



# Implementation Science in Exercise Oncology

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# Presentation Outline



Evidence to Practice Gap



What is ***implementation science***?



Examples of implementation science in  
exercise oncology



Stakeholder thoughts about  
implementation priorities

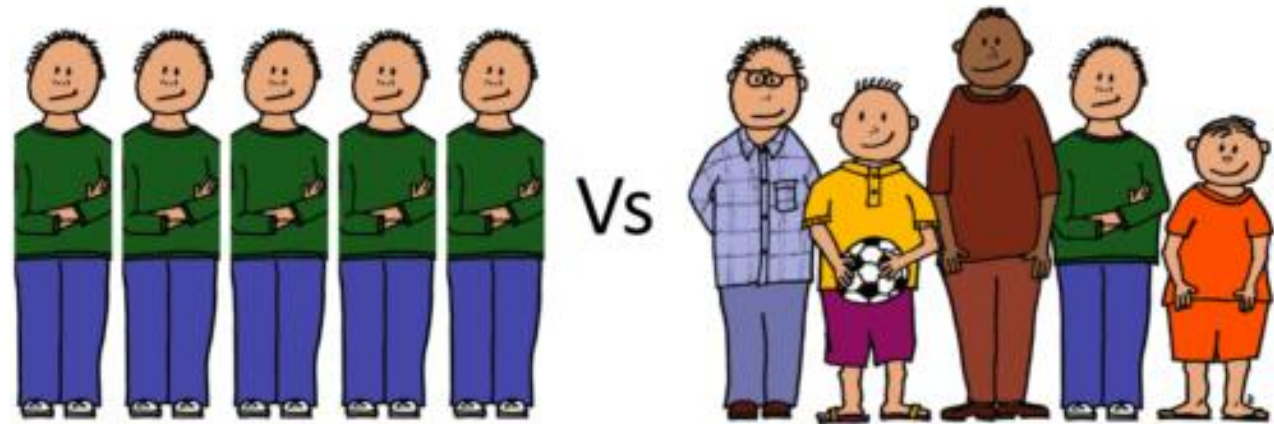
# Evidence to Practice

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- RCTs and Meta-analyses of RCTs set the foundation for Evidence-Based Practice (EBP)
  - Needed to determine efficacy of an intervention
- However, in research, RCTs are “not the only gold that glitters”, and they are limited by:
  - Highly homogenous samples
  - Highly homogenous intervention teams
  - Willing and motivated participants
  - Tightly controlled intervention and control parameters
- RCTs prioritize ***internal validity***, often at the expense of ***external validity*** (generalizability)

Just because an intervention is efficacious, does that mean it is effective?

- **Efficacy** = how well an intervention performs under ideal conditions
- **Effectiveness** = how well an intervention performs under normal/usual conditions



Bottom line: will it work when the constraints and rigours of an RCT are removed and the intervention is delivered at a population level?



Know



MIND THE GAP



Do

# Implementation Science

*“the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services”*

(Eccles & Mittman, 2006, Implementation Sci.)

# Implementation Science

Seeks to understand *if and how well* interventions can be applied '*in the real world*'

What are the **facilitators & barriers** to implementation?

- Feasibility within a target setting (e.g., clinical, community, home)
- Sustainability (e.g., costs, adherence)
- Participant satisfaction with care
- Healthcare professional satisfaction with care
- Integration into the health system and related impact

Study Types/Names

- effectiveness trials
- pragmatic clinical trials
- practical clinical trials
- large simple trials
- Program evaluation





# A Pragmatic Non-Randomized Trial of Prehabilitation Prior to Cancer Surgery: Study Protocol and COVID-19-Related Adaptations

*Daniel Santa Mina<sup>1,2,3\*</sup>, Daniel Sellers<sup>2,3</sup>, Darren Au<sup>3</sup>, Shabbir M. H. Alibhai<sup>2,4</sup>, Hance Clarke<sup>2,3</sup>, Brian H. Cuthbertson<sup>2,5</sup>, Gail Darling<sup>2,6</sup>, Alaa El Danab<sup>7</sup>, Anand Govindarajan<sup>2,8</sup>, Karim Ladha<sup>2,9</sup>, Andrew G. Matthew<sup>2,6</sup>, Stuart McCluskey<sup>2,3</sup>, Karen A. Ng<sup>2,10</sup>, Fayez Quereshy<sup>2,6</sup>, Keyvan Karkouti<sup>2,3</sup> and Ian M. Randall<sup>2,3\*</sup>*

OPEN ACCESS

# Study Objectives and Research Questions

## *Primary Objective: Program Feasibility*

- RQ1a: How many patients will be **referred** and for what reasons?
- RQ1b: What percentage of surgeon-referred patients **participate** in the program?
- RQ1c: What are the **characteristics** of participants and non-participants who are referred to the program?
- RQ1d: What factors contribute to participants **choosing** either FBP or HBP?
- RQ1e: What is the **'prehabilitation window'** for participants (i.e. time from treatment decision to surgery)?
- RQ1f: What is the **adherence** rate to the multimodal components defined by the prehabilitation protocols?
- RQ1g: Is prehabilitation **safe** within a clinical model of care?
- RQ1h: What are the common and unique **barriers and facilitators** to FBP and HBP?
- RQ1i: What are the various **costs and savings** associated with delivering FBP and HBP?

## *Exploratory Objectives: Program Effectiveness*

- RQ2a: What **changes** in do HBP and FBP participants experience by the week prior to surgery and up to 90 days after surgery?
- RQ2b: Compared to usual care (non-participants), what **effect** do FBP and HBP have on peri- and postoperative outcomes (up to 90 days after surgery)?
- RQ2c: Do surgeon's bedside assessment of frailty (as indicated by referral and reason for referral) correlate with established frailty indices?

