exercise program.

BS: Would it be helpful?

5: It might be nice to have something that's modified or... patients who have surgery are fatigued and whatever. And it would be good to have a list of community resources where they might be modified exercise programs with people with clinical diagnoses. BS: Ok.

5: Or a rehabilitation clinic.

BS: I see. So general thing I'm hearing is that other people. Is that to refer to them to an exercise program in the community. So it's what resources they have tailored specifically for breast cancer patients. So umm...

3: Or not even just breast cancer. Or maybe modified for people who've just had surgery. Or maybe a lower activity tolerance to start with. Even if there were an interim program within the hospital there's a 12-week program that patients could register and be referred into directly.

BS: Yeah. What about facilitating the conversation. Like, how many people are enrolling in those. When you give people the option to enroll in the program, are most of them doing it? Because the research we're finding is that most people aren't active. They're not choosing to go do it. So what could help you with that conversation to encourage them to be more active?

4: Most of the patients that are here, we tell them that there's a reduced chance of the breast cancer if you lose weight X amount of weight within six months to one year. That motivates some people but not all of them. Like a small proportion.

2: It's all ad-hoc discussions. It depends on the physician who's treating you as to whether you're going to get that discussion. So I try to have that discussion with all of my patients. So all the primary, secondary are reduced. So stress relief techniques, nutrition, exercise, vitamin D and sleep. These are the five things that I talk about. But there's no set place to do that and in fact, some of our team and XXX are looking for that education as a set thing for all patients. Not just individuals necessarily. There has to be some set survivorship resources and that's what we're aiming to do, but you know... we're only just starting down that path. So to have some resources that you can hand to your patient that say these are the things that are available in the community, that's one piece. The second piece is the education part, there's 60 studies in BC that show that if you do 30 or 15 minutes of exercise, every day or 5 days week will reduce your risk of 30% or sometimes 80% in some studies. And that if you have BC, that you'll reduce your risk of BC recurrence. So you know, you have to educate them by educating your staff with these studies. So as XXX said, we're not trained in residency in nutrition or exercise or any preventative things and this is a huge gap. So yeah, we definitely need something.

BS: So great, so almost you need an educational resource about the information specifically and a second resource with community programs and also referral to go see these people for further, for more detail.

2: Yes exactly and also to educate the healthcare team. You know... you don't know either.

BS: Are there workshops and continuing education for team?

[Participants 1 to 3 are shaking their head "no" about workshops on exercise] 1: No, not for that. It's considered you know, soft for...

BS: Is it wanted?

2: Yeah, I think we should have it. It doesn't matter if we want it or not.

1: And I do think having a formal program to refer them to... I also work at Princess Margaret (PMCC) where they are doing a study right now based in exercise. So exercise for patients who have come through BC treatment. And the intervention is actually technology-based. So all participants get an exercise program and half of them get reminders via email and text message and that type of stuff. So it's specifically looking at technology. But the amount of buy-in I have from patients in terms of the 12-week exercise program that we're offering, 12 weeks, 1 hour per week. They have day time sessions, evening sessions. At least 50% of my patients say yes. Many of them are ineligible because the criteria for the study is really geared for those who have zero PA. So if you walk more than 3 times per week for 30 minutes...

BS: You're ineligible.

1: You're off. But so, less stringent eligibility criteria and a formal exercise component. 50% of my patients are saying yes, they're so used to coming. And especially if they're so used to coming for treatment and chemotherapy. They feel sort of lost when they're out of our system. [laughs]. And so having a 12 week program and they get to come and still have a connection to the centre. Might have multiple benefits.

BS: I see, it's that connection to the centre versus something that's structured and tailored. Something for them to cling to. That's good to know.

1: If you put together like a fact sheet that's for both patients and physicians that says, you know, there are this many studies showing these benefits blah blah blah. You know for half the providers at least, it's news to us. And it's something that patients to show why, you know, they should consider registering in some program.

4: The other thing that I mention to patients is that when they start on ACE-inhibitors and Tamoxifen, if you exercise you have less chance, you have better tolerance to the side effects. For example, cardiovascular side effects, strokes. So if you don't do anything else. At least you will prevent yourself from having high blood pressure, diabetes, all these other things that come with weight gain.

BS: Obviously there are positive benefits, I see. Any other comments about ex?

5: We do things, like in the course they do, one of the things they do is that everyone gets a pedometer. And it's a kind of a motivator. So sometimes a motivating tool. So if you can think of something to give everybody or...

BS: Ok, so things like that to help everyone track their exercise and get feedback and measure how much they do. Ok. Were there any other resources? Before we wrap up? Were there any comments? Or things that we missed? We're trying to understand what resources are available to you to help facilitate the discussion of exercise and PA with BC patients.

1: The other thing is the primary care community out there who more and more cancer centres are depending earlier and earlier and involving them in primary care. I think

that's a big gap. I mean, they generally preach exercise for lots of different reasons, right? Like blood pressure, diabetes, weight control in general. But I think if there was a target educational, you know, interest you know in targeting them in saying exercise not only helps blah blah but also in BC survivors for instance, like that's a gap in a our system wide approach.

BS: Ok, so ok, to go more general in our approach.

1: Less and less, the 5 and 10 year follow up of Mrs. Smith in a BC, in a regional cancer centre is ending. We're no longer hanging on to patients for the length of time and more and more family practices involved in coming into the care sooner. And you know, transitioning these patients back into, into the primary practice without any contact with the cancer centre.

BS: Ok.

1: So I think that's an opportunity.

BS: Ok, great. Thank you.

4: Not just the BC, but similar for the colon cancer. We have a study which is recruiting for an exercise study similar to what Dr. XXX mentioned. Similar to colon cancer patients who looked those who exercise and those who don't and what's the rate of recurrence. Something similar to that....

BS: I see, so maybe almost a program of cancer survivors in general instead just BC. So maybe we can get more buy in.

4: Definitely. Like definitely there's data for breast and colon.

2: And a little about prostate as well.

BS: Ok...ok... That's good to know. Because there's lot of funding for us to focus on BC specifically. There's a good evidence to know. That's good to know that there's a bigger buy in and open it up to other people.

