

INVESTIGATING HEALTHCARE PROVIDERS PERSPECTIVES ON EXERCISE
PROGRAM IMPLEMENTATION IN A CANADIAN SETTING

by

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We are all Treaty people.

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Table of Contents

LIST OF TABLES	iv
LIST OF FIGURES	v
ABSTRACT	vi
LIST OF ABBREVIATIONS USED	vii
CHAPTER 1 INTRODUCTION	1
CHAPTER 2 LITERATURE REVIEW	3
2.1 Impact of Cancer Along the Cancer Care Continuum	3
2.1.1 Psychosocial	3
2.1.2 Physical.....	3
2.2 A Call to “Move More”	5
2.2.1 Psychosocial	6
2.2.2 Physical.....	6
2.2.3 Current guidelines.....	7
2.3 Prevalence of and Attitudes on Exercise in Individuals LWBC	8
2.4 Healthcare Professionals in Exercise Promotion	9
2.4.1 Role, attitudes, and current practices.....	9
2.4.2 Barriers and facilitators.....	10
2.5 Tackling Barriers: A Call-to-Action	16
CHAPTER 3 METHODS	20
3.1 How ID Arose	20
3.1.1 Why ID is appropriate	21
3.1.2 Orienting the researcher	21
3.1.3 Credibility considerations.....	23
3.2 Ethics	24
3.3 Participants	24
3.4 Data Collection	25
3.5 Analysis	27

CHAPTER 4 RESULTS	30
4.1 Participants	30
4.2 Achieving More by Doing Less	31
4.3 Theme 1: Optimizing the Role of CEPs in Multidisciplinary Cancer Care	32
4.3.1 CEP knowledge facilitates HCP conversations about EXCEL	34
4.4 Theme 2: Simplicity Drives Sustainability	35
4.4.1 Low-burden systems facilitate referral	36
4.5 Theme 3: Generating a Positive Feedback Loop	37
4.5.1 Feedback facilitates referral habit	38
CHAPTER 5 DISCUSSION	40
5.1 Theme 1: Optimizing the Role of CEPs in Multidisciplinary Cancer Care	40
5.1.1 Interpretation	40
5.1.2 Summary	42
5.2 Theme 2: Simplicity Drives Sustainability	42
5.2.1 Interpretation	43
5.2.2 Summary	44
5.3 Theme 3: Generating a Positive Feedback Loop	44
5.3.1 Interpretation	45
5.3.2 Summary	45
5.4. Limitations	46
5.5 Future Directions	47
5.6 Conclusion and Implications	48
References	50
Appendix A Informed Consent Form	72
Appendix B Semi-Structured Interview Guide	77

LIST OF TABLES

Table 1. HCP Perceptions of Barriers and Facilitators to Exercise in Individuals LWBC.....	11
Table 2. Summary of Canadian Exercise Specialist types, Qualifications and Scopes of Practice.....	15
Table 3. Themes from HCP Experiences Referring Individuals Living with and Beyond Cancer to an Exercise Program.....	32

LIST OF FIGURES

Figure 1. Interpretive Description Analysis Process.....29

ABSTRACT

Exercise mitigates the negative side-effects of cancer treatment. However, most individuals living with and beyond cancer (LWBC) are insufficiently active. One reason is the lack of guidance received from healthcare care providers (HCPs); HCPs do not routinely refer individuals LWBC to exercise due to time, resource, and expertise constraints. As such, “EXercise for Cancer to Enhance Living Well” (EXCEL) strives to support HCPs to refer individuals LWBC by providing a program, a referral process, and exercise professional support. Our goal was to assess if EXCEL was a feasible referral pathway for HCPs. In EXCEL year three (2023), 13 HCPs who referred individuals to EXCEL were interviewed. Through interpretive description, interviews revealed that HCPs achieve more by doing less; CEP knowledge, integrated referrals, and patient testimonials are next steps to enhance referral adoption. By implementing findings, we aim to ensure HCPs continue to refer to support wellbeing for individuals LWBC.

LIST OF ABBREVIATIONS USED

LWBC	Living With and Beyond Cancer
HCP	Healthcare Provider
EXCEL	EXercise for Cancer to Enhance Living Well
CEP	Clinical Exercise Physiologist
FCR	Fear of Cancer Recurrence
CRF	Cancer-Related Fatigue
CIPN	Chemotherapy-Induced Peripheral Neuropathy
RCT	Randomized Control Trial
SMD	Standard Mean Difference
ACSM	American College of Sports Medicine
WES	Weighted Effect Size
QUAN	Quantitative
QUAL	Qualitative
RR	Risk Ratio
QEP	Qualified Exercise Professional
RE-AIM	Reach, Effectiveness, Adoption, Implementation, Maintenance
QuEST	Qualitative Evaluation for Systematic Translation
ID	Interpretive Description
COM-B	Capability, Opportunity, Motivation - Behaviour

CHAPTER 1 INTRODUCTION

Each year, two in five or 200,000 Canadians are diagnosed with cancer. In 2023, it was estimated that over 655 people would be diagnosed with cancer every day and one in four would die from the disease (Canadian Cancer Statistics Advisory Committee, 2023). As cancer screening and treatments continue to improve, so too has the number of individuals living longer with the disease. The five-year survival rate of all cancers has risen from 55% to almost 65% between 1955 and 2021 (Canadian Cancer Society, 2021).

Individuals living with and beyond cancer (LWBC)¹ are confronted with several negative psychosocial and physical side effects. As the number of individuals LWBC increases, it is crucial to understand how to mitigate these negative impacts to optimize wellbeing and overall quality of life (Tsai et al., 2023; Firkins et al., 2020; Ahmad et al., 2022). Promisingly, exercise is an evidence-based strategy shown to mitigate several negative side-effects. As a result, guidelines exist with specific exercise recommendations for individuals LWBC (Campbell et al., 2019). Despite its importance, as many as 93% of individuals LWBC are not sufficiently active (Avancini et al., 2020; Thraen-Borowski et al., 2017).

While multi-faceted, one contributing reason to their inactivity is the lack of engagement and endorsement that healthcare providers (HCPs)² provide regarding the importance of exercise. HCPs are in position that allows them to discuss the importance of exercise for individuals LWBC, supporting this discussion primarily through referral to tailored exercise programming (Campbell et al., 2019; Schmitz et al., 2019). However, HCPs are not routinely promoting

¹ Individuals living with and beyond cancer (LWBC), sometimes referred to as “cancer survivors” include those from the point of diagnosis, through treatment, and beyond (Marzorati et al., 2017).

² HCPs are defined as any clinician who cares for cancer patients (i.e., medical and radiation oncologists, hematological oncologists, oncology nurses, physiotherapists, social workers, psychologists, pharmacists, etc.).

exercise in their healthcare practice, stating time, education, and resource constraints as barriers to discussing and referring their patients to exercise programming (Alderman et al., 2020).

Consequently, there are missed opportunities during clinical encounters for HCPs to promote and support exercise for individuals LWBC.

EXCEL (EXercise for Cancer to Enhance Living well) is an exercise program that is currently being delivered through an implementation research project (Culos-Reed et al., 2020). EXCEL aims to address prominent HCP barriers of lack of time and expertise by creating (1) a tailored evidence-based exercise program that HCPs know is safe and effective and (2) a feasible referral pathway where individuals LWBC referred to the program are assessed and advised on exercise by a trained Clinical Exercise Physiologist (CEP).³ As part of EXCEL's research implementation, HCP experiences using the EXCEL referral pathway is being assessed. As such, the primary purpose of this study is to explore HCP perspectives and experiences with EXCEL's referral pathway and its ability to address barriers to exercise referral. The information gleaned from interviews will allow for real-time feedback to the EXCEL program to ensure its design is feasible for HCPs to use in the future.

³ Canadian Society of Exercise Physiology CEPs are specialized in delivering exercise advice and prescription for individuals living with chronic illnesses (CSEP-CEP, 2023). Other specialists with similar designations from accredited bodies (e.g., Registered Kinesiologist, ACSM Clinical Exercise Physiologist, physiotherapist) may also fill this role.

CHAPTER 2 LITERATURE REVIEW

2.1 Impact of Cancer Along the Cancer Care Continuum

The negative impacts of cancer for individuals LWBC are ample. While it is not within the scope of this thesis to provide a comprehensive review of all the adverse effects of cancer and its associated treatment(s), the following sections will provide a summary of some of the more commonly reported negative psychosocial and physical health outcomes in those LWBC. Alone and together, these negative outcomes result in reduced quality of life, treatment outcomes, and prognosis (Firkins et al., 2020; Götze et al., 2018).

2.1.1 Psychosocial

Psychosocial struggles (i.e., emotional, social, mental) are common in individuals LWBC (Essue et al., 2020). Over 40% of adults LWBC report three or more emotional concerns (Fitch et al., 2019). Struggles may include financial uncertainty (Nayak et al., 2017), relationship tensions (Wang & Feng, 2022), the fear of cancer recurrence (FCR) (Podina et al., 2023), anxiety and depression (Maass et al., 2019). For example, the odds of depression are over two times (95% CI [1.3 - 4.2]) more likely in individuals LWB breast cancer compared to controls (Maass et al., 2019). Additionally, almost 20% of individuals LWBC experience clinically significant symptoms of FCR, defined as “fear, worry, or concern relating to the possibility that cancer will come back or progress” (Lebel et al., 2016, p. 3265); these levels impair quality of life and often require professional assistance (Luigjes-Huizer et al., 2022).

2.1.2 Physical

Acute, late, and chronic physical side effects also occur, all decreasing daily functioning and quality of life (Nurgali et al., 2018). For example, cancer-related fatigue (CRF) is one of the most frequently reported side effects associated with several common cancer treatments (e.g.,

chemotherapy and radiation) and can persist for months or years following treatment completion (Kang et al., 2023). CRF is persistent fatigue that interferes with daily living (Mock et al., 2001). CRF differs from fatigue in healthy individuals, as it is not alleviated by rest (Mock et al., 2001). While prevalence rates vary depending on cancer type and treatment stage (i.e., on or off treatment), over 70% of those LWBC report CRF, with as many as 40% reporting severe fatigue (Kang et al., 2023).

Chemotherapy-induced cognitive impairment (also known as “chemo-brain”) is another distressing side-effect impacting cognitive functioning such as concentration, memory and processing speed and is associated with several common cancer therapies including chemotherapy, radiation, and hormone therapy (Das et al., 2020; Wu & Amidi, 2017; Orszaghova et al., 2021). While the degree of impairment varies with treatment modality, cancer type, age, genetics, and mental health status (Orzoghova et al., 2021), up to 75% of those on treatment and 35% of individuals several months post-treatment completion experience cognitive impairment (Das et al., 2020; Cramer et al. 2019).