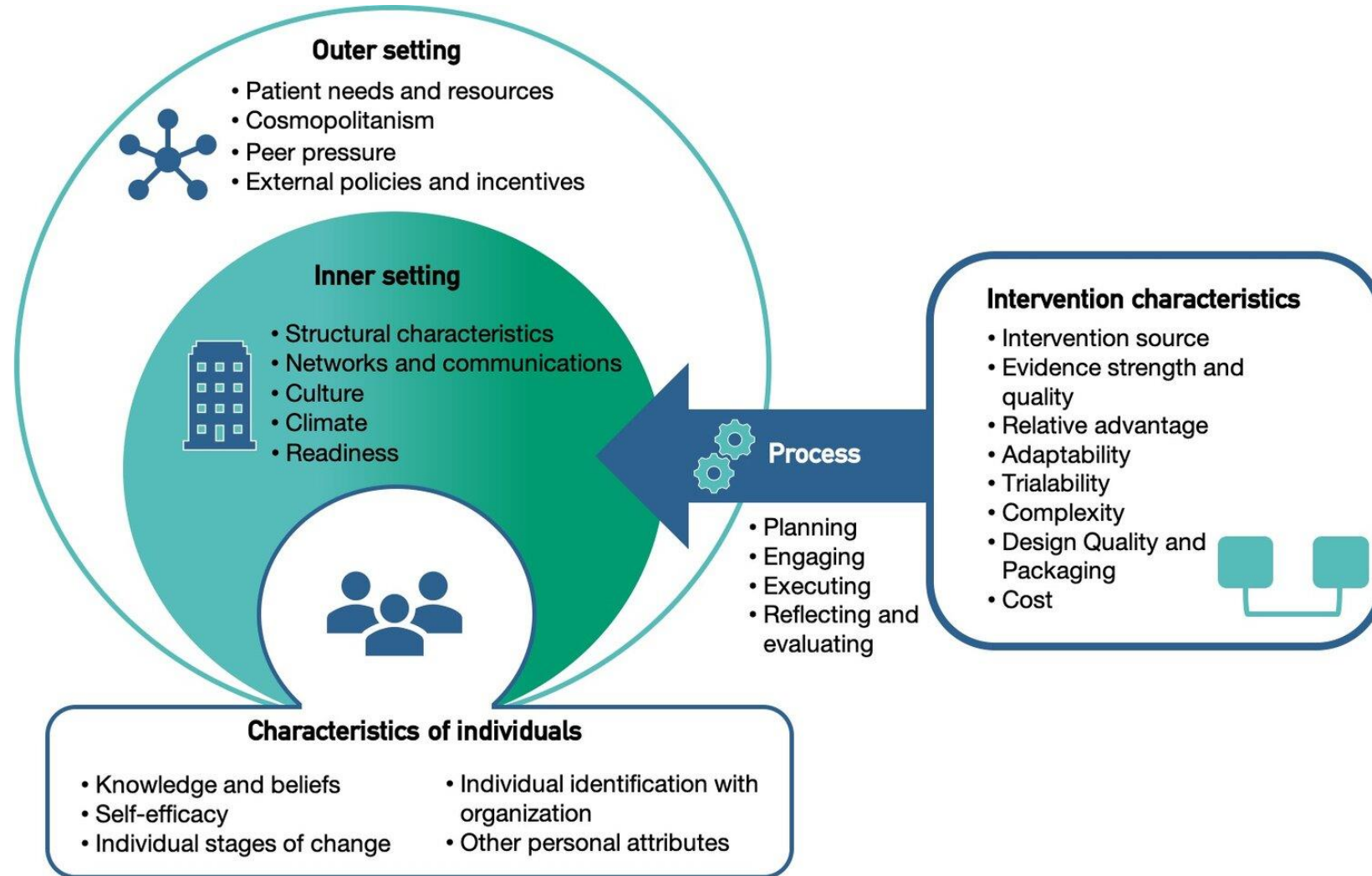


# Research Frameworks

CFIR

RE-AIM

# Consolidated Framework for Implementation Research (CFIR)



# RE-AIM FRAMEWORK

## Elements of the RE-AIM Framework





# Where to start?

- 1. *Build the program*** as you believe it aligns with the evidence and for the setting you wish to see it succeed
- 2. *Evaluate existing programs*** to look for opportunities to optimize or expand
- 3. *Test a model of care*** to address a population need



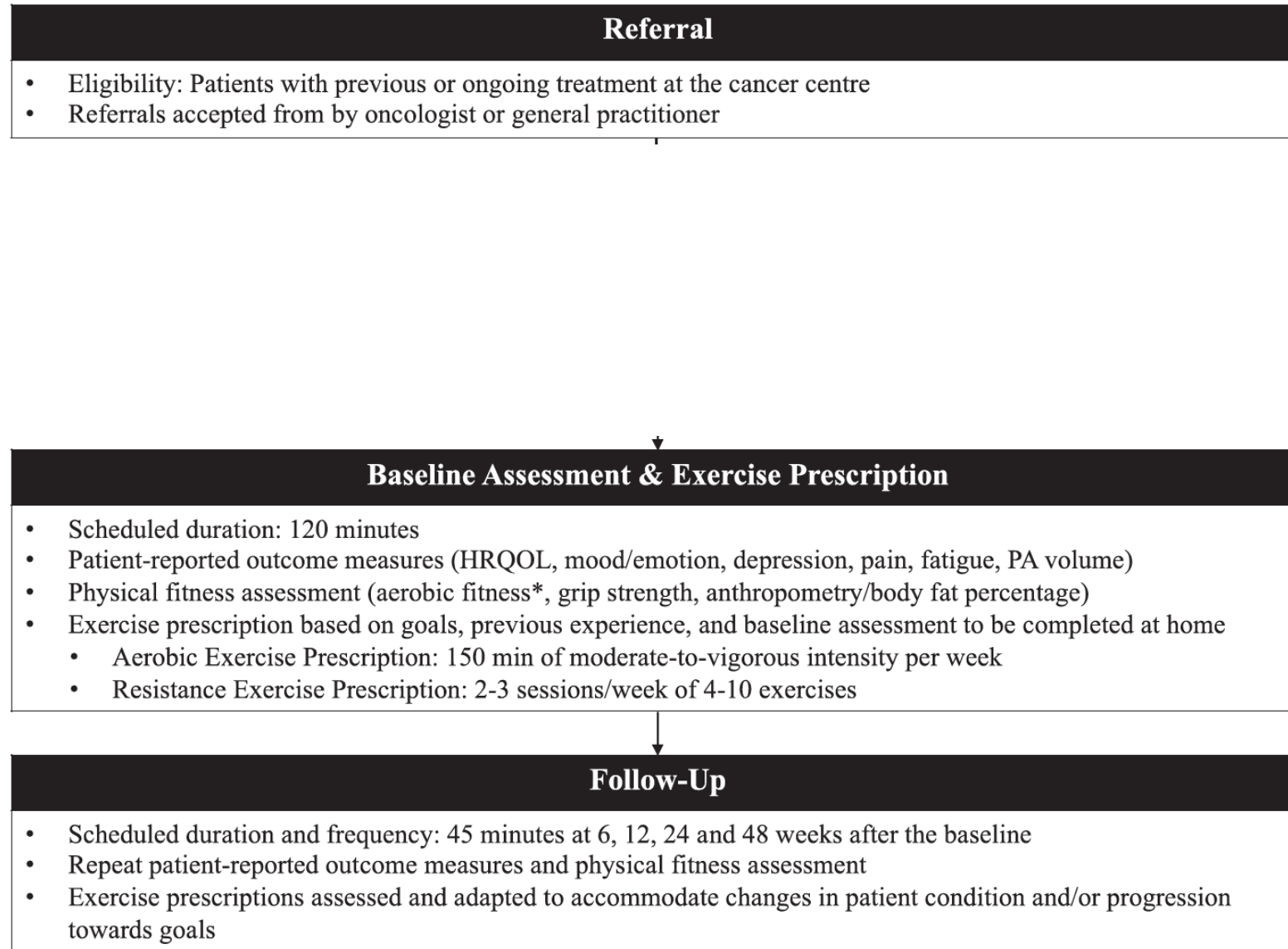
# Development, Implementation, and Effects of a Cancer Center's Exercise-Oncology Program

Daniel Santa Mina, PhD <sup>1,2,3</sup>; Darren Au, MD<sup>1,2</sup>; Leslie E. Auger, PhD<sup>4</sup>; Shabbir M.H. Alibhai, MD, MSc <sup>3,5</sup>; Andrew G. Matthew, PhD, CPsych<sup>2,3,6</sup>; Catherine M. Sabiston, PhD<sup>1</sup>; Paul Oh, MD, MSc<sup>3,7</sup>; Paul G. Ritvo, PhD, CPsych<sup>8</sup>; Eugene B. Chang, MD, MScCH<sup>2,3</sup>; and Jennifer M. Jones, PhD<sup>2,3</sup>

**BACKGROUND:** National and international bodies acknowledge the benefit of exercise for people with cancer, yet limited accessibility to related programming remains. Given their involvement in managing the disease, cancer centers can play a central role in delivering exercise-oncology services. The authors developed and implemented a clinically integrated exercise-oncology program at a major cancer center and evaluated its effectiveness and participant experience. **METHODS:** A hospital-based program with prescribed at-home exercise was developed and accepted referrals over a 42-month period (3.5 years). Implementation was conducted in 2 phases: a pilot phase for women with breast cancer and men with genitourinary cancer and a roll-out phase for all patients with cancer. Enrolled patients were assessed and received an exercise prescription as well as a program manual, resistance bands, and a stability ball from a kinesiologist. Program participation and effectiveness were evaluated up to 48 weeks after the baseline assessment using intention-to-treat analyses. Participants in the roll-out phase were asked to complete a program experience questionnaire at the completion of the 48-week follow-up. **RESULTS:** In total, 112 participants enrolled in the pilot, and 150 enrolled in the roll-out phase. Program attrition to 48 weeks was 48% and 65% in the pilot and roll-out phases, respectively. In participants who consented to research evaluation of their performance, objective and patient-reported measures of functional capacity improved significantly from baseline in both phases. Participants were highly satisfied with the program. **CONCLUSIONS:** Despite significant drop-out to program endpoints, our cancer-exercise program demonstrated clinically relevant improvement in functional outcomes and was highly appreciated by participants. *Cancer* 2019;0:1-11. © 2019 American Cancer Society.