9: I think there should also be some correlation to exercising and diet, particularly in overweight patients. So really they should have education about the importance of losing weight. And maybe involving a dietician as well.

BS: Pairing the information together?

9: Yeah, pairing the information together.

BS: The more we talk about the five key areas with more than just diet or really those two in particular pair well together?

2: Those are the two biggest ones, yeah. But also about stress relieving techniques. More and more we are realizing the physiological changes in the body related to stress cause downstream effects on insulin and stuff, and adrenaline, cortisol, etcetera. Also, all three like yoga, taichi, all these meditative techniques

3: Mindfulness.

2: Yes, mindfulness. Exactly. These are all things that help. They're all linked.

4: We have a mindfulness program that post-diagnosis.

BS: Does that have exercise in it as well.

4: No, it's mostly meditation and basically, mindfulness and being mindful. Yoga exercises. We have a physician that conducts it here and pretty much a patient of any cancer diagnosis it doesn't have to be breast cancer.

7: I wonder if ongoing smoking cessation should also be considered as part of it. Because they should [says something inaudible]

4: They won't want to do smoking cessation because they will gain weight. [Everyone laughs]

3: Well, they'll have to exercise more!

BS: Ok, so more multiple health behaviours tied together.

1: Lifestyle modification. That would help bring in the exercise piece to a multi-pronged. And it sounds like it really should be the survivorship, the on your way out of the door kind of transitioning program. And its sounds like it can be pretty generic for almost anybody leaving the active cancer treatment program piece on their way out here's your 6-week.

BS: But that's where the gap is. You have the resources you need to refer them to places. But something to help for when they leave you don't have contact with them anymore. Any other further comments before we wrap up? No, ok well thank you for attending.

[Lots of thank you's]

Side conversation:

- [1] I think the whole thing around structure is important. Because when you have a bad day, bad morning and you forget so that structure is what the survivorship stream needs. In five years from now, it'll be the best survivorship program
- [2] This is what we need, this our baby.
- Yeah, we're going to have to be only prevention [I think]

Notes on positions

- 1 and 2 = medical oncologists
- 9 = surgeon
- 5 = mammogram manager
- Unknown: 3, 4, 7
 - I think that 3 and 4 are nurses and 7 is the rad onc based in their responses

Focus Group for ON10

Facilitators: AF and SSK

Transcriber: EW with editorial notes in square brackets. As of November 28, 2016, AF has re-transcribed this document as it was not accurate.

Acronyms: PA = physical activity; BC = breast cancer

AF: So I guess what I'll do is I'll start off with just the letter of information so just briefly describes the study itself really what we are looking for. It really today we are just doing part A which is the focus group so I just need everyone to sign a copy and I guess officially consent I will give that to Shauna.

AF: So I guess I will start off with a few questions, so the first one is what types of programs or services are available at this hospital to help you talk about physical activity with breast cancer patients?

SSK: And maybe if you don't mind, I don't mean to interrupt but just to identify yourself before you speak with some sort of pseudonym or name just so I know to keep track of everyone speaking

AR: No resources specific to speak about it, I have given out your active match [postcards]

AF: oh awesome, great

AR: a few times and those, but other than that nothing.

AF: are there any sort of programs or anything like that that perhaps you can refer patients to from the center, like perhaps in the community, like I know in Toronto we have Wellspring or something of that nature? Is there anything in the Kingston area?

MM: I am not aware of any resources

AR: are you aware of anything over at L'hotel Dieu?

LM: Not here, just in the community, not here, not anything like that

AR: so in the community for breast cancer patients what do you?

AF: What sorts of resources are available in the community then?

LM: Through breast cancer action Kingston they have exercise groups for instance, and they have support groups there for people to go to

A: Oh, okay. And do you find that a lot of your patients are asking about that type of thing or

LM: not really

A: Oh, okay

LM: I don't find myself, do you BK

BK: No we give them, when they come in we give them an information booklet that carries all kinds of pamphlets about resources that are available in the community and breast cancer Kinston has a brochure in there that they can contact and a lot of people within Kinston are aware of breast cancer action Kinston throughout their fundraising. So they know that they are available to go for support and exercises

A: and this pamphlet or booklet, what other resources are in it, if you don't mind me asking

LM: We give them a lot of resources to give them like for instance, breast prosthesis, so there's the stores that are available where they can go and get stuff like that. And we give them exercise book through the cancer society, the Canadian Cancer Society

A: Is that the exercise after surgery?

LM: Yes

LM: What a lot of them like though are the websites so we give them reliable websites. I find that most of my patients they don't really, there are a few that want a support group, be involved but I find most of them don't really want to they would rather just go online and get support that way. Or though BK and I or through you guys. They have a lot they the cancer center has the chemotherapy classes and the nutritional classes that they put them in. They like those. I don't think they have the lymphedema one anymore but they were

AR: No, because they were telling them false information.

HL: Is it them who does the dragon boat and if that's a formal

BK: Yes breast cancer action Kingston, they are very involved in it through fundraising. I think they have a walk to, yea they have a walk. So a lot of people are aware of them. Golf tournament I guess

LM: Yes they do and a golf tournament

A: So I guess what I am kind of hearing is that breast cancer action Kingston is kind of the main hub for more or less the survivorship material I guess?

AR: for general and specific information for patients after treatment.

BM: I am not sure what proportion of patients actually use it, I think it's quite small.

AF: okay so it's a small number then but I am generally hearing that no, there are no real resources that's given to the patients following let's say surgery or treatment

BM: I don't quite know what you mean by what resources given to the patients

AF: perhaps something that's printed or that say now that you're done with us, go to the YMCA and see them for their exercise program that's specifically for breast cancer or

BM: I don't believe there is any such program.

AF: So I guess just switching gears here, what types of tools or materials or resources or anything would make it easier for you as and I apologize, are you all medical oncologists on this side?