Chemotherapy-induced peripheral neuropathy (CIPN) (i.e., tingling/numbness/pins-and-needles sensations, inability to sense temperature/pain), is another common disabling physical side effect. CIPN is frequently associated with neurotoxic chemotherapies such as platinum-based drugs, taxanes, and vinca alkaloids (Cioroiu & Weimer, 2017; Maihöfner et al., 2021; National Cancer Institute, 2020). While the prevalence of CIPN varies by therapy dose/duration, genetics, age, or pre-existing nerve damage, as many as 68% of individuals LWBC will suffer from CIPN one month after completing chemotherapy. The chronic incidence (i.e., 6 months or more) of CIPN with some chemotherapeutic agents ranges from 40% to as high as 93% (Colvin, 2019; Brozou et al., 2018; Seretny et al., 2014).

Cachexia, defined as the “ongoing loss of skeletal muscle mass (with or without loss of fat mass) that can be partially but not entirely reversed by conventional nutritional support” (Fearon et al., 2011, p. 489) has been shown to impact as many as 30% of all individuals LWBC (Law, 2022). Like other common side-effects, prevalence depends on cancer type, treatment type and dose. For example, the prevalence of cachexia is as high as 87% in individuals LWB pancreatic and gastric cancer, 60% with several common cancers (e.g., colon, lung, prostate, non-Hodgkin lymphoma), and approximately 40% with breast cancer, sarcoma, leukemia, and Hodgkin’s lymphoma (Kazemi-Bajestani et al., 2015; Shachar et al., 2016; Tegels et al., 2015).

In addition to the varied disease and treatment related side-effects, disease recurrence and/or metastatic relapse impacts a substantial proportion of people LWBC. For example, glioblastoma, epithelial ovarian cancer, and soft tissue sarcomas have near 100%, 85% and 50% recurrence rates (Nabors et al., 2013; Corrado et al., 2017; Casali, 2015). Finally, multimorbidity (i.e., the existence of two or more health conditions) is an additional challenge confronted by individuals LWBC (Asogwa et al., 2023; Keats et al., 2021). Multimorbidity is known to impact cancer diagnosis, treatment(s) received and complicate overall healthcare needs. Of note, those LWBC may be as much as three times more likely to experience multimorbidity than those in the general population (Ahmad et al., 2023).

2.2 A Call to “Move More”

One highly studied approach to mitigating the myriad of negative outcomes for individuals LWBC is exercise. The definition of exercise varies in the literature, but generally refers to “planned, structured, and repetitive” movement that “has as a final or an intermediate objective of the improvement or maintenance of physical fitness.” (Caspersen et al., 1985, p. 126). In addition, there is an established understanding that exercise is not only beneficial for

physical health but is also a protective factor for mental health (Smith & Merwin, 2021). Several recent systematic reviews and meta-analyses of randomized control trials (RCTs) and qualitative studies consistently find that combined aerobic-resistance exercise increases quality of life across a range of cancer types both during and after treatment (Malveiro et al., 2023; Segal et al., 2017; Burke et al., 2017). The following sections highlight the benefits of exercise for well-being in individuals LWBC and describe the current guidelines for exercise in this population.

2.2.1 Psychosocial

Law et al. (2023) conducted a systematic review and found that exercising at least three times per week resulted in improved depression scores compared to controls (standard mean difference [SMD] = -0.16; 95% CI [-0.29 - -0.03]) immediately post-treatment. Another recent systematic review by Sun et al. (2023) found that exercise (2-5 times per week) can reduce symptoms of anxiety (SMD = - 1.51, 95% CI [-1.74 - -1.27]) in those LWBC. Based on a rapidly expanding body of evidence, the American College of Sports Medicine (ACSM) recently updated exercise guidelines for persons LWBC recommending a combination of aerobic and resistance exercise to improve anxiety and depressive symptoms (Campbell et al., 2019).

2.2.2 Physical

CRF: Recent systematic reviews show that exercise is effective at decreasing CRF (Malveiro et al., 2023; Stout et al., 2017). In comparing exercise with other first-line treatments for CRF (i.e., pharmaceutical, psychological, and combinations of both), exercise had the highest effect on reducing CRF (weighted effect size [WES] = 0.30, 95% CI [0.25 - 0.36]) (Mustian et al., 2017). *Cognition*: While promising evidence is emerging suggesting exercise improves self-reported cognition (regression coefficient β = -0.7, 95% CI [-1.2 - -0.1]) (Koevoets et. al., 2022), there is currently a lack of objective primary measures of cognition (Campbell et al., 2019;

Sturgeon et al., 2023) to establish evidence-based exercise recommendations. *Peripheral neuropathy*: Duregon et al. (2018) conducted a systematic review and concluded that exercise for individuals LWBC undergoing chemotherapy should be recommended to mitigate peripheral neuropathy. German and American guidelines for supportive therapy for persons LWBC have adopted this evidence and recommend functional exercise (i.e., mobility, sensorimotor, vibration training) upon initiation of cancer treatment to mitigate peripheral neuropathy (Maihöfner et al., 2021; Loprinzi et al., 2020) *Cachexia*: While evidence is limited, a recent observational study found that self-reported physical activity was strongly positively correlated ($r=0.68$) with improved muscle strength in persons LWBC (Polat et al., 2023). Additionally, while results from RCTs on exercise and cachexia remain inconclusive, it is thought that exercise may help support the maintenance of skeletal muscle regulation (Grande et al., 2021). *Cancer recurrence*: A growing body of evidence suggests exercise may reduce the risk of cancer recurrence (Patel et al., 2019). A recent systematic review and meta-analysis of eight RCTs found the intervention group (breast, lung and mixed cancers) had a risk ratio (RR) of 0.52 (95% CI [0.29-0.92]); this corresponds to a 50% reduced risk of cancer recurrence in persons LWBC who engaged in high-intensity interval training, resistance, and/or endurance exercise (Morishita et al., 2020). *Multimorbidity*: A systematic review and meta-analysis of 23 RCTs assessing the impact of exercise on individuals LWBC with multimorbidity found quality of life and physical functioning was significantly improved with supervised/partially supervised exercise (e.g., aerobic, resistance, calisthenic, circuit, Tai-Chi, balance, and flexibility) (Bricca et al., 2020).

2.2.3 Current guidelines

Given the growing body of evidence supporting the benefits of exercise for individuals LWBC, cancer-specific exercise guidelines have been developed (Segal et al., 2017). The first

guidelines were published in 2010 by the ACSM (Schmitz et al, 2010). The guidelines emphasized the safety of exercise for cancer patients and recommended a combination of at least 150 minutes of aerobic and two resistance exercise sessions each week (Schmitz et al., 2010). These guidelines mirrored general guidelines designed for otherwise healthy populations (Campbell et al., 2019). In response to this (in addition to the 281% increase in exercise oncology RCTs since 2010), the ACSM acknowledged that there is no “one-size fits” all approach and noted that exercise recommendations need to be individualized to accommodate specific patient needs (i.e., health status, treatment(s) received, cancer type, stage, etc.) (Campbell et al., 2019); a multidisciplinary roundtable discussion with input from twenty organizations across the world consequently published updated North American guidelines in 2019 (Campbell et al., 2019). The revised guidelines emphasize the importance of a *progression* towards the original aerobic and resistance recommendations (Campbell et al., 2019). The revised guidelines also provide cancer-specific recommendations tailored to accommodate specific disease and treatment-related side effects (Campbell et al., 2019).

2.3 Prevalence of and Attitudes on Exercise in Individuals LWBC

Despite the multitude of benefits of exercise and published guidelines (Campbell et al., 2019) calling persons LWBC to move more, the majority are not meeting recommended exercise levels. While the degree of inactivity varies across cancer type, demographics, and time since diagnosis, both subjective and objective measures of physical activity find insufficient activity in individuals LWBC (Avancini et al., 2020; Galvão et al., 2015; Thraen-Borowski et al., 2017; Douma et al., 2020). For example, over 50% of persons living with breast, prostate, and other mixed cancers, over 60% of those LWB colorectal cancer, and almost 90% of individuals LWB lung cancer do not meet physical activity guidelines (Gildea et al., 2023). While Canadians

LWBC have physical activity levels similar to the general population, their cancer history puts them at risk for poorer disease outcomes and quality of life (Friedenreich et al., 2016).

Additionally (and not surprisingly), individuals LWBC report up to 50% declines in physical activity 4 to 12 months after a cancer diagnosis (Littman et al., 2010; Mason et al., 2013; Fassier et al., 2016). Despite these declines, a study of almost 300 individuals LWBC found that most are generally receptive to exercise; over 80% believe it is safe, over 90% believe it is beneficial during/after treatment, and over 98% believe they should be exercising (Caperchione et al., 2022). However, 85% of people LWBC state they don't have knowledge on how to exercise (Caperchione et al., 2022).

2.4 Healthcare Professionals in Exercise Promotion

2.4.1 Role, attitudes, and current practices

The reasons underpinning inactivity in individuals LWBC are multifaceted, however Schmitz et al., (2019) suggests that HCP play an important role in facilitating the knowledge translation about exercise to individuals LWBC. This is because HCPs provide credible and reliable sources of information for individuals LWBC to act on (Caperchione et al., 2023). Additionally, qualitative studies of individuals LWBC state that, in the context of exercise referral, if their HCP hadn't brought up exercise, they wouldn't have consulted anyone about it (Caperchione et al., 2023). Finally, Borsati et al. (2023) reports that individuals LWBC receive exercise as important due to the sole fact that an HCP is bringing it up with them.

Generally, HCPs agree that exercise discussions are part of their role. A recent study of HCPs (some of whom had previously discussed exercise and/or referred individuals LWBC to exercise programs and some of who had not), found that almost 90% strongly agreed that discussing exercise with individuals LWBC is part of their role (Cantwell et al., 2018).

Additionally, ample evidence suggests HCPs believe that exercise is effective for mitigating cancer side effects; almost 75% believe that exercise can decrease the risk of recurrence in some cancer types, and 87%, 93% and 94% of HCPs say they would advise those LWBC before, during, and after treatment to engage in exercise (Ramsey et al., 2022). Further, as many as 80% of HCPs believe exercise increases the effectiveness of some forms of treatments (Delialioğlu et al., 2022). Despite HCPs positive attitudes towards exercise, a systematic review by Alderman et al. (2020) finds that less than 60% of HCPs report discussing exercise with individuals LWBC. Noting that referral rates vary by HCP profession (e.g., 9% of nurses and 23% of physicians referred patients to exercise programs), they found that the average referral rate to exercise specialists/programs is less than 20% (Alderman et al., 2020).