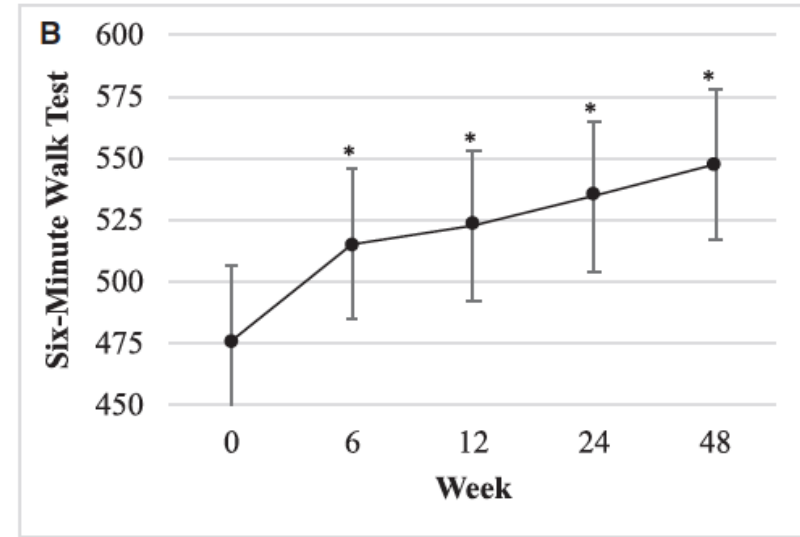
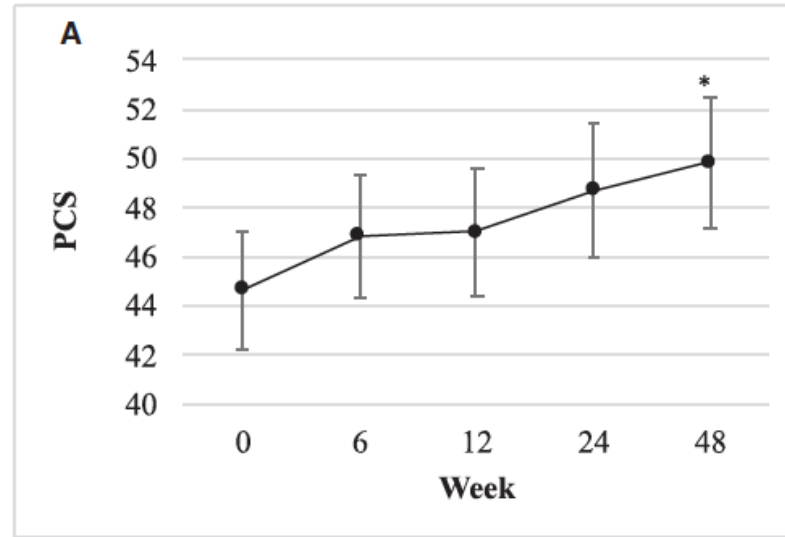
**KEYWORDS:** cancer, exercise, implementation science, program development, rehabilitation, supportive care, survivorship.



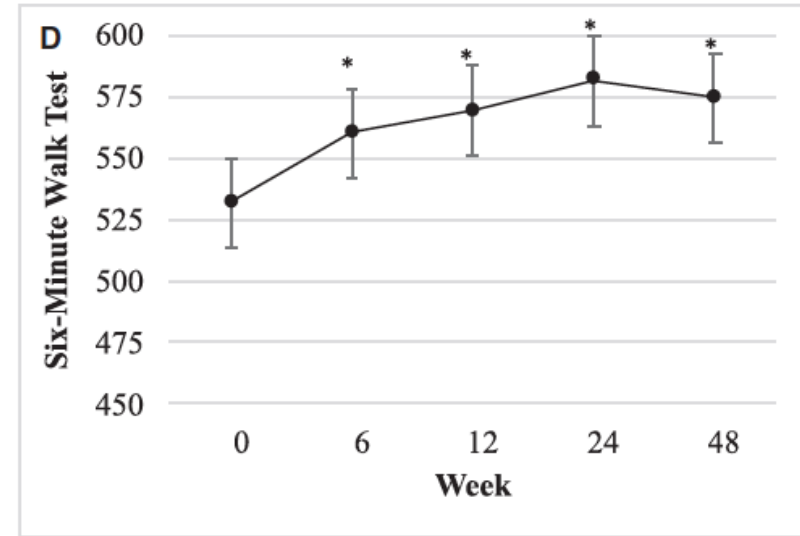
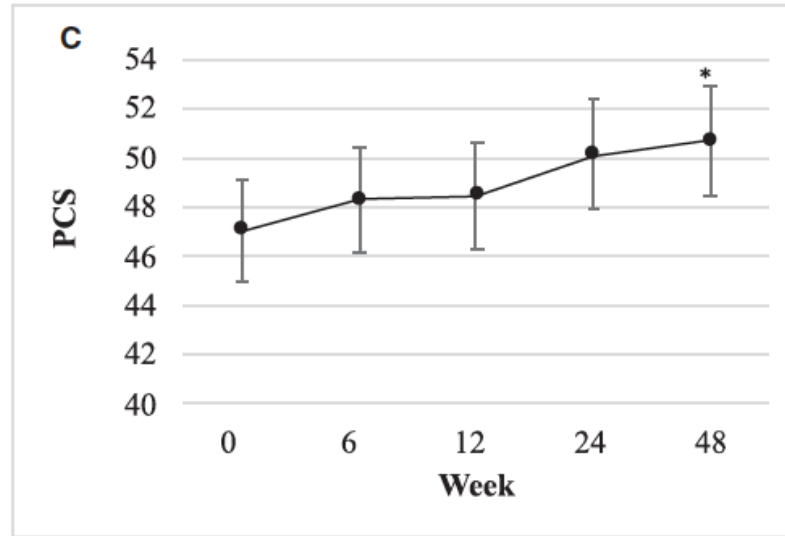


**Figure 1.** Patient flow is illustrated. \*The modality of aerobic fitness testing (cardiopulmonary exercise test or 6-minute walk test) was decided based on patient preference and clinician discretion with consideration for safety and need given patients' current fitness status and goals. +/- Indicates with or without; HRQOL, health-related quality of life; PA, physical activity; MD, medical doctor; OT, occupational therapist; PT; physiotherapist.

## Pilot Phase



## Roll-Out Phase



**Figure 3.** Changes in physical function during (A,B) the pilot phase and (C,D) the roll-out phase are illustrated. An asterisk denotes a significant difference from baseline. PCS indicates physical composite score on the 36-item and 12-item Short-Form Health Surveys from the Medical Outcome Study during the pilot and roll-out phases, respectively.

# Key insights



Building a referral stream takes time (minimize referee burden)



Relentless promotion and stakeholder engagement (+++ presentations)



Tumour site Champions for the program are key



Diversity in patient needs necessitates an interprofessional team

(Building an interprofessional team is Challenging!)



Refinements are continuous



*Home-based exercise is not the same for everyone*

ORIGINAL ARTICLE



# **“This is my home-based exercise”: exploring environmental influences on home-based exercise participation in oncology**

**Christian J. Lopez<sup>1,2</sup> • Cheryl Pritlove<sup>3,4</sup> • Jennifer M. Jones<sup>2,5</sup> • Shabbir M. H. Alibhai<sup>2,5</sup> • Catherine M. Sabiston<sup>1</sup> • Eugene Chang<sup>2</sup> • Daniel Santa Mina<sup>1,2,5</sup> **

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## Reasons for participating in Home-based Exercise

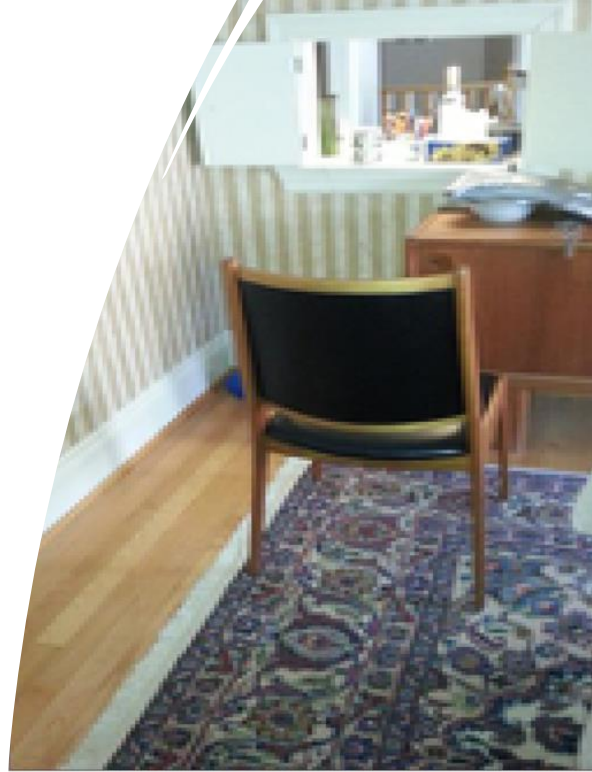
- self-management
- managing competing demands
- Depends on exercise experience and knowledge
- access to exercise facilities (usually lack of)
- autonomy