BM: radiation

MM: medical care

HL: I'll give you all that later

AF: so I guess from the practitioner side, what sort of tool or resource would make it easier for you to then discus physical activity or exercise with breast cancer patients

BM: I don't think it's difficult to discuss with a patient. I actually speak to everybody now, but I can't tell them very much. I can tell them that the same rules apply as to general fitness, that they should be getting 30-45 minutes of aerobic exercise and I tell them that that's enough to get their pulse rate faster but not to make them short of breath and they should do that 4 days a week. And I ask them if they usually work out, I suggest that they should think about joining a gym or an exercise class cause it's easier to do that, then to do on your own. I also talk about weight control and I say that I think that 10 years from now, there is suggestive evidence now that this reduces the risk of recurrence of cancer and it's going to improve your cardiac health. And I tell them I think that the evidence is going to be even stronger than that in a few years from now. That's what I tell them and I don't, but I don't have anything, CCO has nothing on their website and that's something that you should do immediately.

AF: I whole heartedly agree with that.

BM: There is stuff out there for doctors, but that's not actually the real need. So I don't know, I think it would be very important for CCO to have something online. I think it would also be great for people in our community if there was something that was offered to patients free or at least subsidized and that was targeted for cancer patients, I think those would be great things and I would use them

HL: It's, we just had our first meeting with Jennifer Tomasone researcher you may know here at the Y, but it's going to be a long haul.

MM: I totally agree with BM, I think it's easy to talk about it, but it's hard to measure what somebody does. I do talk, today I had 2 consults and I talked about exercise and I encourage women during chemotherapy to exercise even during active treatments, because not just overall health and wellbeing, but there are studies showing that outcomes of the cancers are better with physical exercise. I think there are a lot of misconceptions out there too and you know women have been told for decades to not lift anything with the arm after surgery, and a lot of work needs to be done actually to say most women now don't even get a full resection why are we continuing to harp on this breast stuff lymphedema and then they end up avoiding exercise.

Do you know that there is actually a good randomized trial that shows that upper body exercise with light weights is good, but I don't

BM: you know there's actually a good randomize trial that shows that upper body exercise with light weights is good but I don't have to tell people how to operationalize that I just tell them less than 5 pounds because they always ask me how much, and I don't know. but I don't know really where to send them for expert guidance on that kind of.

A: So I guess it's looking for experts then, and like you said something in the community, CCO needs to

BM: High level experts, people who can handle this, do this for a living.

AF: Okay

AR: I am not as good as everyone else. I will talk to my patients about exercise when they are under the age of 70 but the majority of breast cancer patients I am seeing are 80 year olds and 75 year olds and I have, I say, I must say exercise I often forget about even discussing that. So, I don't know what resource is there but I think, I think you know certainly if there is a resource that doesn't involve physicians that would be good to make sure. But also keeping in mind that who is this, who are we applying this to. Where can I send, I mean I can tell all my patients to walk, be active, try to be out, regardless of what cancer they have but in terms of structured exercise programs and so on, that I am a little less clear on.

AF: So I guess for you, what would kind of spark you then I guess to talk more about exercise with your patients, if I. Is it something as simple as a mug that says exercise question mark sitting in your office or is it something more substantial is it more information on the CCO website

MM: Well we do have a patient education book that everybody receives when they walk in the cancer clinic, and I think, you know that there is a lot of information there already. I am not sure if every patient will read every single page but I have to say I don't even known exactly what is in there

HL: I think it's getting the momentum. I think all the specialists here know that it improves outcomes, it improves symptoms all of these things, patients generally probably think it does and are told by their family physician as well. But I think the trouble is getting something started without going to the extreme and saying the heart community has. I

mean the cardiac rehab program is offered to every patient and is taken up by the majority but it's frightfully expensive and not something that is really needed in this regard so, it's just like exercise in general, just getting it going

MM: I think that would be a critical point to make in fact, because you know it's a hard thing to just pick up a key. When somebody has a health scare then all of a sudden they are more motivated maybe to do things for themselves. And it's not unusual that actually women do ask what else can I do to improve my health. And if anything is proven benefit that exercise definitely is.

HL: I think it's great. It's something you can do for yourself and that people want to

BM: And it's likely as effective as most medications to prevent reoccurrence

AF: Sorry did you have something

BM: I've started talking about this with patient who were, a long time ago before I knew it was any good for recurrence because it's good for you. And I know that the only thing that actually calms me down when I am stressed about anything, health or otherwise, is exercise and I encourage people to continue through their treatment when they can. Because of that, I have got better reasons.

VK: I would probably echo what AR and BM say too. I find that when patients come for chemo they unfortunately gain weight during chemotherapy and that is usually time when they are most, at the end of the chemo like "I have gained so much weight" sometimes discussing exercise programs during chemotherapy is a bit much for them to be very honest it depends on the patient how motivated they are. It is usually once they are done their treatment or starting their adjunct treatment or hormone therapies that they are kind of interested in finding out what other things can I do and that's usually when I kind of initiate a lot of it especially about exercise and long term sort of health benefits there and it would be easier if there is a trial we can recruit them, or specific resources we can refer them to, depends on the patients where they live. We get a lot of patients from outside of Kingston's as well, we get them they have traveled far distance and a lot of times those programs are not available necessarily for them there.

AF: So I guess kind of, I am just trying to summarize everything. So community resources considering where it is that they are coming from, because they might not be from Kingston. Looking at the CCO website and kind of putting more resources on there. And then I also just heard, kind of just bypassing the physician as well, so maybe something that could be easily accessible to the patient

MM: We do have a patient educator; we have a nurse.

BM: I think, it's funny. We have the smoking cessation thing that they, before we can talk to them about what they have come to see us about, she's got to be interrogated by nurses and given them sort of a primary responsibility to talk about smoking cessation. But if we could make that much bloody fuss about that, then I would think we could spend a lot more fuss about this.