2.4.2 Barriers and facilitators

There are multiple reasons why HCPs experience challenges promoting exercise with individuals LWBC. Table 1 highlights a selection of studies conducted in the past 5 years that focused on exploring HCPs perceived barriers/facilitators to exercise oncology promotion. By digging into this literature, we can better understand (1) what the optimal role of HCPs in exercise discussions with individuals LWBC should be and (2) how to design a program that meets HCPs needs within this role. While not a formal systematic review, we identified two qualitative studies, three quantitative studies, and one systematic review of quantitative studies.

Table 1*HCP Perceptions of Barriers and Facilitators to Exercise in Individuals LWBC*

Author & Region	Design	Population	Measures	Findings
Mizrahi et al., 2022: Australia	Quan. 1-time survey	Physicians (23%), nurses (11%), allied health (25%), other (41%) (<i>n</i> =67)	Fitness assessment (aerobic, strength, body composition) & survey (referral habits, attitudes on exercise)	75% report referral to exercise professional is important (F)
Delialioğlu et al., 2022: Turkey	Quan. 1-time survey	Surgical oncologists (45.3%), radiation oncologists (25.6%), hematologists (18.6%), medical oncologists (10.5%) (<i>n</i> =86)	Perceptions, beliefs & practices	Lack of training/expertise (B)
Ramsey et al., 2022: Australia	Quan. 1-time survey	Medical practitioners (42%), nurses (28%), exercise specialists (14%), non-exercises allied health (16%) (<i>n</i> =375)	Knowledge & current beliefs on exercise & cancer, current practices on exercise referral	48% report safety, 47% time, 40% how to screen, 35-50% when/how/who to refer & how to counsel (B); 89% report posters for individuals LWBC, 86% practitioner education sessions, 85% having exercise specialist on team (F)
Alderman et al., 2020: Australia, Belgium, Canada	Quan. systematic review	Physical therapists (<i>n</i> =98 hospitals); patients (<i>n</i> =15,25479); medical oncologists (56%), surgical oncologists (3-5%), oncology nurses (6.8%), radiation nurses (4.2%), other (1.7%) (<i>n</i> =123); outpatient care physicians (<i>n</i> =287), physicians inpatient care (<i>n</i> =242), oncology nurses (<i>n</i> =388), physicians outpatient	Attitudes, practice, barriers & enablers	Time, referral pathways, patient interest (B); exercise specialists (F)

		(n=287), physician inpatient (n=242), & oncology nurses (n=388) (n=917); survivors (n=311); oncologists (n=281); medical, radiation oncologists (n=199); oncology nurses (n=274); oncology nurses (n=119); oncology nurses (69%), physiotherapists (31%) (n=84); oncologists (n=167); survivors (8%), adults no cancer (92%) (n=358); physicians (general practitioners, specialized practitioners) (58%), oncology nurses (42%) (n=956)*		
Shea et al., 2020: Atlantic Canada	Qual. Description, 1-time semi-structured interviews	Oncologists (23%), nurses (23%), allied health (20%), administrators (17%), program leaders (17%) (n=30)	Attitudes, practices, barriers & enablers	Time, expertise, funding (B); programs, exercise specialist, networks to facilitate reach beyond central zones, ongoing research (F)
Dennett et al., 2020: Australia	Qual. Thematic analysis, 1-time semi-structured interviews	Oncologists (12%), nurses (52%), haematologist (4%), allied health (32%) (n=25)	Thoughts, barriers/facilitators	Right time to engage patients, knowledge, resources/services to refer to (B); convenient reach (F)

Note. Quan = Quantitative. Qual = Qualitative. B = Barriers. F = Facilitators

*Semicolons (;) in Alderman et al. *population* column separates each population reviewed

Five studies (qualitative and quantitative) assessed HCP perceived barriers to discussing and referring exercise (Delialioğlu et al., 2022, Ramsey et al., 2022; Alderman et al., 2020; Shea et al., 2020; Dennett et al., 2020). Lack of time/competing priorities was identified in four of the five studies (Delialioğlu et al., 2022, Ramsey et al., 2022; Alderman et al., 2020; Shea et al., 2020). Ramsey et al., (2022) found that almost 50% of HCPs report this barrier (Ramsey et al., 2022). Lack of education/expertise (e.g., not knowing the types of exercise to recommend, not knowing how to assess an individual LWBC's fitness to exercise) was identified in all five studies (Delialioğlu et al., 2022, Ramsey et al., 2022; Alderman et al., 2020; Shea et al., 2020; Dennett et al., 2020). For example, Dennett (2020) quotes an oncologist stating “When patients ask me what they can do [for exercise] I say well just do whatever you want” highlighting the lack of knowledge and confidence in providing specific exercise recommendations (p. 6038). Additionally, Ramsey et al. (2022) report as many as 50% of HCPs who don't know how to screen individuals LWBC for suitability to exercise (Ramsey et al., 2022). Lack of programs to refer individuals LWBC to was identified in three studies (Alderman et al., 2020; Dennett et al., 2020, Shea et al., 2020). For example, Dennett (2020) quotes a clinician stating the following that speaks to the limitation of program availability: “It's not worth bringing it up. You don't plant the seed, unless you can water it” (Dennett et al., 2020b, p. 6039). Next, limited knowledge on referral pathways/limited structured referral mechanisms was expressed in two studies (Ramsey et al., 2022; Alderman et al., 2020). For example, Ramsey et al. (2022) finds 30-50% of HCPs do not know how to refer individuals to exercise programs.

Next, five studies evaluated/suggested facilitators to exercise promotion among HCPs (qualitative and quantitative) (Ramsey et al., 2022; Alderman et al., 2020; Shea et

al., 2020; Dennett et al., 2020; Mizrahi et al., 2022). All found that HCPs report exercise specialists team integration as a facilitator to discussing exercise with individuals LWBC; the exercise specialist would be able to take on the role of in-depth assessment and advisement of an exercise plan (Ramsey et al., 2022; Alderman et al., 2020; Shea et al., 2020; Dennett et al., 2020; Mizrahi et al., 2022).

Given the time and expertise constraints expressed by many HCPs (Table 1), the current established role of HCPs in exercise promotion has focused specifically on their role in the initiation of a brief discussion with their patient and subsequent referral to an exercise specialist (Caperchione et al., 2023). Specifically, a proposed pathway would involve HCPs initiating a brief conversation about exercise followed by a referral to an established exercise program whereby a CEP or similarly designated professions (see Table 2) would assess, advise, and monitor the individual LWBC to ensure their fitness to participate in exercise (Schmitz et al., 2019; Caperchione et al., 2023).

Table 2*Summary of Exercise Specialist types, Qualifications and Scopes of Practice*

Role	Qualifications	Scope of Practice
Clinical Exercise Physiologist (CEP)	Certification from Canadian Society for Exercise Physiology or American Association of Sports Medicine	Evaluate and screen for suitability to exercise, develop exercise programs and monitor those enrolled, support exercise behaviour change skills, understand how chronic disease impacts exercise.
Physiotherapist	Master's in physiotherapy	Evaluate, diagnose, and treat mobility impairments, prescribe exercise tailored to addressing pain in acute phase of injury.
Registered Kinesiologist	Kinesiology degree and additional licensing exam, regulated by province-specific regulatory bodies	Promote physical activity as a means to rehabilitate and enhance performance, such as strength conditioning treatment (College of Kinesiologists of Ontario)
Qualified exercise professional (QEP)	Background in kinesiology (or similar training) & Thrive Health Services training	Run community exercise programs.

Note: CEP = Clinical Exercise Professional. QEP = Qualified Exercise Professional, table adapted from Daun et al., 2024 & Wagoner et al., 2023

This model is supported by studies that suggest there is improved participation and outcomes for individuals LWBC in those who receive both an HCP recommendation and are provided an additional exercise program resource (in comparison to a recommendation alone) (Winters-Stone et al., 2018; Kirkham et al., 2018). By HCPs initiating a brief discussion, they have a huge opportunity to effect behaviour change with respect to exercise (Schmitz et al., 2019). In response to the push towards this referral model, Caperchione et al. (2023) explored HCP experiences with this referral pathway, whereby HCPs referred individuals LWBC to a CEP integrated within the cancer care pathway. Through interviews with both HCPs and CEPs, they found that HCP initiation

of exercise discussions promotes exercise as a credible adjunct to cancer treatment, and the referral pathway made exercise access easier for individuals LWBC (Caperchione et al., 2023).

2.5 Tackling Barriers: A Call-to-Action

Given the importance of exercise in the health and well-being of individuals LWBC and the role of HCPs within effecting this change, multiple calls-to-action to integrate exercise into cancer care have been made (Nadler et al., 2017; Caperchione et al., 2023). In response to the call, a Canadian-based research collaborative amongst two Canadian provinces, EXCEL (Culos-Reed et al., 2020) is seeking to implement a strategy to enhance HCPs discussion and referral to exercise through creation, implementation and evaluation of a feasible referral pathway for HCPs.

EXCEL is a large effectiveness-implementation study that offers individuals LWBC in rural/remote areas with an 8-12 week, circuit-based exercise program (i.e., aerobic, resistance, balance and flexibility exercises) (Culos-Reed et al., 2020). By leveraging a clinic-to-community model, regional “hubs” support community organizations in delivering and monitoring the EXCEL program. This means that HCPs practicing in rural/remote areas can refer individuals LWBC to a central hub CEP (e.g., located in Calgary or Halifax) who assesses an individual LWBC’s fitness to exercise and discusses their personal exercise goals. Once assessed, the participant can take part in the 8-12 week program in their local community run by EXCEL-trained⁴ qualified exercise professionals (QEPs) or virtually through a secure Zoom platform. Of note for the current

⁴ QEPs complete exercise-oncology online training(www.thrivehealthservices.com)

study, EXCEL leverages the HCP-to-CEP referral pathway, whereby HCPs are educated by lead EXCEL researchers about the program and how to refer to it and can then directly refer individuals LWBC to hub CEPs. In addition to measuring the effectiveness of EXCEL to enhance the existing body of literature showing exercise is effective at improving mental and physical fitness (via fitness tests pre- and post- program), EXCEL is measuring how feasible the program is in clinical practice (as per recommendations from the ACSM stating that conducting research with a focus on implementation feasibility is critical to ensuring the program can translate outside research environments) (Schmitz et al., 2019; Brownson et al., 2018; Czosnek et al., 2021). As such, the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) effectiveness implementation framework is being employed (Vinson et al., 2018); further, RE-AIM was updated to RE-AIM QuEST (Qualitative Evaluation for Systematic Translation) to recognize the value of qualitative interviews with HCP stakeholders to inform implementation. As such, information gained from interviews allows for real-time referral pathway improvement through context-dependent insights from HCPs (Glasgow et al., 1999; Glasgow et al., 2019; Forman et al., 2017). The thoughtful design of EXCEL hopes to address barriers and leverage facilitators to HCP referral, including: (1) an exercise program in-and-of-itself that exists for HCPs to refer to, (2) educational sessions provided to HCPs on how the program works and how to refer to it, and (3) a referral pathway that is intended address HCP barriers to initiating exercise discussions by leveraging the role of CEPs.