# Physical Environment

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- Dynamic (customizable) environment
- Indoor features and characteristics (+/-)
- Outdoor features and characteristics
- Aesthetics of exercise space

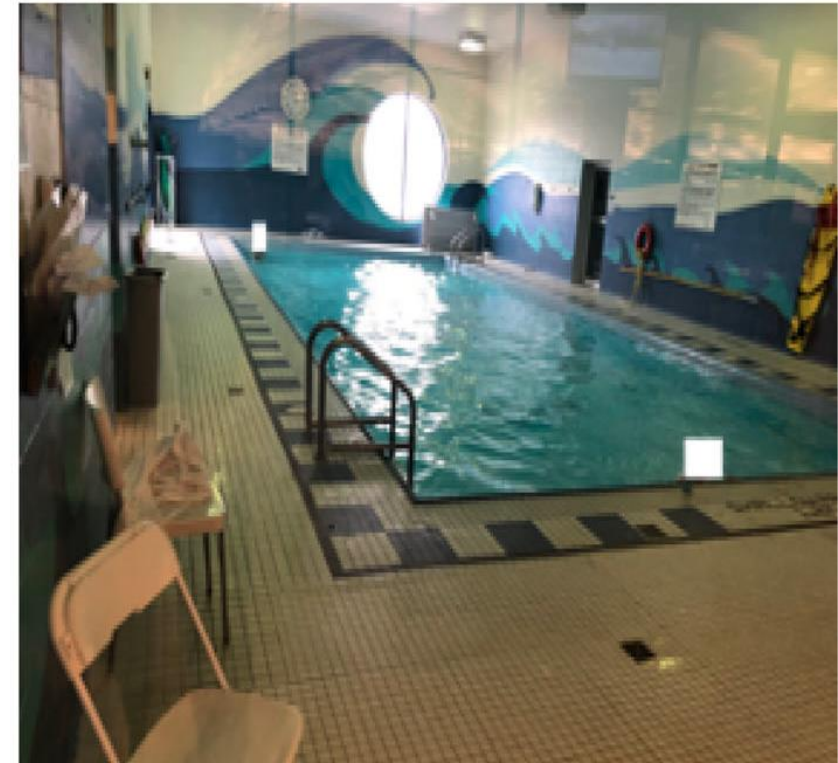
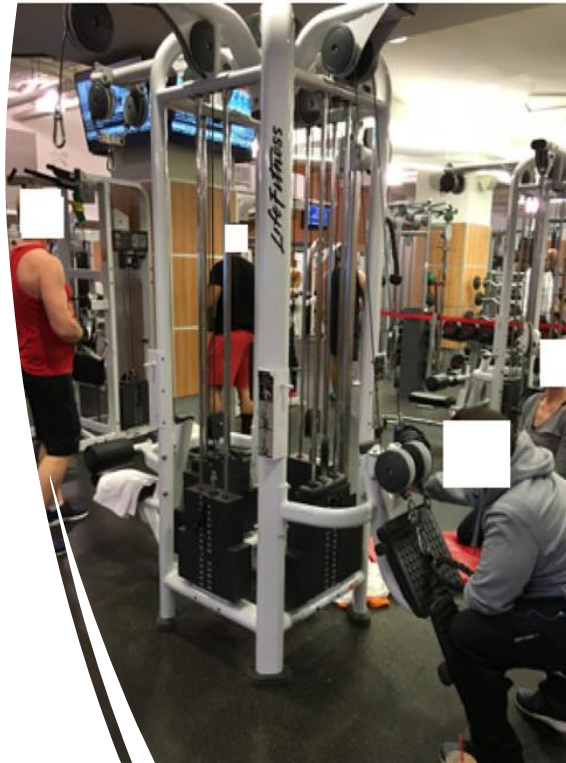




# Social Environment

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- Presence of people
- Social climate
- Exercise modeling
- Connection
- Exercise support and guidance



# How did this help?

1. We can better direct patients to facility or home-based programming based on their preferences, facilitators, and barriers to participation
2. For @Home patients, we can get a better picture of their home-based setting to improve exercise prescriptions

Physical Environment	Areas to Investigate	Yes/No
Space	There is enough space to move around	
	There is enough empty wall space	
Flooring	The flooring is not slippery	
	The flooring is not uncomfortable for lying exercises	
Stability	The furniture used is sturdy and secure	
	The furniture used is the right height (to hold onto during exercise or complete exercises correctly)	
	Resistance bands can be correctly anchored and positioned	
	There are railings on the side of the stairs to hold onto during exercise	
	The steps used for exercise are not too steep	
Feedback and Guidance	The steps are not slippery	
	There is a screen to watch exercise videos or use exergaming devices	
	There is a mirror that can be used to self-monitor exercise	
Exercise Equipment	Exercise equipment is available and compatible to the participant's needs and exercises prescribed	
	The equipment is clean and regularly maintained	
Proximity	The above features relevant to the exercises prescribed are present in one area	
	The exercise prescription can be completed within a single area	
Environment Options and Modifications	The exercise prescription needs to be adapted for a second setting	
	There have been changes made within the environment that require modifications to the exercise prescription	
	The participant has changed the location where the exercise prescription is completed	
Social Environment		
	The level of privacy meets the preference and need of the participant	
	The setting offers a positive social climate (e.g., attitudes, encouragement)	
	The participant is familiar or has a sense of community within the setting	
	Supports are available to facilitate exercise (e.g., exercise partner, household demands, supervision from an exercise professional)	
Comments and Recommendations		



# Translational Journal

OF THE AMERICAN COLLEGE  
OF SPORTS MEDICINE

## Clinical Investigation/Case Study

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# Integrating Exercise into the Electronic Medical Record: A Case Series in Oncology

Daniel Santa Mina,<sup>1,2</sup> Stacy Edyth Cutrono,<sup>3</sup> and Laura Q. Rogers<sup>4</sup>

# WE-Can Fitness Assessment

Test, Anything

MRN: 1234567

Save Cancel Print patient copy

Profile Precautions Physical Assessment Treatment History 6MWT Graded Exercise (Treadmill) Exercise Prescription Care Plan

Exercise contraindications/precaution

Resting heart rate: reading 1 72 reading 2 bpm  
SpO2: reading 1 98 reading 2 %  
BP: reading 1 120 / 80 reading 2 / mmHg  
Comments:

Body Composition

Height: 184 cm  
Weight: 83.46 kg  
Waist circumference: 93.5 cm  
Clothing weight: kg  
Fat Free Mass (FFM): 64.95 kg  
Fat mass: 18.51 kg  
BMI: 24.6 kg/m2  
Body fat: 22.2 %

Preview note:

**WE-Can Exercise Fitness Assessment**  
**Visit date:** 11-Dec-2015  
**Assessed by:** Darren Au, RKin  
**MRN:** 4206214  
Anything Test is a 48-year-old man who was referred to the Wellness and Exercise for Cancer Survivors program (WE-Can) by Dr. John Smith. Informed consent for initial assessment and exercise prescription by Registered Kinesiologist was obtained today.  
He is accompanied by family. Wife was in attendance during this appointment.  
He followed pre-assessment instructions for alcohol, caffeine, meals, smoking, and exercise.  
**Cardiovascular Health Screening**  
- Resting heart rate: 72 bpm (reading 1)  
- SpO2: 98 % (reading 1)  
- BP: 120/80 mmHg (reading 1)  
**Body Composition**  
- Height: 184 cm  
- Weight: 83.46 kg  
- Waist circumference: 93.5 cm  
- Fat Free Mass (FFM): 64.95 kg  
- Fat mass: 18.51 kg  
- BMI: 24.6 kg/m2  
- Body fat: 22.2 %

Grip Strength

Right: reading 1 30 reading 2 31 max 31 kg  
Left: reading 1 32 reading 2 34 max 34 kg  
Sum: Calculate 65  
Handedness: ☒ Right ☐ Left Clear

Aerobic Fitness

Aerobic fitness: ☐ 6MWT ☒ MetCart-Treadmill ☐ MetCart-Bike ☐ No test Clear  
Reason for selection:

Grip Strength

- Right: 30 kg (reading 1) 31 kg (reading 2) 31 kg (max)  
- Left: 32 kg (reading 1) 34 kg (reading 2) 34 kg (max)  
- Sum: 65 kg  
- Handedness: Right

Aerobic Fitness

- Aerobic fitness: MetCart-Treadmill

Treatment History

Anything Test was diagnosed with stage IV prostate cancer in May-2014. Gleason 8. Mets to left iliac lymph nodes

Patient has received the following treatment:

- 15-Jul-2014: Open radical prostatectomy by Dr. John Smith at the Princess Margaret  
- currently on Lurpon hormone therapy

6 Minute Walk Test

- Total distance: 522 m



# eCancer

**Exercise Prescription**

Date of prescription: 25 - Oct - 2015

Week: 1 to: 6

**Aerobic Exercise Prescription**

Frequency: 4 days per week (min 3 days/week)

Intensity level: 55 % to 80 %

Target HR Range: 115 to: 135 bpm

Target RPE Range: 3 to: 6 (Moderate to Hard)

**Time and Type**

At least 30 minutes per day of moderate exercise (i.e. brisk walking) or 20 minutes per day of vigorous exercise (i.e. walk-jog program, tennis, etc)

Time: 45 min

Exercise type: ☒ Walking ☒ Cycling ☐ Swimming  
☒ Joggin ☐ Elliptical ☐ Other

Comments: Was advised that taking intermittent breaks during aerobic exercises is encouraged.

**Resistance Exercise Prescription**

Frequency: 2 days per week (min 2 days/week)

**Upper Extremity Exercises**

Muscle group: Back

Exercise: Seated Row

Reps: 10

Sets: 3

Rest (sec): 60

Comments:

Exercise Rx Screenshot

**ELLICSR**  
WE-Can

**UHN** Toronto General  
Toronto Western  
Princess Margaret  
Toronto Rehab

Name: Anything Test MRN: 1234567

Week: 1 to 6  
Date: 25-Oct-2015

**Aerobic Exercise Prescription**

**Frequency:** 4 days per week (minimum 3 days per week)

**Intensity:** My Target HR Range = 115 to 135 bpm  
My Target RPE Range = 3 to 6 (Moderate to Hard)

**Time:** 45 min (At least 30 minutes per day of moderate exercise (i.e. brisk walking) or 20 minutes per day of vigorous exercise (i.e., walk-jog program, tennis, etc.).)

**Type:** Walking, Cycling, and Joggin  
(At least 30 minutes per day of moderate exercise (i.e. brisk walking) or 20 minutes per day of vigorous exercise (i.e., walk-jog program, tennis, etc.).)

**Comments:** Was advised that taking intermittent breaks during aerobic exercises is encouraged.

**Resistance Exercise Program**

Exercise	Reps	Sets	Rest (sec)	Progression / Comments
Seated Row	10	3	60	
Standing Triceps Extension	10	3	60	
Squat with Exercise Ball	12	3	60	
Dead bug	8	3	60	

Exercise Rx Printout

# Applying CFIR to guide integration of exercise services into the EMR

CFIR Domain	Domain Traits
Intervention Characteristics	<b><i>Cost; evidence strength and quality; complexity</i></b>
Outer Setting	Patient needs and resources; <b><i>external policy and incentives; peer pressure</i></b>
Inner Setting	Structural characteristics; implementation climate (compatibility); <b><i>implementation readiness (resources such as templates, data infrastructure, and referral system, leadership engagement); networks and communications; culture</i></b>
Characteristics of the Individuals	<b><i>Self-efficacy; knowledge and beliefs about the intervention</i></b>
Process	Planning, executing, engaging ( <b><i>champions</i></b> ; formally appointed leaders)



Potentially Useful Implementation Construct			
CFIR Domain (25)	University of Alabama at Birmingham	Sylvester Comprehensive Cancer Center	Princess Margaret Cancer Centre
Intervention characteristics	Cost; adaptability; evidence strength and quality	Cost; relative advantage: complexity; evidence strength and quality	Cost; evidence strength and quality; complexity
Outer setting	Patient needs and resources; external policy and incentives	External policy and incentives; peer pressure; patient needs and resources	Patient needs and resources; external policy and incentives; peer pressure
Inner setting	Implementation climate (e.g., compatibility, relative priority); implementation readiness (e.g., available resources such as certified Cancer Exercise Trainers)	Implementation climate (relative priority, tension for change, compatibility); implementation readiness (resources such as exercise professionals and wellness center; leadership engagement); networks and communications	Structural characteristics; implementation climate (compatibility); implementation readiness (resources such as templates, data infrastructure, and referral system, leadership engagement); networks and communications; culture
Characteristics of individuals	Self-efficacy; other personal attributes (e.g., physician workplace values)	Self-efficacy; knowledge and beliefs about the intervention	Self-efficacy; knowledge and beliefs about the intervention
Process	Engaging (champions, formally appointment leaders); executing	Engaging (champions, formally appointment leaders); executing	Planning, executing, engaging (champions; formally appointed leaders)

# EVALUATION



ASSESSMENT



ANALYSIS



PERFORMANCE



IMPROVEMENT


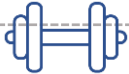




RESULTS



FEEDBACK

# Exercise and Relaxation Programs for Allo-HSCT In-Patients

Author	Intervention	Title	Findings
Morishita et al. 2019		The benefit of <b>exercise</b> in patients who undergo allogeneic hematopoietic stem cell transplantation	+ QoL + Physical function + Psychosocial wellbeing + Survival rate
Jarden et al. 2009	 	A randomized trial on the effect of a <b>multimodal intervention</b> on physical capacity, functional performance and quality of life in adult patients undergoing allogeneic SCT	+ Muscle strength - Fatigue + Psychosocial wellbeing
Inoue et al., 2010		The impact of <b>early rehabilitation</b> on the duration of hospitalization in patients after allogeneic hematopoietic stem cell transplantation	+ QoL + Physical function - Length of hospital stay

## Princess Margaret Cancer Centre - Toronto



- 2 allo-HSCT units
- 26 individual rooms

## Group-Based Rehab Program

Goal: maintain mobility and prevent physical deconditioning



### Resistance Training Class

### Circuit Training Class

### Gentle Movement & Music Therapy Class

- 10 exercises
- Full body workout
- Low/moderate intensity
- Chairs/resistance bands



### Mindfulness and Relaxation Class

- Breathing exercises
- Progressive Muscle Relaxation



Original Article

## Evaluation of a Group-Based Exercise and Relaxation Rehabilitation Program During Hospitalization for Allogeneic Hematopoietic Stem Cell Transplant

Encarna Camacho Pérez MSc, Samantha Mayo RN, PhD, Jeffrey H. Lipton MD, PhD, Eugene Chang MD, PhD, Lyndsey De Souza MScOT, Daniel Santa Mina PhD✉

First published: 11 February 2022 | <https://doi.org/10.1002/pmrj.12784>

## Objectives:

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Use RE-AIM to evaluate the rehab program to inform program revision and expansion

# Study Participation | Sample Characteristics

N=47	
Characteristics	Mean ± SD
Age	55.56 (13.14)
Frequency (%)	
Sex	
Male	26 (57.8)
Female	19 (42.2)
Ethnicity	
Caucasian/White	36 (80)
East Asian	2 (4.4)
Black	1 (2.2)
Arabic	1 (2.2)
Ashkenazi Jew	1 (2.2)
Hispanic	1 (2.2)
South East Asian	1 (2.2)
East Asian	1 (2.2)
Other	1 (2.2)
Marital Status	
Married	27 (60)
Single	4 (8.9)
Common law	3 (6.7)
Long-term relationship	2 (4.4)
No information	8 (17.8)

Education	
University	27 (57.4)
High school	4 (8.5)
Grade school	1 (2.1)
No information	15 (31.9)
Work Status	
Disability/sick leave	16 (35.6)
Retired	13 (28.9)
Working/studying full time	5 (11.1)
No information	11 (24.4)
Personal Income	
>\$75,000	10 (22.2)
\$40-75,000	10 (22.2)
\$20,000-\$39,000	1 (2.2)
<\$20,000	1 (2.2)
No information	23 (51.1)
Diagnosis	
Acute Myeloid Leukemia	24 (55.32)
Myelodysplastic Syndrome	6 (12.76)
Acute Lymphoblastic Leukaemia	3 (6.38)
Chronic Myelomonocytic Leukemia	2 (2.13)
T-Cell Lymphoma/Leukemia	2 (4.25)
Sezary Syndrome	2 (4.25)
Myelofibrosis	2 (4.25)
B-Cell Lymphoma	1 (2.13)
Mast Cell Leukemia	1 (2.13)
Chronic Lymphocytic Leukemia	1 (2.13)
Mixed Biphenotypic Acute Leukemia	1 (2.13)