AF: okay very interesting

BM: I don't object to smoking cessation I think it should be introduced in a timely way, not at the very first visit

AR: I actually, the smoking cessation model works pretty well, and if there was a model the nurses did an exercise assessment or something at the beginning than that might lead to a sustained program. I am not sure it is going to be the exact same. The resources that are needed and the education are going to be different for people who are starting out and during chemo. whereas the treatment during chemo and radiation phase vs. the survivorship after, when they are on their long term hormones and their process and so on, I think those need to be a little bit, to me almost thought of as yes they are both exercise but they are different groups of patients

AF: Okay

AR: And the last thing is, take out of the CCO guidelines that patients need to have a stress test before beginning because I am not sure if that is evidence based and to me it's another barrier for activity. That's all I have

AF: Okay we were also kind of discussing in our lab perhaps developing a podcast for physicians that would kind of summarize current guidelines about exercise for breast cancer survivorship and you know things like it decreases recurrence based on this study, it increases cardiovascular fitness and I actually could see this applying to nurses and other clinicians as well. what do you guys think about something like that as well. Does that seem like something you would actually perhaps use, on a commute to work or is that something that is completely out of left field

BH: Can I just go back to what AR said there, you just talked like your group is doing this and I think that's really important but I think it's important that whatever you produce should part of an integrative program of health promotion. You don't want to have one nurse come in and preach the gospel about smoking and say go to the health unit and they will give you some free patches, and then another nurse comes in, comes with you blessing and says and you got to get some exercise and here's your ticket to [mumbling with lots of words, and someone coughing] and someone else comes and says well I am your dietician and you have got to lose some weight and so it needs to me integrated and not this fragmented thing that we tend to do in Ontario with those sort of things. Where you go to one shop to get your mammogram you go to another shop to get your pap smear, like why?

AR: The short answer to your podcast is I listen to podcasts all the time fine. I don't think a podcast focusing on education, a physician. To me I don't think the gap is between knowledge of the guidelines, I mean we all know. Maybe the specifics of the guideline on sillier things are different but really it's the implement ability, the implementation piece is the big piece, so if there were more so than getting physicians aware that exercise should be recommended to patients.

HG: presentations or talks on, I can see, I know there are other areas in the province and the country where the Y has partnered with cancer centers to, so having somebody to set that up let's say in Windsor or wherever come to centers like ours and do a grand roundup and say this the importance of exercise, this is how we implemented it. That's valuable

AF: So kind of that translation piece between centers so we are all kind of working together as opposed to, like you said, the fragmented approach that we are taking. Okay so that's really interesting. I guess are there other resources that you find useful. Like I love this group is mentioning the guidelines, I think that that's really important but if I were to hand you a piece of paper that had the guidelines would that, would you hand that to your patient or what's that kind of missing implementation sort of piece?

BM: As a loose leaf thing? I would rather see it integrated into a single document that we give our patients. It's another dimension of trying to help our patients to be well in the future. I think little fragmented bits are probably not useful, not as useful as if they were integrated.

MM: Ottawa has a some sort of wellness clinic, or I don't know what they call it, for women cause you know we give them like [mumbling] look good, feel good. this program that program. You have got your prosthesis day; you get this day. So if there is some sort of integrated place where women could go, and that's an opportunity for networking and see what other people do, I think that would be a great resource, like you know our chemo classes are well appreciated. So some resource like that would be nice.

AR: If there is a boiler plate, so everybody is doing early discharge now in Ontario right. So most times patients are getting a letter and family doctors are getting a letter and I think getting just the exercise guidelines embedded in there as a boiler plate would have probably a similar uptake to other recommendations in that letter.

AF: So would that be a very long letter at this point,
AR: No it's not, it doesn't have to be the recommendations but it can be something, whatever it is. It can be a paragraph that says active exercise is recommended for their patients, like a 3 lines, and for more information see this website or whatever. There are these discharge letters going out that are supposed to be part of discharge packages and discharges to patients that are sort of summaries of you know all that stuff. The more that can be built in, the less it relies on a physician to remember something in clinic.

MM: Those are really guidelines for follow up rather than survivorship guidelines, those are mostly fellow to guide the family doctor, how often they need to do clinical exam and what to look for for recurrence rather than, when to have their mammograms. it wasn't so much about survivorship right. So I think something separately made you know, we talk about bone health, and weight and physical exercise that's more of survivorship kind of

AR: Yeah but aren't we giving something like that to our patients now? If not we should be. Anyway...

BH: The letter to the breast patients, I don't think it mentions exercise or smoking

VK: But it does talk about bone health if you can have it in transit

HL: But that's something we could add.

AR: But that's something we had up in Sudbury.

- It makes sense

HL: But the patient letter doesn't really address that kind of stuff either

AF: When does a patient get a patient letter?

MM: At discharge...at discharge from cancer treatment.

AR: For mostly just colorectal and breast sites.

AF: I see, okay, very interesting, just so I am not ignoring the nurses, is there anything else you ladies would like to add about a resource that would help you with talking to your patients or anything like that?

BK: I would say no not really. However saying that I think that in the community where there's lacking for resources is with the health teams that the patients go to specifically for ours for post-ops for drain cares or just for any cancer patient having nursing come in, we have a patient today who was told by one of the homecare teams today not to exercise so

that's misinformation that they are getting that the health teams aren't properly informed about so there has to be some way that we are getting the proper information out to the health teams across our city anyway, because it's lacking

AF: Okay so I guess I am kind of seeing educational pieces to bring everyone together onto the same page, resources available both in the community, online and then kind of integrating everything with other lifestyle behaviors as well as integrating into whatever packages or pieces of information the patients are receiving. Is that a very barebones summary?

BM: For exercise there may need to be funding, a lot of our patients can't afford a grant for gym membership.

AF: Very true, yes. Part of the grant we have received too is also building in tools like that so it, cost of going to a gym or going to a program is definitely a big barrier for a lot of the patients

AR: And I think evidence that it works, not that exercise works but that information. I mean information is the lowest form of behavior change right, so if there's other, you know I don't know what it is, that's what you guys are researching. What actually works to get people active. Figure it out...

AF: Just figure it out. So just before we quickly wrap up because I know everyone has places to be, is there anything else anyone would like to add about kind of resources or tools or anything that would help kind of push breast cancer patients to be more active? Or is there anything that I've missed

AR: So I think your podcast idea is good, but I think the podcast should be under breast cancer patients.

AF: It should be geared towards them, okay.

AR: Yeah...yeah.

VK: And I think who bills for this commonly and integrating this into CCO.

AF: Okay so building it in CCO, podcast for cancer patients not care providers. Anything else?

AR: A billing code for exercise prescription.

[Lots of laughs around the room]

AF: That's a separate discussion

AR: That's an easy question.

BM: Who was it we had who spoke at rounds?