In alignment with Re-AIM QuEST, EXCEL is seeking to understand HCP experiences with the referral pathway. The rationale to assess HCP experiences is threefold: (1) literature on HCP experiences with the HCP-to-CEP referral pathway is

limited; one study by Caperchione et al. (2023) assessed three HCP experiences with this referral pathway (Caperchione et al., 2023) (2) literature involving HCP experiences during implementation of oncology exercise programs is limited; in a systematic review of 39 exercise oncology implementation studies, none assessed HCP experiences (Czosnek et al., 2021) (3) As illustrated in Table 1, data on Canadian-specific HCP experiences with exercise implementation is limited. As such, the primary purpose of this study is to explore HCP perspectives and experiences with EXCELS referral pathway. This is a question that has been suggested as a next step in research by Albert et al. (2020). In doing this, we hope to answer the following research question using a qualitative approach guided by interpretive description (ID): What are the perspectives and experiences of HCPs using EXCELS referral pathway? How can this help inform our understanding of the pathway's strengths and limitations so that we can incorporate their feedback into ensuring EXCEL (and programs like it) can be implemented clinically? Insights into this research question (informed by Thorne (2016)) have been provided through semi-structured interviews that have been analyzed. Through my analysis of these interviews, I hope to (1) identify any ongoing challenges and any propose changes necessary to improve HCPs referrals to the EXCEL program and (2) assess how these challenges may apply to the development of future exercise programs for Canadian individuals LWBC.

The choice of a qualitative approach is warranted for several reasons. First, qualitative studies are warranted when there is limited information for the topic in question (Thorne, 2016); there is currently very limited research on novel referral pathway assessments. Second, qualitative methods are critical to understanding the *how* and *why* in implementation research; in EXCEL, we are conducting exploratory research

to figure out what works and what doesn't work (and why/why not) within the referral pathway to adapt the pathway to meet HCP needs (Hamilton & Finley, 2019).

CHAPTER 3 METHODS

The current study was developed using an ID methodology. ID is a qualitative research method that strives to generate knowledge that is specific for a clinical context of health. It is typically chosen by health researchers when conducting projects that have a clinical/practical application to health systems as it promotes practical informed action (Thorne, 2016). As such, given the goal of developing and adapting a referral pathway for clinical use by HCPs, ID was used. Development of research questions, the interview guide and the analysis plan were guided by ID. This chapter will explain how ID arose, why ID was appropriate for the current research, my own researcher orientation, credibility considerations, ethics, participants, data collection, and analysis plan.

3.1 How ID Arose

Thorne (2016) developed the ID qualitative research method. Prior to ID, three common qualitative research approaches existed: ethnography (developed from anthropology), grounded theory (developed from social science), phenomenology (developed from psychology). All three of these approaches focus on theorizing about human nature and behaviour. As such, ID was born out of a need for a qualitative research approach that could go beyond theorizing and meet the needs of applied health disciplines, such as nursing.

It allows for health disciplines to not only theorize, but to do so in a way that facilitates application to clinical experience by grounding the analysis in one's own health disciplinary knowledge. In other words, knowledge production through qualitative ID is understood within a practical context due to disciplinary experience, building on a constructivist orientation to knowledge inquiry. This fosters a unique approach to

knowledge creation, whereby knowledge is co-constructed between the researcher (myself) and participant responses. ID is not a “formal method” (p. 38) with a “circumscribed sequence of steps” (p. 38). Rather, it builds on traditional methods to align them with an applied health discipline epistemology (Thorne, 2016).

3.1.1 Why ID is appropriate

According to Thorne (2016), ID has three characteristics: (1) answers “a real-world question” (p. 40); (2) provides “understanding of what we do and don’t know” (p. 40); and (3) appreciates the context that participants practice under to generate meaningful results. ID not only presents findings but discusses how those findings and their context inform the future of that clinical practice (i.e. the “so what” of the findings); as such, ID interpretation assumes that we seek realities that don’t exist objectively but are socially constructed through subjective clinical experience. In the context of this thesis, the goal is to determine the perspectives and experiences of HCPs with regards to exercise referral to implement a real-world clinical referral pathway within a practical oncology discipline (Thorne, 2016). As such, it meets criteria 1-3 above.

3.1.2 Orienting the researcher

According to Thorne (2016), orienting oneself as a researcher is a key component of ID for several reasons. First, it provides transparency to readers about how the interpretation may be guided by the researcher’s prior beliefs. Second, it ensures that the researcher takes time to reflect on their prior assumptions so that potential biases upon interpretation can be mitigated (Thorne, 2016).

To begin my orientation, I have an honours undergraduate degree in Neuroscience and am currently studying my Master of Science in Kinesiology. I am personally biased

towards the benefits of exercise for wellbeing; I recently ran my second marathon and am actively training for another one to support my own personal wellbeing. As such, my interpretation of interviews ensured that I did not assume all HCPs agree with the importance of exercise for wellbeing. Next, I currently volunteer in the “Physical Activity and Cancer Lab” (in Halifax) which values, promotes, and delivers evidence-based exercise programs for individuals LWBC; most individuals enter our programs through referrals from HCPs. Through informal conversations with participants, I have learned personal stories about the lack of information received by HCPs about exercise programming. I also frequently observe our research coordinator (a CEP) who assesses and advises individuals LWBC on exercise based on HCP referrals. Most interactions I observe within the lab between HCPs, the CEP and individuals LWBC are positive, wherein HCPs and individuals LWBC appreciate the CEP role. As such, it was critical that my interpretation of interview segments on the role of CEPs was not biased towards interpreting all HCPs as supportive of CEPs. Third, I came into the current project when it was already off the ground and actively recruiting HCPs; I did not construct the interview guide nor conduct the interviews but have adopted a positive view of the potential benefits of EXCELS referral pathway through education from peers and supervisors who are involved in the project. Despite coming into the project mid-way, I have taken significant steps to understand the project, including extensive research to draft the current proposal, conversations with supervisors/primary investigators/PhD students/lab coordinators, master’s course lectures on qualitative research and implementation science, and research/reading/watching lectures on ID. Despite coming into a project that was off-the-ground, I have extensively reviewed the literature and have

built my own case within this thesis proposal for why EXCEL is a critical program; it will be important that I recognize the bias I have that supports the value of EXCEL.

To keep the above biases in check, Thorne (2016) suggests that specific evaluation criteria on the purpose, process and context are critical. First, “epistemological integrity” (p. 233) entails ensuring the research process aligns with the research question. Next, I will ensure that “representative credibility” (p. 234) is applied; for example, when findings from the current study suggested HCPs supported the pathway, no inferences that this is true across all Canadian HCPs were made. Next, “analytic logic” (p. 235) was applied; this meant that stating inductive reasoning occurred was not sufficient, and validation of the inductive process through examples was provided. Finally, “interpretive authority” (p. 235) was applied; my own classification of which truths in the results are more subjective and which are likely more of a shared view (i.e., less subjective) were discerned (Thorne, 2016).

3.1.3 Credibility considerations

In addition to the evaluation on purpose, process and context, Thorne (2016) suggests that there are additional ways to critique ID research that consider larger disciplinary context: moral defensibility, disciplinary relevance, pragmatic obligation, contextual awareness. The current study is morally defensible because it seeks to understand how EXCEL is working for HCPs to ensure (1) HCP clinical practice is optimized and (2) individuals LWBC can benefit from exercise programs to improve their wellbeing. Next, disciplinary relevance exists because no assessment of EXCELs referral pathway has been done. Third, pragmatic obligation exists because if the referral pathway is found to be successful based on interview responses, the integration of the pathway into

clinical practice can be further explored as a feasible option. If found not successful, the pathway can be adapted based on responses to make it more feasible. Finally, I have considered contextual awareness; I understand that my views are influenced by my own perspective (as outlined in the “Orienting the researcher” section), while HCPs come with their own disciplinary perspective.

3.2 Ethics

EXCEL was registered with ClinicalTrials.gov (# NCT04478851) and was approved by the respective ethics boards at participating Canadian provinces: (1) Health Research Ethics Board of Alberta (HREBA.CC-20-0098) (coordinating center) (2) Nova Scotia Health Research Ethics Board (ROMEO File # 1026031). Consent forms with study information were sent to recruited HCPs, with verbal consent obtained at the point of interview prior to data collection (Appendix A). Interview transcripts from Nova Scotia are stored on the Nova Scotia Health servers, with all de-identified transcripts sent to the coordinating centre, University of Calgary. Alberta transcripts are all stored on the University of Calgary servers.

3.3 Participants

Research leaders in Nova Scotia and Alberta identified hub and satellite sites within their provinces. Nova Scotia’s hub was Halifax, while its satellite sites were located within Nova Scotia. Alberta’s hub site was Calgary, and included satellite sites within Alberta, Manitoba, and Saskatchewan. After identification of sites, emails were sent out to HCPs practicing at those sites. Follow-up meetings and larger “lunch-and-learns” with HCPs were scheduled, which were facilitated by provincial leaders to teach HCPs about the EXCEL program and the referral pathway. This educational component

was in alignment with the COM-B (Capability, Opportunity, Motivation – Behaviour) framework, whereby optimal conditions for capability (ability to cognitively understand the importance of exercise through EXCEL educational resources), opportunity (creating an environmental, i.e. the program, to make the referral possible) and motivation (promote the exercise oncology field to energize HCPs towards engaging in referral behaviours) can combine to change behaviour in HCPs (Michie et al., 2011). The focus on educating HCPs is also in alignment with the Ezenwankwo et al. (2022) scoping review, where findings advised that service reach may be best achieved by educating HCPs about how, when, and where patients can be referred to existing programs.

This study employed purposive sampling to recruit HCPs from satellite sites who referred their patients (individuals LWBC) to the EXCEL program. HCPs were contacted by a research coordinator via email to request their participation in an interview. HCPs interviewed included oncologists, general practitioners, surgeons, physiotherapists, pharmacists, social workers, and nurses.