# REACH

- 82% of patients attend at least one class but only 45% attend >3
- Barriers:
  - Transplant complications/unwell
  - Isolation for infection control
  - Fatigue
  - Low blood counts
  - Not interested
  - Competing medical procedure

# Effectiveness

- Highly Satisfied
  - *"I felt like I was contributing to my own recovery, exercising kept me feeling that I could be strong and tough through my treatment..."*
- Reduced anxiety (HADS)
- Despite the intervention
  - Worsened performance on TUG and Grip Strength
  - Loss of 5% body weight
  - Worsened fatigue & QOL

# Adoption

- Mixed findings regarding the setting (open hall space)
  - Many preferred a dedicated room
- In-patient equipment variability (2/3 with equipment)



7 participants had access to a stationary bike and **all** used it



5 participants had access to a small pedal trainer but **none** used it

# Implementation

- >80% of participants were able to engage as planned
  - Some required adaptations/special programming, including 1:1 care
- Safe (no adverse events)



# Maintenance

- ~40% considered quitting but were encouraged to stick with it.
- >90% intended to continue exercising after discharge
  - But 30% identified barriers to at-home training

## Practical Insights and Recommendations

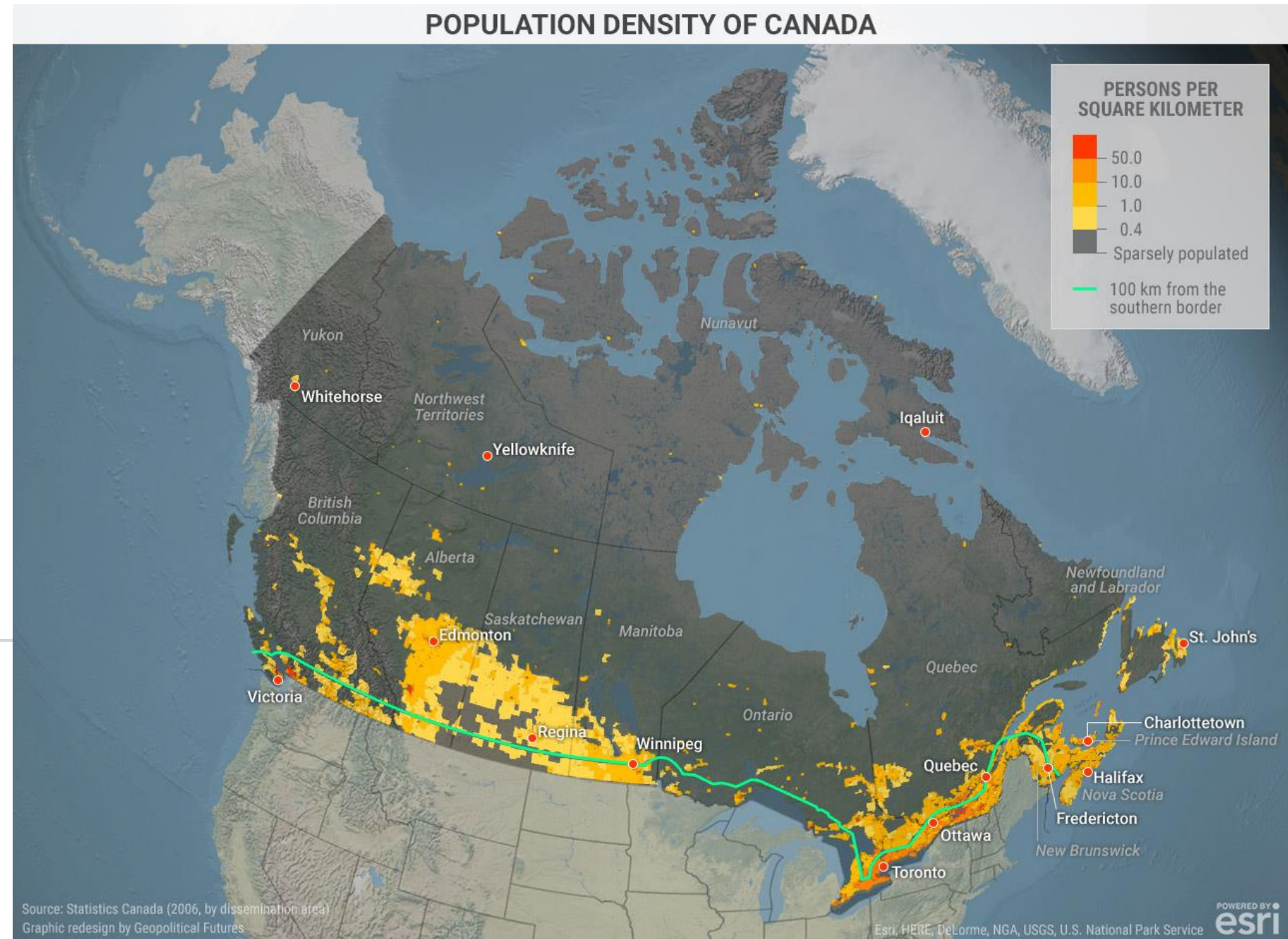
- Low attendance often due to **isolated, frail, cytopenic, GVHD, fatigued, receiving aggressive protocols, competing clinical activity**
- Prefer exercise classes over relaxation
- Prefer a dedicated space vs. open hallway/community area
- Less than expected loss in physical function (i.e. some maintenance relative to comparable research)
- To improve satisfaction/effects, potentially need to:
  - Increase number of classes offered
  - increase duration of classes
  - Increase intensity of exercise