HL: Catherine Sabiston.

BM: Oh that Catherine Sabiston

AF: Oh yeah, she's my supervisor.

BM: And yeah, that kind of thing that helps medical practice. That kind of having someone who is a leader in the field to talk in the community is very good for you.

AF: Yep she's the boss lady

HL: And we can get someone to set it up at a center come in.

BM: This is really interesting work and good luck with it.

AF: Thank you.

BM: I love HG idea of borrowing what works from other places and not seeking just to invent it all.

AR: I also think liaising with the geriatrics exercise crowd because our population here is old.

BM: That's right... lots of geriatricians.

MM: And I think how to measure it...

AF: Ok, so adding something about measuring exercise.

[Many thank you's and good byes and sounds of people leaving].

Focus Group for ON11

Facilitators: AF and BS

Transcriber: AF with editorial notes in square brackets

Numbers represent participants.

Acronyms: PA = physical activity; BC = breast cancer; BCS = breast cancer survivor(s)

Attendees: 3 medical oncologists (TH, RS, SV); 2 nurses (KB, KT) and 1 clinical research associate (NW)

AF: Introducing the topic re: resources that are available to BCS in the centre.

SV: We had some, but effectively no. It's really self-driven and by physicians who refer them.

AF: And you said that there was a program that...

SV: There used to be a gym that you could go that was part of a research program and they also became interested in having cancer patients go there. It was about 6 or 7 years ago. XXX had spear-headed a study there that opened up the gym in the basement to patients, but after that...

KB: There is a GoodLife in the basement, but you have to member...

AF: Ok, so to use the gym you have to be a member of the gym?

KB: Yes.

TH: Is this specifically for breast cancer or any cancer? I was just looking at your title [of the letter of information] and was...

AF: It's specifically breast cancer because that's where our funding is coming from. Is there a reason why the other program wasn't able to sustain longterm?

SV: Money.

AF: Money? Ok, so I guess more so research funding [ran out]?

KB: Patients did enjoy it and I think they did well.

SV: Well, I think it depends there are a couple of reasons that lead to its [demise]. Partially funding and money. Personnel. Medical liability was an important issue. Do we cover a gym as an important medical issue? And within the hospital environment. I think the other one is only a fraction of our patients used it. It wasn't as though they enjoyed it and went in droves to it. Only a fraction of our patients used it so that lead to more careful thinking as to whether it should be run.

RS: It's simple, as the one who drove that, it was sustained through multiple research grants. But let's cut to the chase, the administration wouldn't support it. I think we can just leave it at that.

AF: Ok.

RS: A good cry was had by all.

SV: What percentage of patients do you think attended?

RS: That I can't tell you...I don't have the numbers. I can tell you the numbers in the studies, but I can't tell you the total.

KB: I think it was 10% ...?

SV: That's a lot. We have over 12, 000 breast cancer visits a year. So we didn't have 1200 attending...

RS: No, far from it. But whether it could've been redeveloped they [admin] would not support it.

AF: I see, okay.

TH: You're asking about potential barriers. We do have an ongoing study in right now in colon cancer survivors. I can tell you that definitely one of the barriers is the physically having to come here. I wonder if talking to the percentage of people that come here...

SV: Parking costs are high here.

Many voices "mmhmm"-ing in agreement.

RS: That's part of the whole grouping of people on the studies we have on-going. Even now there's people approaching me for more exercise studies. They have dollars in hand and my very concern is the same logistics. And logistical concerns we had a couple of years ago. We don't have administration behind you. It's hard enough anyways, but when you don't have the administration behind you it's even more of a challenge. And it's unfortunate, it truly is.

Now, there is something just down the street called Maplesoft that has a gym facility that is not far away. I mean it's not the same as Toronto. Ten minutes down the road is actually ten minutes. You're standing in traffic for four hours. So it is something that's

realistic. So cancer is responsible for delivering this component of care, while others are responsible for *this* component of care. They can get it [PA] elsewhere. I'm an exercise advocate so I get it on the one hand. But on the other this is a simple non-toxic thing that anyone can do anywhere. It's unfortunate that we can't facilitate it.

AF: The centre that you mentioned, Maplesoft...

RS: It's literally 30 seconds down the road, maybe one minute in traffic.

AF: Do they specialize in exercise specifically?

Many voices: Survivorship. SV: Informatics, exercise, yoga

RS: Nutrition.

SV: It's volunteer-driven.

AF: Do you know if a lot of patients from this centre end up going there.

RS: We don't know, we couldn't tell you what percentage. But they do get patients. The other large centre that gets patients, that's not exercise, is the Ottawa Integrative Cancer Centre [OICC]. Which is more of uh...

KB: Naturopathic.

RS: Centre. So those are the two big go-tos for complementary and alternative medications.

SV: But if you're talking about directed, PA, they don't do it. They're more oriented towards the whole package. For instance, the OICC has a yoga program, which is a different component of caloric output. Not that kind that XXX pushes us all to do.

TH: XXX leads by example.

Laughing

AF: Is there a printed resource that's given to survivors out of this centre or any protocol?

RS: No, but I can tell you we're working on it.

KB: They do mention it in our Wellness Beyond Cancer Program. That has a component about exercise, there is a slide.

RS: But that's the "out" [referring to out-patient], not the "in" [referring to when patients start Tx] unless you have me as an oncologist and you are grilled right from the get go – get off your ass. So we're currently developing that [referring to protocol mentioned earlier] now that the guidelines are out from Cancer Care Ontario. We've formed another working group saying okay we need to implement and document it. I don't know if it's going to be six months or something like that.

TH: I discuss exercise with most of my cancer survivors, but I have to admit that there's nothing that I can give them. Similar in family medicine [there] is that constant struggle as well. I mean, there's lots of studies that show that giving someone a prescription for exercise, even something written increases their chances of doing it. I have to admit I've never done that, but I think that something we can encourage to all our patients. About the benefits to cancer and non-cancer. It's good for whatever. There's certainly no harm to it and there's a lot of benefits. But we don't have any literature. I don't give them anything in their hands and I don't direct them to a website.

AF: In a discussion like that, how would that go? If I came in and had some questions would it be more so...