3.4 Data Collection

HCPs were recruited between September 2020 and June 2023 as part of the EXCEL clinical network. All network members were asked to participate in a semi-structured interview to assess their perspectives and experiences using EXCELs referral pathway. All interviews were conducted in year three of EXCEL, between July 2023 and September 2023. Interviews were conducted in-person and online via Zoom. Interviews lasted between 17 and 45 minutes, were recorded, and transcribed verbatim into Microsoft Word. The transcriptionist also accounted for non-verbal communication (e.g., laughter) from HCPs. The Nova Scotia interviews were conducted by a trained researcher

who was the research coordinator for the Atlantic hub of the EXCEL project; she is a PhD Candidate in the Faculty of Health who has extensive interview experience. The Alberta interviews were conducted by three different students (2 PhD, 1 Masters), all of whom practiced interview techniques with interview-experienced PhD students.

Interview questions (Appendix B) were prepared to evaluate HCPs perspectives and experiences on EXCELs referral pathway. The interview also included questions to learn about their current views on exercise in order to inform the context to guide accurate interpretation. The guide was developed using the RE-AIM QuEST framework, which proposes open-ended questions applied during implementation (Forman et al., 2017). Interview questions centred around the following topics:

1. Background (e.g., years of experience, are you physically active)
2. Experience with EXCEL (e.g., what are your perceptions of exercise, what is the value of EXCEL/exercise programs generally in cancer care)
3. Experience discussing EXCEL (e.g., what type of resources do you provide to patients about EXCEL/exercise, what barriers make it hard to introduce EXCEL)
4. Experience with CEPs (e.g., what is the importance of CEPs in cancer care, are there barriers in using CEPs as main facilitator of exercise oncology education/referral for patients in clinical settings)
5. Plans for continued participation (e.g., will you continue referring patients to EXCEL in the future, what additional resources would aid in facilitating this referral)

3.5 Analysis

Transcripts were organized with the assistance of NVivo (Lumivero, 2020). Analytic notes to ensure traceability were employed throughout the process. Braun & Clarke's (2006) thematic analysis method was used, a method that is accepted under the ID methodology. The over-arching steps to this method include data familiarization, coding, and theme identification; I chose to follow Maguire & Delahunt (2017) step-by-step guide to thematic analysis to inform my approach. *Familiarization*: I first familiarized myself with the data prior to coding to understand its scope (Thorne, 2016). This involved reading and re-reading transcripts, making comments on the transcripts, and conversations with the interviewer/transcriptionist. While familiarizing, I wrote short summaries on my initial thoughts of what the interviewee was saying for several transcripts. Taken from Hunt (2009) approach to ID, these summaries were used to ensure that throughout analysis of transcripts, participant stories and idiosyncrasies were not ignored. *Coding*: As per Thorne et al. (2004) and advisement from ID qualitative researchers, interviews should be analyzed holistically (i.e., not line-by-line/word-by-word coding), as this ensures researchers continue to look at the larger picture patterns and follow their intuition. In Maguire & Delahunt's (2017) guide, this type of analysis is referred to as "theoretical thematic analysis" (p. 3354), which states that only items relevant to the research question are coded. Coding took place according to (1) open coding: assigns non-inductive broad categories to the data, followed by non-inductive specific categories, (2) axial coding: identifies connections between coded data (e.g., what context gives rise to that code), and (3) selective coding: identifies and explores core themes. A codebook that outlined codes, their definitions and examples was kept and was

modified as I read through new transcripts to ensure a thorough iterative analytic approach.

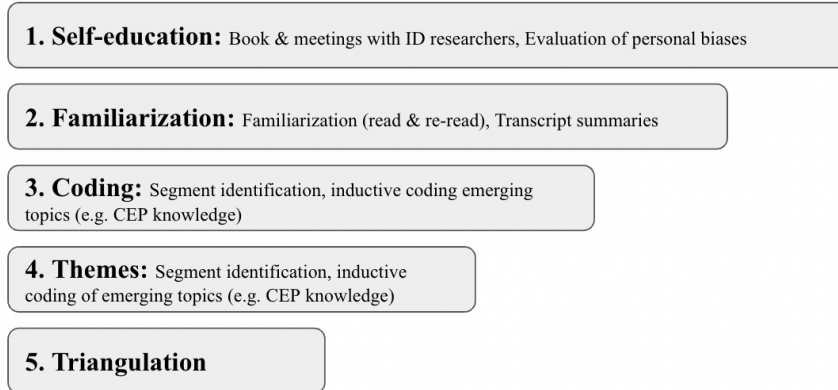
As per Thorne (2016) transformation steps, themes that began emerging were verified against interview transcripts constantly to ensure it was representative of what the interviewee was saying. To ensure interpretation was appropriate, a combination of clinical engagement (CEPs working in exercise oncology and oncology nurses) and my own disciplinary experience in exercise and cancer was employed. In this phase, I asked myself questions about what the data was telling me, what I wanted to know and what the relationship was between these two. This was a critical place where interpretation of HCP statements were made. For example, when deriving Theme 1, the following approach was applied:

1. Given my background with CEPs, I identified statements on the role of CEPs as important. The data revealed that HCPs value CEPs and use knowledge of CEPs to initiate discussions about exercise and EXCEL; it equally revealed a lack of knowledge about the specific role of CEPs (described in results)
2. I wanted to know how a lack of knowledge on CEPs may be a barrier to referral (described in discussion)

A summary of the analysis process is described below in Figure 1.

Figure 1

Interpretive Description Analysis Process



Note. ID = Interpretive Description, CEP = clinical exercise physiologist

After coding approximately 7 interviews, I engaged with one of the interviewers to disseminate my preliminary themes, with a goal of ensuring they were consistent with their observations during interviews. This engagement aligns with the concept of “investigator triangulation” (Patton, 1999, p.1195) in qualitative research, which states that by having multiple data analyzers, credibility, and quality of research is enhanced (Patton, 1999). Within this stage, I equally asked myself about what I may *not be seeing* in the data and alternative ways of thinking about the data. This ensured that drawing on potential theoretical outliers was accounted for. Here, identification of themes and their further interpretation into the clinical context started to emerge (Thorne, 2016).

CHAPTER 4 RESULTS

The aim of this inquiry was to assess HCP perspectives and experiences using the EXCEL referral pathway. This chapter first describes participant characteristics. Then, it describes an underlying narrative of “achieving more by doing less” that depicts HCP experiences using the pathway; this narrative manifests through three distinct themes described below.

4.1 Participants

A total of 13 HCP interviews were conducted. Twenty-six HCPs from the NS hub who referred participants to EXCEL were invited to complete a one-time interview; 6 consented to participate and were interviewed. Nineteen HCPs from the AB hub who referred participants to EXCEL were also invited; 7 consented to participate and were interviewed.

Participants were all trained to work with oncology patients and included 1 oncologist, 1 surgeon, 2 general practitioners, 3 nurses, 2 social workers, 1 physiotherapist, and 1 pharmacist (2 participant roles were not recorded). For quote identification purposes moving forward, roles are identified as either (1) “Physicians” (includes surgeons, oncologists, and general practitioners) (2) “Nurses” or (3) Allied health provider and other (includes social workers, physiotherapists, pharmacists, and non-identified roles). Years of experience in healthcare, while not reported by all HCPs, ranged from 7 to 25 years. Sex and gender of participants was not obtained during interviews.

All HCPs interviewed had referred to EXCEL and noted that they consider exercise as critical for the overall wellbeing of individuals LWBC. Specifically, they

spoke to its benefits for physical and mental health, improved sleep, and decreased fatigue. Additionally, they spoke to its ability to empower patients to be in control of their own health.

“...we always encourage our patients to uh exercise after receiving their prostate cancer [diagnosis] and sometimes learning into treatment” -Nurse

“Physical activity is so important. It helps the patient's sleep better at night, which helps them heal and get through this process.” -Nurse

“...I think it gives them, you know, something outside of this very sanitized medicalized world to kind of also work on within their own control. So, I think the value mentally, physically, and also socially, you know, is tremendous there as well.” -Allied health provider and other

“...I think it's really important in the sense that it helps to improve patient um endurance and decrease level of fatigue.” -Physician

4.2 Achieving More by Doing Less

The coherent narrative that underpinned HCPs perspectives and experiences was that HCPs feel empowered to do more (i.e., refer to exercise) by doing less. This was achieved through the implementation of an integrated system that supported them in doing so. These supportive systems (i.e., access to CEPs, streamlined referral pathway, program feedback) manifested as three subthemes: (1) Optimizing the role of CEPs in multidisciplinary cancer care, (2) Simplicity drives sustainability, and (3) Generating a positive feedback loop. Facilitators emerged within each theme. Themes and their respective facilitator are summarized in Table 3.

Table 3

Themes from HCP Experiences Referring Individuals Living with and Beyond Cancer to an Exercise Program

Sub-theme	Facilitator
Optimizing the role of CEPs in multidisciplinary cancer care	Knowledge and education on role of CEPs
Simplicity drives sustainability	Integration of referrals with existing medical record systems
Generating a positive feedback loop	Patient testimonials from their EXCEL experience

Note: HCP=Healthcare Professional, CEP=clinical exercise professional,

EXCEL=EXercise for Cancer to Enhance Living Well

4.3 Theme 1: Optimizing the Role of CEPs in Multidisciplinary Cancer Care

The first theme identified was “optimizing the role of CEPs in multidisciplinary cancer care”. Some HCPs were well versed on the role of the CEP:

“So when I describe it to my patients, I say it's not like the gym guy that's going to yell at you to do push-ups, it's someone that has, you know, a very medical...a medical and an understanding of human anatomy. And from that perspective, understanding of like movement, like the signs of movement, kinesiology.” -Allied health provider and other

“As [role] we're not great at exercise. Were good at you know understanding what need but our CEP's are who's really you know the key role in delivering that exercise I think” -Allied health provider and other

Some struggled to describe their role:

“I'm familiar with the term. I don't know a whole lot about it.” -Nurse

“I wouldn't know what their credentials or expectations of them are. But I think it's a physical activity promoter, director, uhm, specialist uhm of knowledge...”