Test a New Model of Care

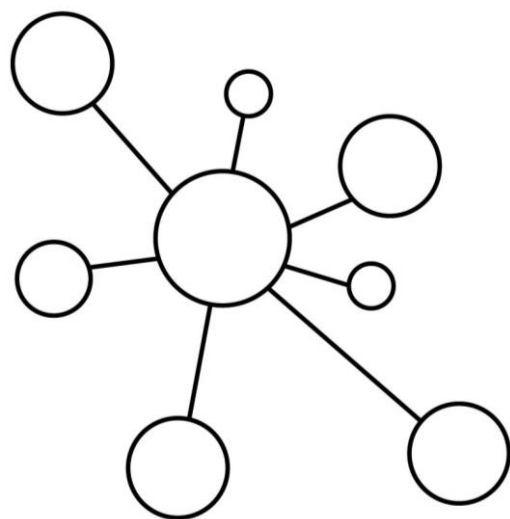
# Canadian Population Density



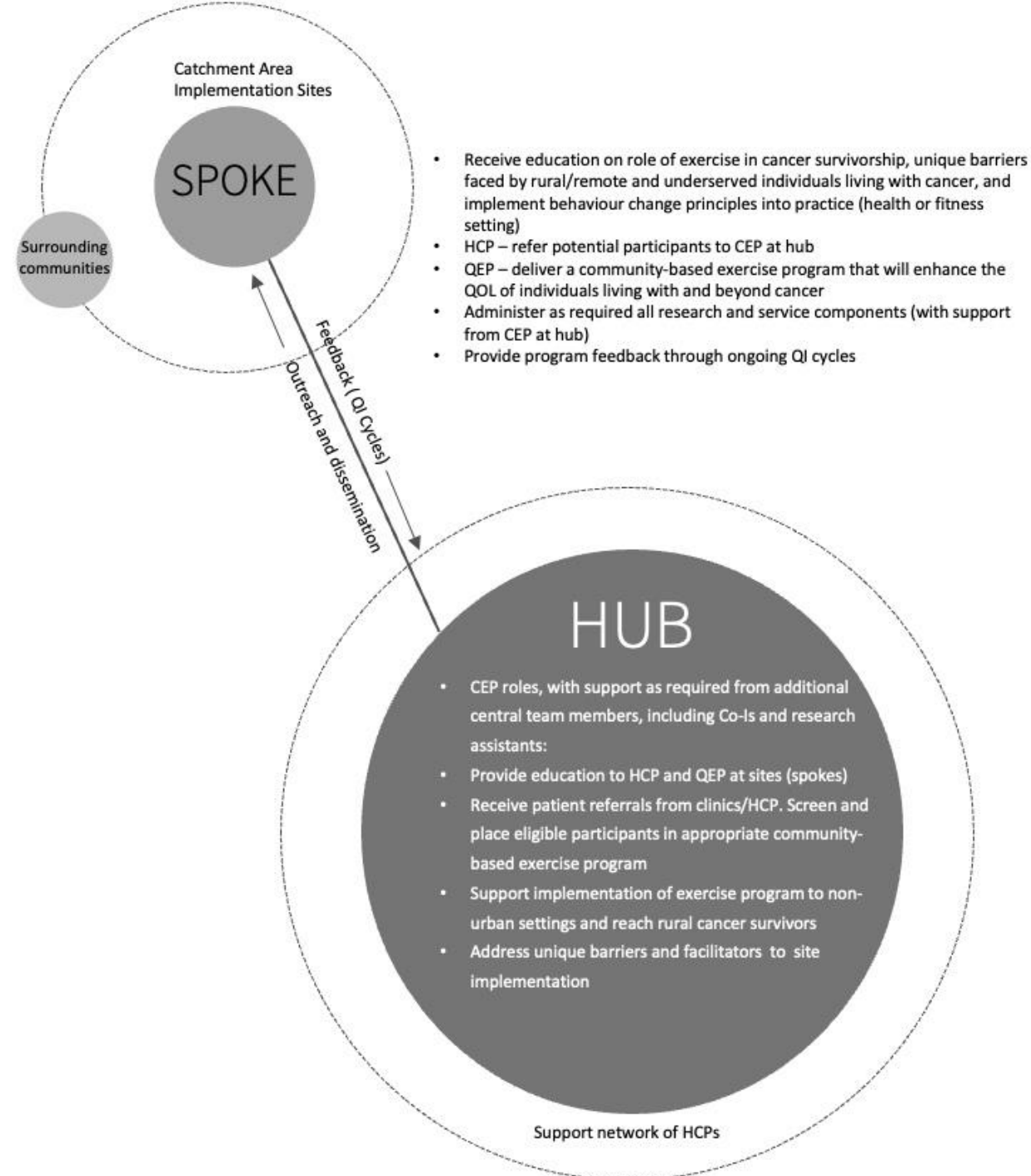


# Exercise for Cancer to Enhance Living Well (EXCEL)

- Hybrid Implementation Effectiveness Study
- N=1500
- Objective: Increase accessibility to exercise services for cancer survivors in **“Rural and hard to reach”** areas
- Measures of success:
  - physical activity, fitness, and QOL (up to 1-year post intervention)
  - New exercise professionals trained to work with cancer survivors
  - New centres delivering exercise oncology programming



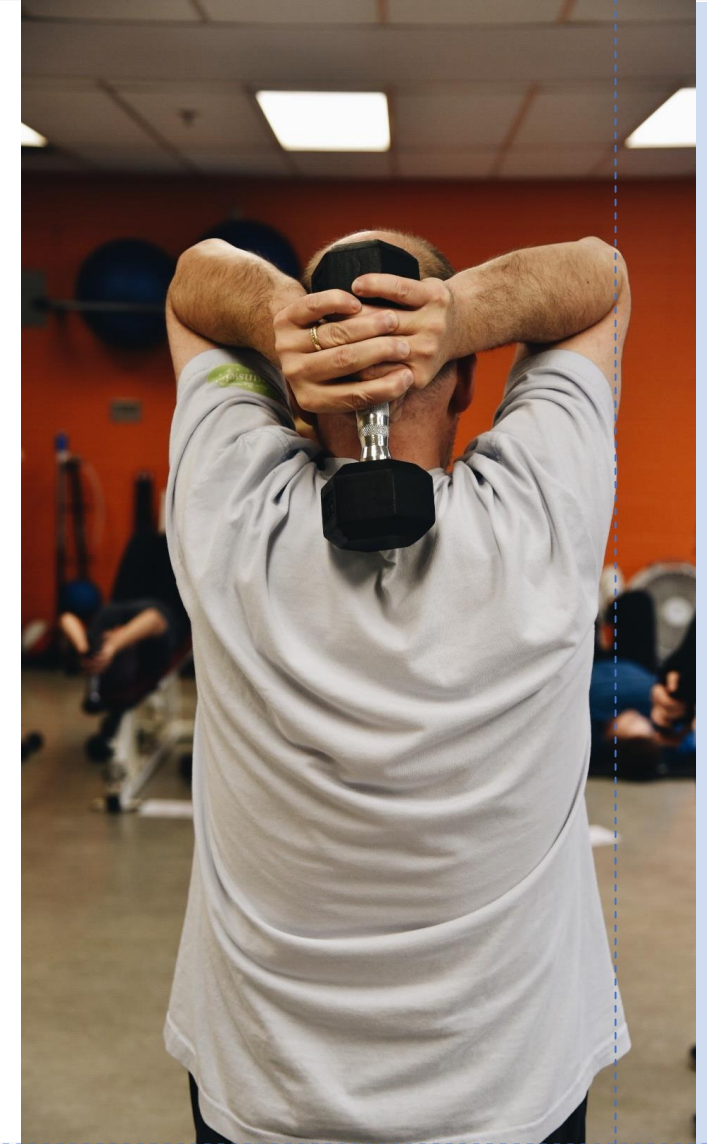
# Hub & Spoke Model





# The Model

- Train non-oncology trained exercise professionals
  - Pay them to deliver a free, 12-week, group-based program with supervision and support
    - 2x/week, 1 hour each
- Circuit-style
  - Tailored to individual needs
- Zoom platform
  - Moderator plus instructor
  - Safety, set-up, build rapport, deliver effective fitness training
- Developing the EXCEL community
  - Pre-post class time for discussion
  - Education webinars for pt