TH: I don't follow anything specific. I follow just the general guidelines – 150 to 180 minutes. And I give them some advice how to do that and what that means. The idea that you can spread it over... Some of the studies I looked at it doesn't matter how sustained it is, it's the number of minutes. So I try to encourage them step by step. And I know of some research in older adults and the benefits. I encourage them to take the first step.

AF: If we were to develop a tool or a printed resource or a program or something that would help everyone talk to their breast cancer patients about exercise what would that resource look like?

KB: It would have to be short and sweet and very specific, these are the things you can do. Sort of step by step. You can do double-sided but it's gotta be catchy and understood very easily.

AF: Would that be something that's printed that you physically give to patients?

KB: In my mind it's printed.

SV: I think today's woman might actually be more oriented towards a couple of different resources. One is the printed, but there's far too much paper in our clinics. But I think if you're going to deliver a message, the message should be simple. That exercise matters and why it matters. It's not that we're telling you to exercise; it's for all the other benefits. And specifically if you're a breast cancer survivor. Just an explanation as to why [exercise is important for survivors]. Then a goal-oriented message as well. That it's not about weight [loss], it's about breast cancer reduction as well. Finally, a goal-

oriented message with regards to what's required. Twenty minutes per day every day. People can't measure their calorics, but enough to get a bit of a sheen on you. That's what I tell people. I've been telling people that for years. It's not enough to go for a stroll with the dog, I want you to walk enough to get a little bit of a shine on you. That's literally what I tell them. I think those types of messages are important – very goal-oriented. I think it's important to have a website to see what kinds of exercise they could do. And once again, redeliver – go to this website it'll take you exactly what to do. I would do that.

TH: I think having some small and printed is great. But I think in this era – you know, why can we not leverage technology for some of that messaging. You see these catchy ads and things and why can we not leverage technology?

SV: If you have a website you can capture the number of hits. And every time someone goes in and they can answer if they're a breast cancer survivor. I think it's a great data source.

TH: And I really like that, I'll put my little plug in, not every BCS is young. There are a lot of women who are young and very motivated. But we have a lot of older survivors so I think it's important both in your messaging and in the exercise information that they may want to get into.

NW: I'm in clinical research and I'm often a fly on the wall for these types of discussions, but I can say a lot of patients follow a lot of different online support groups and online forums. That's very popular with BCS. If you could latch on to that...

SV: I think you should a scan to see who has something like that, that is specific. I don't think you're going to find much. I don't think you'll find much.

Many voices interrupting and there is mention of Livestrong by KB. AF clarifying what he means by specific (i.e., cancer centre specific on or online) – SV means online.

SV: Well Livestrong will talk about what's needed. But if you actually have you [points to AF] doing the exercises, but if you have that for the age-oriented group. Samples of what they can do I mean, wow. I think what a great idea. But not one of these...I don't want the woman in the leotard who looks fabulous. I think we should real women.

RS: A lot of the messaging that should be put forward is really what the literature shows. Aerobic exercise can improve quality of life. Point blank, a little bit.... Resistance exercise is really key here for any woman whether they realize or not. Well for anybody! These women who end going through menopause and get steroids, and become relatively more sedentary than before. Body composition goes from muscle to fat in 3 months. Then you get into this hugely vicious circle.

The one question that everyone has is how to promote that in a safe way. If you've never lifted weights and that's what you need to do in some way or another. And you just tell some woman to do it, she may do it with all good intentions but she might not do it properly. And that's where injuries happen. How to best get that message out?

SV: So giving the proverbial she the paper is hard to track. We cannot track compliance with that we have bigger things to address in our 10 minute appointment. But that can be tracked with one of our ESAS questionnaires. It could actually encompass that...

RS: So we asked that and we're not allowed because it's a standardized whatever and no one is allowed into that.

- AF: Could we do an ESAS-add on?
- RS: No! Been there, asked that...
- SV: But nothing stops you from validating a new instrument...
- RS: We have to get Cancer Care Ontario on board.

SV: I think it's not a bad idea. For instance, it's more than just exercise. There are other issues that we never ask on ESAS that are specific to BC, neuropathy all these other things. There's no reason you couldn't attempt to validate another questionnaire which would be really great. I think if you showed that point, it's a big one, there's an interest in this type of thing. And I think it's worthwhile exploiting.

At the end of treatment, there are obviously big issues. At the end of formal therapy, when we're about to discharge patients, foremost on their minds is what's gonna happen, who's gonna follow me, what tests are going to happen, do I know if the treatment worked? The second part, in my follow up what's required. And we'll tell them that their family doctor will be informed, we'll send them a letter. This is the only test. Then there is a big discussion on why I'm not having more tests, etcetera. Then the final, I would say 50% of women will express a concern about weight. The older population doesn't really talk about weight. But 50% will express interest about weight. The goal of the program is about quality of life. But I think part of it all should address the issue that weight control is a fairly big and long-term issue. So we're talking about some short-term things that start to improve quality of life <u>within</u> a short time frame. But we're also talking about long-term commitment to weight control etcetera. I think that's a really powerful message.

RS: So what we're struggling with...is I don't know if the term should be weight control because it's more about body composition right? It doesn't matter what you weigh, it's what your fat-muscle ratio is. What happens when you lose all this muscle and get all this fat is even in the elderly, and XXX this is why I think we should push this in the elderly. Because that's where all the strength and the falls and the other issues come

from. Balance and functional activities. I use the word it's not about the little black dress, it's about.... [inaudible].

AF and RS are talking about something and agreeing, but can't make it out in the recording.

SV: It's about goals. When I talk about goals, goal-orientation is about recurrence reduction that's foremost. Goal orientation is about quality of life and quality of life is measured in so many ways. For the elderly, functionality, balance, things like that. Fatigue reduction.

KB: In our young population, a lot of them are government employees. I know some of that...I know XXX Teacher's Insurance Plan they are provided the availability for getting a personal trainer to help them get back on track to get back to work. I don't know, maybe exploring what options they have through their private insurance to help them. And that sort of takes the ownace off of us.

RS: It's about what are the key, short messages.