-Allied health provider and other

“You guys are the first people I've known with this degree. And I looked it up a little bit, and I think it's fascinating.” -Allied health provider and other

“So, I know that it's not physiotherapy and it's not kinesiology, it's like how to exercise to meet your goals.” -Allied health provider and other

“...I don't think I could give you a perfect definition, but I mean I understand that sort of the role of a physiologist and my assumption is that if they are certified does then they are meeting certain criteria in order to safely have people exercise right?” -Physician

While having heard of CEPs, some did not understand the nuances between physiotherapists and CEPs:

“I don't know if I really understand the nuances ... between a physiotherapist and an exercise physiologist.” -Allied health provider and other

“An exercise physiologist, what's the training? Because these aren't physiotherapists. So what's the background?” -Physician

Of those who knew the role of the CEP or were described their role by the interviewer, HCPs recognized the skills they provide and supported integrating them as part of cancer care:

“...I've worked with many [CEPs] throughout my career and [name] who we work with for EXCEL uh has that training as well... I'm a huge supporter of our exercise professionals.” -Allied health provider and other

“100% I think [CEPs have] always been a missing piece. I think a PT and a CEP is a perfect team in combination with our other rehab people [for] both our acute

and certainly our chronic health care populations. It really is a missing piece in health care.” -Allied health provider and other

“...as a tool in our toolkit, or as somebody that we can rely on, I think [having a CEP on the team would] be highly valuable.” -Physician

Additionally, many highlighted the depth of knowledge CEPs provide:

“[They] bring a better depth of knowledge to what I can tell them” -Allied health provider and other

“...I often will say we need an OT, and a physio, and, you know, a CEP would be perfect. Because, you know, a lot of what I do is like kind of like exercise counselling, but I don't have the time or the capacity or the skills to provide adaptive movements.” -Allied health provider and other

Overall, the results suggest a knowledge gap surrounding the role and expertise of CEPs among HCPs interviewed. Additionally, the specific differences between physiotherapists and CEPs are not well understood. Of those who better understood the role of the CEP, there was high support and appreciation for their expertise and integration into cancer care.

4.3.1 CEP knowledge facilitates HCP conversations about EXCEL

HCPs used their knowledge of CEPs to facilitate and support conversations about EXCEL with individuals LWBC:

“...I do mention to the patients [that CEPs are] very like specific to... chronic disease and cancer...” -Nurse

Additionally, some suggested that general knowledge surrounding CEPs would be useful background for them to have:

“...knowledge of...the role of the CEP and what their background is and what they can offer and how they can work collaboratively with in the team together with the rehab professionals you know specifically but that bigger team as well...education on both those facets [is needed]” -Allied health provider and other

“I think like any time you are working in a multidisciplinary environment its important to let people know what the persons job is and how they can help and how they can be integrated in.” -Physician

The results above describe how knowledge about CEPs (e.g. their role and expertise), serves as a facilitator for HCPs to engage in exercise conversations with individuals LWBC. Additionally, given varied knowledge and understanding of the role of CEPs, additional education may be an important next step to better support HCPs in initiating exercise conversations with their patients. Thus, as it pertains to the larger subtheme of “Achieving more by doing less”, promoting greater understanding on the role of CEPs may empower HCPs to do more (i.e., refer to exercise), as it may instill greater confidence in a trusted resource that HCPs can lean on to take on in-depth exercise assessments for individuals LWBC.

4.4 Theme 2: Simplicity Drives Sustainability

A second theme that emerged was “simplicity drives sustainability”; the simpler and more time efficient a referral system is, the more positively an HCP will respond to it. To set up the context, many HCPs commented on their time-constrained clinical environments that limits their ability to discuss exercise in-depth:

“...there's so many things to do with a visit, and there's so much ground to cover, and you're getting pages about other patients, and you're running behind in the clinic, that it's so difficult to give the focus to everything that it requires.”

-Physician

“I don't have the time or the capacity or the skills to provide adaptive movements.” -Allied health provider and other

“...we just don't have the time” -Physician

“I think the main barriers are...the time in the clinic to do it.” -Physician

“...sometimes time [is a barrier].” -Allied health provider and other

“... when [my patient and I are] talking...I do bring [exercise] up, and it is important, but it's not something that I can address at that very moment.” -Nurse

4.4.1 Low-burden systems facilitate referral

HCPs identified low-burden referral systems as important facilitators to continued referral; this logically aligns with the time-constrained context expressed by many HCPs above. Some HCPs perceived the current EXCEL referral system to be low-burden due to strong communication, efficient email systems and low paperwork burden:

“I think we've um really established a good system and have had a lot of communication around that.” -Allied health provider and other

“I definitely like the fact that I can email you folks and say like this person has consented, here's their phone number.” -Nurse

“Yeah. Like the smaller the amount of paperwork, the better. If I can just give you guys their information, that really helps. It makes me more likely to do it...I usually like that I can put it to somebody else to follow up on.” -Nurse

“Well, I hope to [continue to refer to EXCEL]. Especially if you give me the one page forms that are easy to fill out.” -Physician

Some suggested that referrals integrated into current medical electronic systems would be an important addition for adopting referral more seamlessly into clinical practice:

“I think maybe the easier thing would be if you were a bookable in [name of booking system]...” -Allied health provider and other

“...I think we should have just one medical record. And if it was just like a little thing I clicked and off it went, that would be an ideal world. Sending an email is fine for me. But I did forget yesterday...”-Physician

While EXCEL has provided a feasible and easy-to-use system for many HCPs, referrals may be further simplified and supported by integrating referrals into medical record systems. Thus, HCPs are inclined to “do more” (i.e., refer) when the system requires them to “do less”.

4.5 Theme 3: Generating a Positive Feedback Loop

The final theme, “generating a positive feedback loop”, describes the benefits of positive patient feedback/health outcomes for reinforcing HCPs to continue referring individuals LWBC to EXCEL. Many HCPs explicitly stated several positive experiences they have had with regards to feedback from individuals LWBC who participated in EXCEL:

“...the patients who I have had who have engaged with your programs have finished and said, ‘I wish there wasn't an end to this. I'd love to keep going. And I feel so much better.’” -Allied health provider and other

“[I heard about EXCEL]...through a participant. And he was very, very eager to share with me one of the things that he had stumbled upon...But he was the one who gave me the information about the program. And then was very proud about some of the promotional materials...We got some posters done up. We’ve referred a few patients since then. And yeah, so he actually was our shared person that made me aware of that program. So I’m very thankful.” -Allied health provider and other

“The feedback from the participants has been great.” -Allied health provider

“We get really great feedback [from patients] on the EXCEL program.” -Nurse

4.5.1 Feedback facilitates referral habit

In addition to current feedback that HCPs received above, HCPs spoke to the value of participant testimonials and EXCEL research findings as sources of positive reinforcement for continued referral:

“I wonder if there’s like patient testimonials that would help the clinicians. Because I know for me, if I’m starting to refer either like somebody new or a different thing, and the patient comes back after and is like, ‘Oh, my God, I feel so great. This was... Thank you for doing that,’ that just like builds that habit.”

-Allied health provider and other

“[I] just hand out the pamphlet but I don’t get really any feedback on afterwards.” -Allied health provider and other

“...you could have like a patient testimonial, like a little blurb” -Physician

“...I guess...preliminary or ongoing findings is always interesting to hear about.”

-Allied health provider and other

HCPs also spoke to the importance of using participant feedback to inform their description of the program to other individuals LWBC that they treat:

“...I tell them make sure you tell me what's working for you, so that I can give that feedback to more people coming down the line...” -Nurse

“...we have had some people on active treatment that have done the program. They said good things, and I know that they said they've tailored it to their needs, which is usually what we tell people that you know that it sounds like the program is very open to doing that. But I think it's very important.” -Nurse

The results above demonstrate that HCPs recognize the times when individuals LWBC speak positively about the program. In keeping with this, feedback is noted as important reinforcement to continued referral. With respect to the larger narrative, HCPs are motivated to do more when they receive feedback.

CHAPTER 5 DISCUSSION

In chapter 5, each of the interpretive themes are discussed. This chapter also explores limitations, future directions, and implications of the research.

5.1 Theme 1: Optimizing the Role of CEPs in Multidisciplinary Cancer Care

The first theme that emerged relates to HCP perspectives on CEPs in multidisciplinary cancer care. The lack of knowledge identified on the role of CEPs may lie in the fact that CEPs are a relatively new role in clinical history; in fact, the professional standards program that accredits CEPs is just over 40 years old (CSEP, 2023). Additionally, a description of the role, training, and expertise of the CEP is not currently included in the educational materials used in EXCEL. HCPs who knew the role of CEPs used this knowledge to support conversations about EXCEL with individuals LWBC, with some suggesting that more education on their role is needed; while several studies have found the need for more HCP education on how to promote exercise (Pellerine et al., 2022; Albert et al., 2020), few have identified CEP knowledge as a specific component piece to this education. Those who understood the role of CEPs were in favour of integrating them in cancer care. Similarly, Russell et al. interviewed HCPs on their experiences with referral to allied health services for individuals LWBC, and found high support for multidisciplinary coordination between primary and allied health providers. Additionally, Adams et al. (2021) surveyed HCPs, and found integration of exercise professionals into cancer care teams as a high-priority item.

5.1.1 Interpretation

The lack of knowledge on the role of CEPs was an important finding because it was interpreted as a barrier to HCP referral in EXCEL. The linkage between knowledge

and referral has been identified in several studies. For example, O'Brien et al. (2018) found that knowledge promotion on exercise in medicine is associated with greater frequency of referrals in Nova Scotia. Additionally, Zurynski et al. (2021) found that clearly defined roles within multidisciplinary teams (in the context of lifestyle modification programs) is an enabler to referral.

The first reason why low CEP knowledge is interpreted as a barrier to referral is because HCPs (who have a duty to care for their patients) are more willing to refer to care providers (such as CEPs) if they have a clear understanding of and belief that a referral will benefit and improve the overall care of their patient; for example, specifics on their training, licensing and registration may be key in HCP decision-making with regard to referrals. As such, a greater awareness and appreciation for the CEP role is thought to foster trust and promote greater referrals. Similarly, Pellerine et al. (2022) state that HCPs must have confidence in exercise professionals' ability to provide care for the referred patient in order to support a trustworthy referral process. The next reason why low knowledge is interpreted as a barrier to referral is because HCPs within our sample expressed that knowledge surrounding CEPs was used to support their conversations with individuals LWBC about exercise and EXCEL; this in turn ensures that individuals LWBC are more willing to engage in the program. For example, Caperchione et al. (2023) interviewed 3 HCPs and 21 individuals LWBC to gain their perspectives on a similar referral pathway structure to that of EXCEL; individuals LWBC had low knowledge on the role of CEPs, and this low knowledge was associated with lower uptake of exercise programs by them (Caperchione et al., 2023). As such, HCPs play an important role in "cueing" patients to exercise by facilitating an understanding of the role of exercise professionals. Similarly, Zurynski et al. (2021) found that HCPs play an

important role in managing patient expectations of what to expect from a program; when their expectations are managed, individuals LWBC are more likely to engage with the program. As such, HCPs should come equipped with knowledge about CEPs in order to manage patient expectations of a program. Thus, HCP understanding of the function of CEPs (or similar exercise professionals) may play a critical role in an individual LWBC's decision to partake in a program, thus a successful referral.