SV: I think a public health message should be oriented to the public. When Marla Shapiro had BC, all of us, every single person said she looked great. And the next thing out of everyone's mouth was well, she had a chef, a chauffeur and a personal trainer. And we want women to have a prescription-free process. A self-driven process.

RS: It would be nice if part of what was funded, was a 6-8 week "pick your package" program. Chemo is 6 cycles, you get your exercise membership for 6-8 months...I don't know, pick a number. It's like cardiac rehab, you have your heart attack you gotta go for this to graduate so to speak. And then you're not going to sustain any lifestyle changes, that's challenging for anybody, you're going to keep everybody, but if you don't engage 90% you're never going to get anyone.

Many voices agreeing.

NW: Taking the first step is the hardest part. Make it a habit for them in the 8 months that they're here and I'm sure they'd be more willing.

RS: In other words, you're not getting your chemo unless you've signed up for exercise. Obviously there are nuances to it...

SV: I think we get caught up...I was just thinking about my own attitude about it [exercise]... these women have so much to deal with when they came in. Why can't they deal with this other aspect. It's not a bad thing....

KB: There's the chemo teach class and there's a slide ...

RS: There's a one-liner, but they're so overwhelmed. I don't know what they...

SV: Why can't we underwhelm them a bit...

KB: Where can we put it? What are the other avenues.

AF: Is there anything in their discharge packages?

KB: Oh yeah. Well, I do the survivorship program that's my other job. The Wellness Beyond Cancer. I'm one of the nurses so yes, we have a strong component there. Every time we do a survivorship plan there's a component about it. You talk to them about exercise, what are they doing, how they manage it. But we don't follow up.

NW: Are the family doctors, or primary care providers involved in following up with some of that?

SV: If we have that kind of attention from family physicians, the current weight and obesity issues would not be rampant in society.

[There is a part of the recording that RS asked not to be recorded because she offers political views about family physicians].

TH: I don't know that we're [oncologists] a lot better. Part of it is education for our physicians, our colleagues, ourselves. If you think about going through medical school. How often do they teach you about how to actually counsel someone about weight loss and exercise and stuff.

RS: We don't know anything about it.

TH: It's not well-taught. I say it's a systemic problem. Not specific just to ... I mean everyone is busy. Beyond that we're not well-education.

SV: So, let is start with us.

RS: I agree 100%

SV: I think part of your thing might be to also develop a counseling package and a travelling show for physicians who work with cancer patients to teach it. But teach it efficiently. We don't have time to run a consultation.

TH: And is there evidence. What the key things. We're all taught how to ask questions about smoking cessation and how to counsel someone about that. But there must be certain aspects of teaching and about how do you approach. I read that study about if you write a Rx for someone that just you would a medicine that there's an encouragement. There must be studies about that...What are the key things that you

can do fairly quickly and efficiently in our clinics. I think education our health teams and our physicians is important. And I think we can all improve on what we're doing in that way.

KB: The head and neck group has developed a program and maybe you can add an adjunct. Do you want to learn about physical exercise, then come to this class that we're going to run once per month. Maybe you can put it out there? Would people be interested? You know we have a great class that can teach you get back to work and exercising. We're instructing you to do things specifically. But I don't know there is a liability here.

RS: Part of it is the patient and part of it physicians. Physicians and nurses...it's not part of our standard education. If you know anything about exercise, it's because you got the information from elsewhere. And you taught yourself something. There's no formal.... In nursing and in medicine, it doesn't matter which branch.... Underestimate what we don't know.

TH: And I would say, I think education is important. I think what a lot of physicians struggle with...the follow up is one issue. The other thing is a lot societal aspects that... I think smoking rates and smoking did not come down as significantly as when public health got involved and we can no longer smoke. There's a change in perspective. To be honest, seatbelts and smoking and my feeling that public health deal with is societal aspects of obesity. I think there's thing we can do and there are things that are helpful.

AF: summarizes what everyone has said using the ecological model. Question about speaking at MCCs or breast tumour board meetings and whether or not they found this useful.

RS: It has to be multipronged. You gotta get in from everywhere. It's gotta start with the ground up. Advocate for getting it [PA] onto the curriculum and into training programs. Whatever the medical speciality is and yes you need CMEs. We gotta get onto agendas. You gotta get onto CME agendas.

TH: It's not about the credit. If it's on the topic of conference, it's important...a little bit...it's validated.

RS: It's creeping slowly. I remember doing exercise trials in cancer patients. I will quote you the REB thought I was...they thought it was inappropriate and wrong and unethical to exercise patients. We're going back 20 years. So we've come a long way. The fact that we're actually talking about it and pushing our patients. But we still have a long way to go. But it's got to be as second nature as you brushing your teeth as far as I'm concerned. You don't have to, you just have to get off the coach.

Many voices repeating to get off the coach.

AF: So the message I guess has to be very simple, clear.

RS: And where to go.

AF: And where to go, so I guess we have to find those community-based resources or find those professionals have training in cancer and exercise.

RS: What do I do, here's the 2-second buzzword. Then we shove a piece of paper at you, or we send you to an app or website. Keep it simple.

KB: Maybe it's a variety of those.

TH: Or maybe it's an app...There's an app for that....

Laughter

TH: If you look at the craze of Fitbits and things like that. Again, technology...I think that medicine, if you think about it, has not kept up with a lot of technological changes. I mean, granted that there are studies and all of that stuff. But there's a lot of cool, neat things that we haven't leveraged well enough. Where the young people who are really excited, can make these things that I don't know how to put together. The websites and the apps or whatever. We need to better leverage that technology. There's a lot of things we can do with our smartphones now. Like, 20 years ago we couldn't do.

KB: You can go to WeightWatchers now on your phone.

TH: There's information...you have a mini computer with you. I think we have to better... There are things I think we can do better. We just haven't figure, innovation. We have to think outside the box a bit.

KT: You have to think about the population a little bit. So if you're looking at 70 plus year olds. My dad can barely use his flip phone let alone a smartphone. So, there has to be something for those people who aren't [technologically savvy] and socioeconomic [status is important].

To me the message is, you know when people are complaining about fatigue. You know, the first thing I ask them is are you exercising? Well, I'm too tired. I want a pill. There's no pill. Put on your shoes and go for a walk. That's what I tell them. It doesn't have to be huge. You don't have to go to the gym. You don't have to run. Go for a walk, build yourself up.

The message has to be simple and you have to get to everybody. Not just the people want to go to the gym and have the fancy shoes. It's gotta before the 75 year old...you know?

AF: Maybe even exercising at home? Walk up and down your stairs.

KT: Absolutely. Go to the mall. The seniors go to the mall and walk around the mall. Walking sticks.

AF: So I guess I'm hearing, different platforms, simple messages, a graduated thing. This is how you start, this is how you can add.

Many voices agreeing or saying "yes"

AF: They need to hear it from everyone. And then from the physician, health care provider side, I'm hearing we need start while they're in med school, have CMEs, have conferences, be at all the breast tumour board meetings and infiltrate the system from every angle.

RS: And I do think that patients need a reliable, you know per city, per town, here's the website that will take you to the experts in your area. And it's going to be different across the province. We don't have it. I know for Toronto, [researcher]'s center is amazing, but still that serves a small relative...

AF: It's tough if you're coming in from...

TH: A lot of people don't want to commute. They don't want to pay the cost.

RS: I can't see it being wonderful except for that one little area.

AF: it's great for that one little area, but yeah.

KB: They have a Maplesoft in the Toronto area, but you're right.

TH: I think something like, it's great to have resources and stuff like that. But to be honest....so [oncologist] had that rehab thing at XXX, which I thought was a fabulous idea. I tried to get a lot of my patients to go. But, I couldn't get my patients, a lot of my elderly patients to go because of transportation issues. I couldn't get them to go. I think that's a huge consideration.

It [referring to future resource] has to local or some of them have transportation issues and they don't want to ask their families to take them. So I think a combination...there are some people who are motivated and they have the resources, time, money and transportation and want to go somewhere. Just like there's those of us who want to exercise at a gym and then there's those of us who want to do their own. So I think it has to have different options so that it can touch upon the large breadth of our patients. KT: And getting the word out there too. Have it be as second nature as don't smoke to exercise. I still have someone's wife look at me when I say get off the couch, oh no he's too sick for that. No that's not good for him, that's not good for him he has to rest.

The whole concept of getting out and moving is not necessarily second nature to a lot of people of that generation. My parents, my dad had a triple bypass convincing my mother that it was fine for him to get walking sticks and go for a walk. She wanted a doctor's note. She didn't believe me. She thought he should stay at home. So it's similar of that generation, 70 and up. So it has to come at them in the media. How this is the next best thing since sliced bread.

AF: Okay. The final question I have is developing a podcast to talk about exercise for breast cancer patients and the current evidence that's available. Right now we think it would be good to have it geared towards health care providers. Is that something that sounds interesting, not helpful, completely out there? What are your thoughts.

RS: I know this young woman by the name XXX who has done a podcast.

AF: I know her, yes we've been talking. I listened to it.

SV: Sorry, what do you mean that a podcast would be oriented the message towards HCP?

AF describes the podcast.

SV: I'm not sure it's the best use of a resource. That's just my opinion.

RS: I think it's more your age than our age. But that doesn't make it wrong, it's the generational gap.

SV: Before I left I liked the discussion about the possibility about teaching doctors how to counsel on these things. It's one thing to tell patients to stop smoking. It's another to tell them what the options are. I mean, unless I go and read the latest CMAJ process, which sometimes is too long to read. I think sometimes, it's part of an education process that you can CME points for. And all these little things.

RS: It just speaks to the way different generations are going to learn and will learn. I mean [medical student] will stick on a podcast while she commutes. I won't.

TH: There's also tonnes of different podcasts available so there's time and all of that. I think it's a good idea, but you have to be cognizant of the audience. And if you're talking about medical students, that might be a good way to disseminate information. If you're talking about an older generation, there may or may not...

Discussion about what "old" means.

KB: You [points to AF] would watch [sic] a podcast, I wouldn't.

TH: I have some podcasts on my phone. Do you know how often I listen to it? Probably one. TedTalks and MedX. Those are the two and I have a bunch that I've only listened to two or three.

RS: It's no different than anything else.

TH: Even within the generations, I'm sure there's people that do listen and people that don't. It's not a blanket statement. I think that you're not going to reach the population you watch to reach if that's the route that you go, I think.

AF: Before we wrap up, are there any sort of last minute things that you'd like to add or clarify?

RS: This is great, you gotta keep pushing it from every which way.

AF: Summarizes the discussion.

KT: Is there a place for referring people to PCOP physiotherapy? Some of them?

RS: What do you mean?

KT: From an education to patients and trying to get them to exercise. Get them...sort of buy-in from physio as far as that route?

RS: I think we have buy in from physio and psychosocial.

KT: Is there resources to do that?

RS: No.

KB: That's what I'm saying in our centre [she works for a private industry centre as well], we have that.

KT: We have resources for a smoking cessation person. It would be lovely if the exercise part was considered as important.

RS: Well you know there was an exercise person and they were cut. We had it, but then...

AF: It was person you referred them to?

RS: Yes.

AF: Thank you. This has been excellent.

SV: I'll bet that you're not going to find any difference from centre to centre in terms of what's available and what's not available.

RS: There's different levels of enthusiasm from up and down.

AF: I mean the ones who agree to do the focus groups are motivated and excited and driven.

SV: No one has major resources available.

KB: That's what I'm saying. I work a private industry job so I'm away from the hospital. And we give written information called Fitness for Life. And I give that on my first talk as part of the package that gets sent to them. And it goes in the mail. I mean, do I mention it on the phone with them? Yes I do. But are they doing it? I can't say so, but it is part of my checklist that every time I talk to them that I talk to them about their physical health and what they're doing for exercise. So we do that, but that's private industry through third party billing. So we have some of those resources out there and we're trying to get that but it comes from societal. It has to come from....

TH: The government has to come first. They have to give funding.

SV: You know we give lots of money to parents with children. Maybe we can give a stipend to the survivor for...

TH: So they cut the healthy tax credit for kids. Originally they were thinking of having one for adults.

KB: They don't even teach phys ed in schools, it's once or twice per week. It should be every day. Where are our fat children coming from? The school because they're on their video games.

RS: It comes down to the parents.