One practical suggestion is for EXCEL to hold an educational workshop; for example, "Exercise is Medicine Canada" found that a 1-day workshop was effective at (1) increasing HCP confidence in who to refer (2) answering patient questions about exercise and (3) increasing the proportion of referrals by over 50% (Fowles et al., 2018).

5.1.2 Summary

HCP perspectives highlights a limitation in the current referral pathway: low CEP knowledge. The need for more education on the role of CEPs is warranted so that HCPs can trust their patient is in good hands and sell their value to individuals LWBC. Of note, fewer physicians and nurses (compared to dieticians) report exercise training (Pellerine et al., 2022); given that our sample contains mostly nurses and physicians, education may be especially critical. Educational interventions should thus consider inclusion of CEP-specific modules to ensure HCPs are equipped to refer with confidence.

5.2 Theme 2: Simplicity Drives Sustainability

Next, sustainable referral is driven by simplicity due to time-constrained clinical demands of HCPs. While EXCEL's current referral system (email) was seen as feasible, one key facilitator was to integrate referrals into referral platforms that HCPs already use (e.g., having "referral to exercise" as an option to click off). Schmitz et al. (2019) also

propose that integration of referrals within electronic record systems is an important next step for implementation; they additionally suggest that electronic medical record data of individuals LWBC may be leveraged to synthesize important information on patient function and exercise levels in order to either (1) alert an HCP that an individual may be well-fit for a program (such as EXCEL), and/or (2) trigger automatic delivery of exercise materials to individuals LWBC.

5.2.1 Interpretation

Integrating referral into platforms was an important finding because this integration is seen as critical for ensuring referral is time-efficient, easy and readily accessible (so as not to forget to refer). In support of this, a scoping review of over 60 studies that looked at factors influencing referrals in primary care found that technology supporting electronic referrals facilitated the number of referrals made by general practitioners and enhanced overall efficiency (Seyed-Nezhad et al., 2021). Additionally, integration is thought to be critical for enhancing efficiency of referrals across specialties (e.g., better communication between primary and oncology care) (Azamar-Alonso et al., 2019).

In addition to better system wide integration, automated referrals (i.e., patient information is sent directly to the CEP without HCP input) have been explored. Recognizing the busy clinical demands of oncology HCPs, Ahmed et al. (2024) studied automated referrals in the context of oncology palliative care consults. With the caveat that any follow-up by the palliative care program should be emphasized as being part of the cancer care team, patients were extremely receptive to the idea. Notwithstanding, it should be noted that with the rise of more structured referral systems (i.e., integrated

and/or automated), there may be negative implications to consider. First, with more structured systems, there is limited ability to communicate details about the referral; for example, drop-down menus to select “referral to exercise” may limit an HCPs ability to communicate details about the individual LWBC’s context (McGovern et al., 2018). As such, a system that may implement a “click-to-refer” button should consider the importance of having a typed note function. Second, auto-referrals may limit an HCPs perceived need to verbally bring up the importance of exercise with individuals LWBC. Given that HCPs speaking to individuals LWBC about the importance of exercise has been noted as a key facilitator to their participation (Borsati et al., 2023), automation may inadvertently result in a reduced uptake of exercise programs by individuals LWBC. Finally, auto-referrals must consider the volume of referrals that would be received, and if there is sufficient CEP resources and capacity to manage all the referrals.

5.2.2 Summary

HCPs in our sample have described their time-constrained clinical environments, thus warranting more integrated and/or automated referral mechanisms. However, these systems should be carefully trialed and examined to fully understand their implications.

5.3 Theme 3: Generating a Positive Feedback Loop

The final theme described the benefits of positive patient feedback and health outcomes for reinforcing and motivating HCPs to continue referring individuals LWBC to EXCEL. Receiving testimonials about the benefits of EXCEL positively supports HCP referral habit. In the context of pulmonary rehabilitation program referral, Watson et al. (2020) also found that positive patient feedback drove future referrals; specifically, they also found that HCPs use prior patient experience with the program to motivate future

patients to engage in the program. Similarly, Cantwell et al. (2018) also found that all the 30 surveyed HCPs were motivated to refer due to the positive benefits of programs for individuals LWBC. Finally, similar to the EXCEL HCP suggestion of receiving preliminary research results, da Silva et al. (2024) found that HCPs may be more motivated to refer if they see tangible outcomes.

5.3.1 Interpretation

This finding is important because patient feedback in healthcare is increasingly being recognized as an important tool that supports HCP practice; for example, HCPs may use feedback to develop individual support plans for patients, such as referral to a program (van Rooijen et al., 2020; Sundaram et al., 2022; Gidman et al., 2013). One reason why feedback is thought to be important for HCPs is because feedback allows for self-reflection on how their practice may be contributing to positive patient experiences; this in turn has been found to shape HCP self-fulfilment (Jones et al., 2020). For example, in response to the concern that conversations around exercise can be challenging, one nurse commented that patient feedback was a helpful reminder that those discussions pay off: “You'll get a card or a letter, maybe months down the line that...they've appreciated the care that the patient's received and the time we've given them, the discussions that we've had, how open we've been...” (Jones et al., 2020).

5.3.2 Summary

This section has informed the critical importance of developing referral mechanisms that allow HCPs to understand how the individual LWBC is receiving the program. As such, EXCEL (and future referral pathways) should strive to implement

strategies whereby HCPs are able to receive feedback from individual LWBC's experiences in EXCEL.

5.4. Limitations

An important consideration when interpreting the findings of the current study is that all HCPs interviewed had referred their patients to the EXCEL program in the past and were largely supportive of exercise for their patients to improve their overall wellbeing. As such, the findings may not reflect the views of HCPs who did not refer/do not support exercise for individuals LWBC. The views of HCPs who chose not to refer are especially critical to involve, as there may be barriers that prevented them from referring that must be addressed prior to clinical implementation.

Next, the location of healthcare systems in which HCPs worked were limited. HCPs in our sample practice across four Canadian provinces. As such, the results may not generalize to the whole of Canada, given that both geography and healthcare resource allocation changes by province. For example, in the context of referrals to EXCEL, cancer navigators (typically oncology nurses) may play an important role in referring. However, navigation programs and practices differ in each province/territory based on their populations needs; as such, the barriers to referring to EXCEL by an HCP practicing in one geographical region may not extend to all regions (Champ & Dixon, 2024). Further to this, cancer health systems within a single province may have different funding schemes, a consideration raised by HCPs in the context of referrals to allied health professionals (Russell et al., 2023).

Next, data analysis and collection were non-concurrent. Concurrent analysis and collection are suggested as important in ID (and qualitative methods generally) as it

allows researchers to use the knowledge and learnings from interviews to adapt future interviews within the same project (Thorne, 2016). Given that I came into the project once data had been collected already, this was not done.

Finally, as per my researcher positionality statement, I am not a clinician. As such, my choices of what segments of the interview to analyze were based on my own experience working in this space and conversations with clinicians. For example, given my own work with CEPs and knowledge of their role in exercise oncology, I was especially drawn towards extracting segments of the interview relating to CEP knowledge and attitudes. As such, my selection of interview segments to analyze are limited towards my own interpretation and biases of what I thought to be critical information as it pertains to referral.

5.5 Future Directions

Given our sample included only HCPs who referred to the program, next steps in the EXCEL study should strive to recruit and interview HCPs who have never referred to EXCEL or who choose not to refer to EXCEL. This would provide valuable insights on how we might turn a non-referrer into a referrer by learning about their perceived barriers and facilitators. Next, data on where CEP knowledge gaps currently lie (e.g., via distribution of surveys to HCPs) may allow tailored adaptations of educational sessions to include specific CEP knowledge education. Beyond EXCEL, the development of a sustainable approach to CEP education amongst the HCP sample is suggested; one way this may be done is proactively through integration of education on exercise professionals (such as CEPs, QEPs, registered kinesiologists) within professional school education (e.g., medicine, physiotherapy, pharmacy). It will also be critical to assess what it will

take to make a referral process more automated through research of Canadian medical record and referral systems. This is especially important given that across and within both provinces and HCP professional sectors, there is great variability in systems used. In addition to this, research that assesses HCP acceptability of integrated and/or automated referral systems should be assessed in the context of exercise oncology, similar to the work of Ahmed et al. (2024) conducted in the context of automated palliative care consults.

5.6 Conclusion and Implications

Gaining HCP perspectives on EXCELS referral pathway has highlighted that HCPs are more likely to achieve more (i.e., refer more patients) through supportive pathways that provide them with access to a trained exercise professional (i.e., CEP), an efficient referral process, and positive reinforcement (i.e., improved patient outcomes). By analyzing interviews, we extracted several important limitations within the current EXCEL referral pathway that should be addressed in the current pathway and equally used as considerations when developing a sustainable referral pathway for future clinical implementation. First, the gap in knowledge on CEPs may be addressed by more education on their role to ensure HCPs trust who they are referring their patient to. This finding will serve to inform and adapt current EXCEL educational presentations for HCPs to ensure they include information on exercise professionals' certifications and scope of practice. Additionally, the high support for CEPs support embedding an exercise professional into cancer care to help initiate and support exercise conversations and hence facilitate exercise referrals. Next, the physical process of referring should be integrated into current electronics systems to support HCPs in referring, given HCPs time-

constrained environments. This indicates that research into referral systems that our HCP sample is using may provide us with a deeper understanding of how to successfully create an automatic referral system (e.g., leveraging the “Noona” Patient App, an app that connects patients with their cancer care providers). Finally, HCPs value patient feedback on the program as an important source of evidence for future referral. Within EXCEL, strategies to enable participants to share feedback with HCPs are being explored (i.e., online discussion forum).

Importantly, limitations within the current study design mean that results cannot be generalized to all HCPs across Canada and are limited to the viewpoints of HCPs who referred to our program and support exercise for individuals LWBC.

These study findings are critical to inform the creation of a sustainable exercise referral process that HCPs are willing to adopt. If HCPs are willing to adopt and utilize referrals to exercise, the amount of discussions about exercise and subsequent referral of individuals LWBC to programs is expected to increase; this will allow individuals LWBC the important opportunity to improve their mental and physical wellbeing.

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Appendix A Informed Consent Form



Informed Consent Form for Participation in a Research Study

EXCEL: EXercise for Cancer to Enhance Living well Study

(A study to evaluate the benefit of a community-based exercise program for cancer survivors in rural and remote Canada)

Clinical Trial Resgistry NCT04478851

Principal Investigator: Dr. Melanie Keats, PhD
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And NSHA Affiliated Scientist, Division of Medical Oncology

Sponsor/Funder(s): The Canadian Institutes of Health Research/ Canadian Cancer Society
and the Alberta Cancer Foundation

You are being invited to participate in a research study because you are a healthcare provider, involved in the care of those living with and beyond cancer. This consent form provides detailed information about the study to assist you with making an informed decision. Please read this document carefully and ask any questions you may have. All questions should be answered to your satisfaction before you decide whether to participate.

The study staff will tell you about timelines for making your decision. You may find it helpful to discuss the study with family and friends so that you can make the best possible decision within the given timelines.

Taking part in this study is voluntary. You may choose not to take part or, if you choose to participate, you may leave the study at any time without giving a reason. Deciding not to take part or deciding to leave the study will not result in any penalty.

The principal investigator, who is one of the researchers, the site research coordinator, or research assistant, will discuss this study with you and will answer any questions you may have. If you do consent to participate in this study, you will need to sign and date this consent form. You will receive a copy of the signed form.

WHAT IS THE BACKGROUND INFORMATION FOR THIS STUDY?

The growing population of cancer survivors in Canada has brought attention to the long term toll of cancer and its treatment on the body, mind, and overall health of survivors. Exercise is an effective intervention that can optimize the health and well-being of cancer survivors and possibly reduce rates of cancer recurrence and secondary cancers.

The Nova Scotia Health Research Ethics Board, which oversees the ethical acceptability of research involving humans, has reviewed and granted ethics approval for this study.

WHY IS THIS STUDY BEING DONE?



The purpose of this study is to evaluate the benefit of a community-based or online exercise program for cancer survivors who live in rural and remote locations. The study is called EXCEL and includes an evidence-based exercise program. Our aim is to provide an exercise program to cancer survivors living in rural and remote locations to promote adoption of an active lifestyle in order to improve health outcomes. EXCEL will increase accessibility to exercise as a supportive cancer care resource for all cancer survivors. As part of our quality improvement cycles, we are interested in understanding your experiences as a healthcare provider with EXCEL.

HOW MANY PEOPLE WILL TAKE PART IN THIS STUDY?

Between 10-15 healthcare providers and 10-15 fitness professionals across Canada will take part in these interviews. Of those, 5 from each group will be from Nova Scotia.

WHAT WILL HAPPEN DURING THIS STUDY?

If you agree to participate, the interview will be one-on-one with the research coordinator or research assistant, and will take approximately 20-25 minutes to complete. The purpose of these interviews is to get your feedback on your experience with EXCEL, specifically surrounding the logistics of referring your patients to EXCEL.

WHAT ARE THE POTENTIAL SIDE EFFECTS FROM PARTICIPATING IN THIS STUDY?

You will be responding to questions regarding your experience with the study. You may refuse to answer any questions that you do not feel comfortable with.

WHAT ARE THE BENEFITS OF PARTICIPATING IN THIS STUDY?

Participation in this study may or may not be of personal benefit to you. However, based on the results of this study, it is hoped that we can learn how to better support clinical referral of patients into community based exercise oncology programs.

WHAT ARE MY RESPONSIBILITIES AS A STUDY PARTICIPANT?

If you choose to participate in this study, you will be asked to participate in one interview, which will require a 20-25 minute time period. The research coordinator or research assistant will ask you a series of questions related to your experience with the referral process in EXCEL.

CAN I CHOOSE TO LEAVE THIS STUDY EARLY?

You can choose to end your participation in this research (called early withdrawal) at any time without having to provide a reason. If you choose to withdraw early from the study without finishing the interview, you are encouraged to contact the principal investigator or research coordinator.

You may withdraw your permission to use information that was collected about you for this study at any time by letting the research coordinator know. However, this would also mean that



you withdraw from the study. Information that was recorded before you withdrew will be used by the researchers for the purposes of the study, but no additional information will be collected or sent to the sponsor after you withdraw your permission.

HOW WILL MY PERSONAL INFORMATION BE KEPT CONFIDENTIAL?

If you decide to participate in this study, the principal investigator and study staff will only collect the information they need for this study.

Records identifying you will be kept confidential to the extent permitted by the applicable laws, will not be disclosed or made publicly available, except as described in this consent document.

Authorized representatives of the following organization may look at your identifiable study records at the site where these records are held for quality assurance purposes and/or to verify that the information collected for the study is correct and follows proper laws and guidelines:

- The NSHA REB and people working for or with the NSHA REB because they oversee the ethical conduct of research studies within the NSHA;

All information collected during this study will be kept confidential and will not be shared with anyone outside the study unless required by law. You will not be named in any reports, publications, or presentations that may come from this study.

Authorized representatives of the above organization may **receive** information related to the study that will be kept confidential in a secure online server at NS Health used in current or future relevant health research. Your name or other information that may identify you will **not** be provided (i.e., the information will be de-identified). The records received by these organizations will be coded with a number. The key that indicates what number you have been assigned will be kept secure by the researchers directly involved with your study and will not be released. To protect your identity, the information from the interview will only include your study ID. Collected information during the interview about your position (role, years in cancer care) will be removed from transcription and not be included within the qualitative data analysis.

If the results of this study are published, your identity will remain confidential. It is expected that the information collected during the study will be used in analyses and will be published and/or presented to the scientific community at meetings and in journals, but your identity will remain confidential. It is expected that the study results will be published as soon as possible after completion. This information may also be used as part of a submission to regulatory authorities around the world to support the approval of this intervention.

Even though the likelihood that someone may identify you from the study data is very small, it can never be completely eliminated. Every effort will be made to keep your identifiable information confidential, and to follow the ethical and legal rules about collecting, using and disclosing this information.



WILL I BE COMPENSATED FOR PARTICIPATING IN THIS STUDY?

Although no funds have been set aside to compensate you in the event of injury or illness related to the study procedures, you do not give up any of your legal rights for compensation by signing this form.

WHAT ARE MY RIGHTS AS A PARTICIPANT IN THIS STUDY?

You will be told, in a timely manner, about new information that may be relevant to your willingness to stay in this study. You have the right to be informed of the results of this study once the entire study is complete. If you would like to be informed of these results, please contact the principal investigator.

The results of this study will be available on a clinical registry; refer to the section titled "Where can I find online information about this study?". Your rights to privacy are legally protected by federal and provincial laws that require safeguards to ensure that your privacy is respected.

By signing this form you do not give up any of your legal rights against the hospital, investigators, sponsor, involved institutions for compensation or their agents, nor does this form relieve these parties from their legal and professional responsibilities.

IS THERE CONFLICT OF INTEREST RELATED TO THIS STUDY?

There are no conflicts of interest declared between the principal investigator and sponsor of this study.

WHERE CAN I FIND ONLINE INFORMATION ABOUT THIS STUDY?

A description of this clinical trial will be available on <http://www.clinicaltrials.gov>, as required by U.S. Law. This Web site will not include information that can identify you. At most, the Web site will include a summary of the results. You can search this Web site at any time.

The study registration number to use this website is: NCT04478851



WHO DO I CONTACT FOR QUESTIONS?

If you have questions about taking part in this study, or if you suffer a research-related injury, you should talk to the research coordinator or principal investigator. These person(s) are :

Ms. Jodi Langley (Research Coordinator)

Ph: 902-473-2035

Email: jodi.langley@nshealth.ca

Dr. Melanie Keats, PhD (Principal Investigator)

Ph: 902-494-7173

Email: melanie.keats@nshealth.ca

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

If you have questions about your rights as a research participant, and/or concerns or complaints about this research study, you can contact the Nova Scotia Health Authority Research Ethics Board manager at 902-473-8426 or Patient Relations at (902) 473-2133 or 1-855-799-0990 or healthcareexperience@nshealth.ca.

VERBAL CONSENT

Verbal consent will be given prior to collecting any data.

Appendix B Semi-Structured Interview Guide

Semi-structured interview questions

EXCEL HCPs

Notes to interviewer:

- Background questions
 - What are your views on PA/exercise? Are you physically active yourself?
 - Do you refer to other wellness/exercise/PA resources? If so, what?

First, I'd like to ask some background questions about yourself:

1. Please tell me about your in cancer care/healthcare, how many years you've been in your role, and your involvement with the EXCEL study. If you're comfortable, please share your pronouns and biological sex.

Next, I'd like to ask you about your experience with the EXCEL study:

1. What are your perceptions of physical activity or exercise in general, or EXCEL if you are familiar with it, for individuals living with and beyond cancer?
2. What is it's use / value / overall role in cancer care? How do you see it supporting those going through cancer treatment? Into survivorship?

I'd now like to discuss your experiences with discussing EXCEL in your clinical setting:

1. Did you have any patients bring it up to you (vs you to them)?
2. Are you providing information about the EXCEL study to potential participants?
 - a. If no – go to 2 and probe on 'what barriers do you have to exercise oncology/EXCEL discussions/info being presented
 - b. Tell me about your experiences with providing resources.
 - i. Probe: What do you typically use? Study brochure, posters, etc. do you have enough info??
3. We know there are many barriers in within clinical settings that make it hard to discuss exercise. Can you tell us what barriers you feel make it hard for you to introduce EXCEL to your patients?
4. Beyond simply informing about EXCEL, do you have conversations or provide resources to your patients about exercise benefits for individuals with cancer?
 - a. If 'yes', what benefits do you discuss? Do you find patients receptive to this type of conversation?
 - b. If 'no', why not? How might EXCEL support you in being able to facilitate these types of conversations?

5. Are you familiar with a CEP (say full name)?

a. Depending on yes/no response, have discussion about what they think value of CEP within cancer care is

i. Probe: In busy clinic environments, a CEP may be a key HCP to facilitate patients learning more about exercise, being screened, and being referred into exercise programs.

1. What do you think about this?

2. Thoughts about barriers to doing this?

3. How it might be helpful in your role in supporting patients to live well?

Lastly, I'd like to ask you about continued participation and communication with the EXCEL study:

1. Do you plan to continue to refer to the EXCEL study in the future?

a. If 'yes', can the EXCEL team provide any additional resources for support?

b. If 'no', what can the EXCEL team provide to might help with your potential referrals to EXCEL?

2. Our communication involves email reminders for EXCEL referrals, study newsletters that provide updates on current progress, and direct outreach via phone call. Would you like to continue to receive this type of communication? Do you have a preference or suggestions for future communication from the EXCEL study team?

This is the end of the interview. Thank you for participating in the interview and the study in general. Don't hesitate to contact me in case you have any questions or concerns