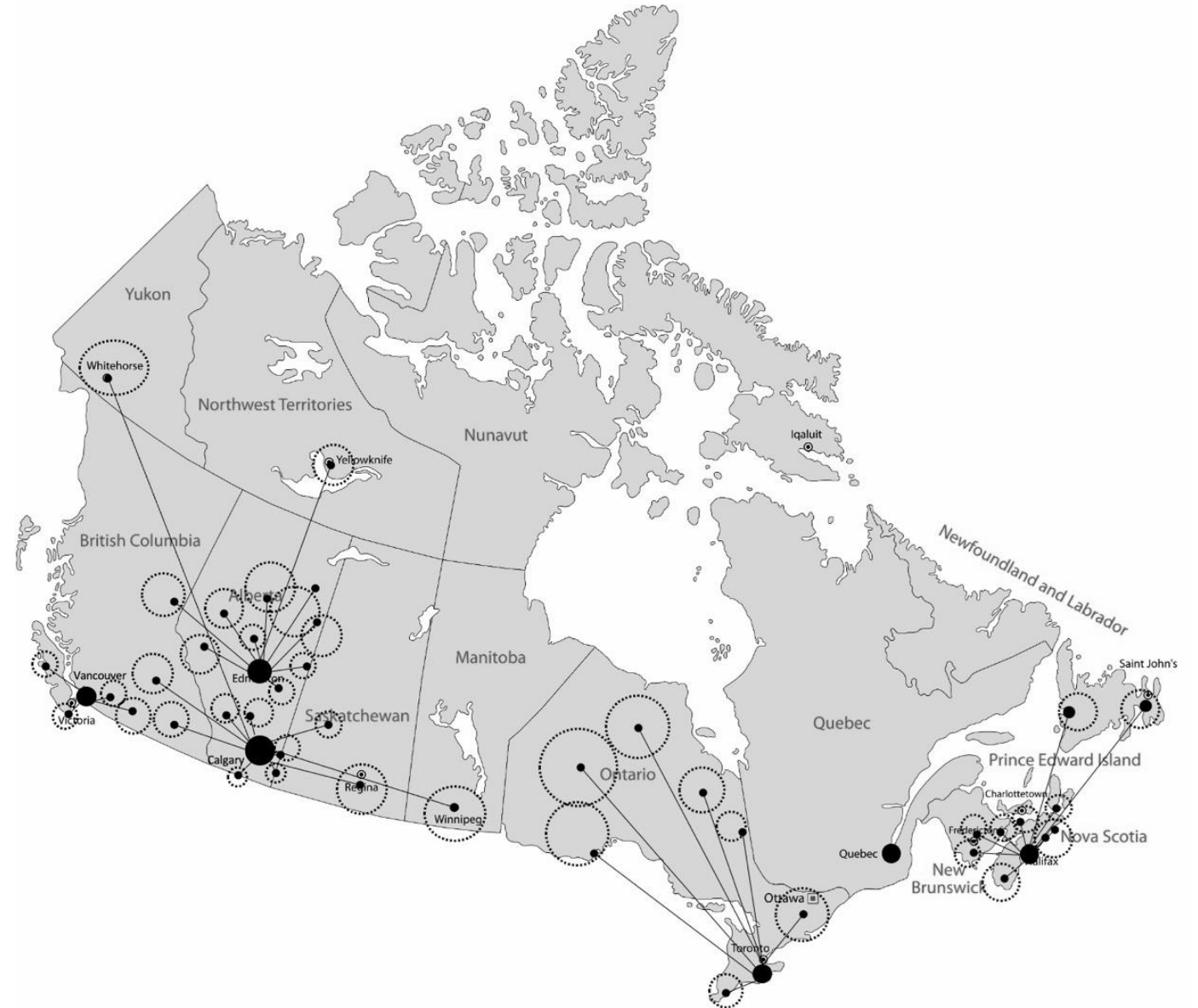
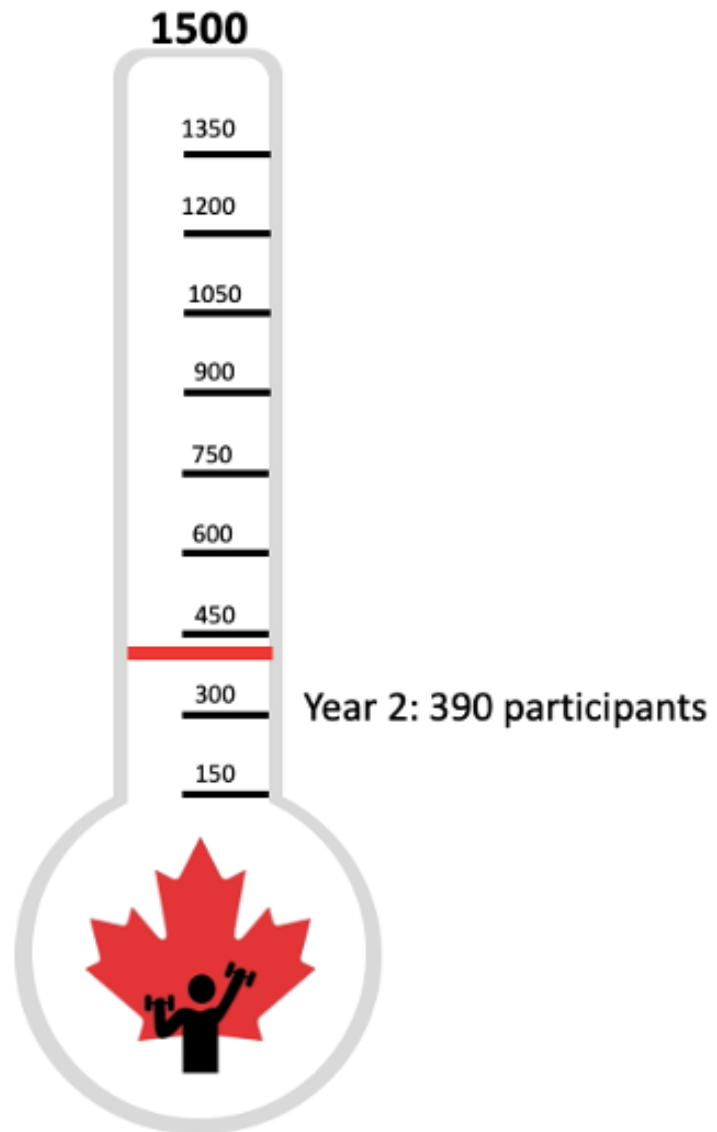


# RE-AIM Framework

Construct	Reporting Outcomes
Reach	<ul style="list-style-type: none"> <li>▪ Referral <ul style="list-style-type: none"> <li>○ Indirect-HCP Referral</li> <li>○ Direct-HCP Referral</li> <li>○ Self-Referral</li> </ul> </li> <li>▪ Enrollment <ul style="list-style-type: none"> <li>○ # of participants enrolled</li> <li>○ # of participants who do not enroll</li> <li>○ Characteristics of enrolled and non-enrolled</li> <li>○ Reasons for study refusal</li> </ul> </li> </ul>
Effectiveness	<ul style="list-style-type: none"> <li>▪ Patient-Reported Outcomes <ul style="list-style-type: none"> <li>○ QOL, Fatigue, Physical Activity, Exercise Barriers, Symptom Burden</li> </ul> </li> <li>▪ Functional Fitness Outcomes <ul style="list-style-type: none"> <li>○ Aerobic Endurance, Musculoskeletal Fitness, Balance, Flexibility, PA Volume (accel)</li> </ul> </li> </ul>
Adoption	<ul style="list-style-type: none"> <li>▪ <b>Characteristics of adopting / non-adopting clinical sites</b> <ul style="list-style-type: none"> <li>○ <b># and type of educational and referral resources provided</b></li> <li>○ <b>Personnel involved – # and type/who</b></li> </ul> </li> <li>▪ <b>Fitness professional partnerships and characteristics</b> <ul style="list-style-type: none"> <li>○ <b># of trained QEPs</b></li> <li>○ <b># of exercise classes provided</b></li> <li>○ <b># organizations and type (i.e., individuals, fitness centres)</b></li> </ul> </li> </ul>
Implementation	<ul style="list-style-type: none"> <li>▪ Fidelity Checks</li> <li>▪ Safety of Exercise Program</li> <li>▪ Program Acceptability (i.e., adherence) <ul style="list-style-type: none"> <li>○ Exercise class attendance tracking</li> </ul> </li> <li>▪ Program Costs</li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>▪ <b>Sustainability of exercise programs within the community</b> <ul style="list-style-type: none"> <li>○ <b># of ongoing programs</b></li> </ul> </li> <li>▪ Participation in home- or centre-based exercise programs <ul style="list-style-type: none"> <li>○ # of participants continuing to engage in structured exercise post 12-Week EXCEL program</li> </ul> </li> <li>▪ Physical activity levels at 24-week (objective and self-report) and 1-year follow-up (self-report)</li> </ul>



# Progress to date...





Finally, some thoughts on priorities for strategies to advance exercise implementation into cancer care

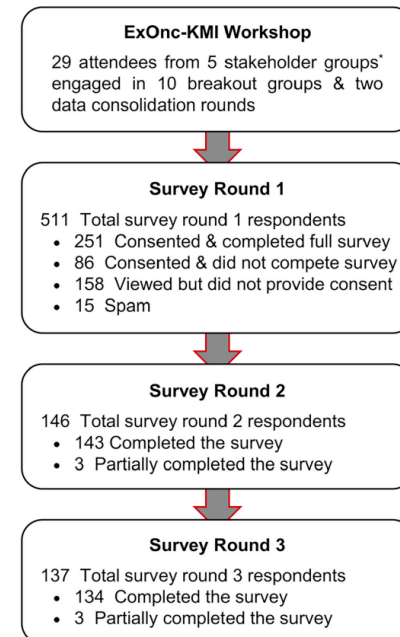
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# The Exercise Oncology Knowledge Mobilization Initiative: An International Modified Delphi Study

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## PARTICIPANT ENGAGEMENT PER PHASE



## OUTPUTS

- 16 KM themes initially defined  
3 Themes consolidated into others  
133 Comments & questions returned  
1 Theme created while processing  
the 133 comments & questions  
14 Final KM themes defined
- 14 KM themes rated  
804 Comments & questions returned  
4 Themes consolidated into 2
- 12 KM themes rated & ranked  
174 Comments & questions returned  
45 Additional themes proposed
- 12 Final KM themes ranked

**FIGURE 1 |** Participant flow and outputs per study phase. KM, knowledge mobilization. \***Stakeholder Group Definitions:** **Healthcare providers** [HCPs; i.e., members of any allied health profession (e.g., Dietitians, Kinesiologists, Nurses, Physicians, Social Workers)]; **Policy makers** [e.g., program-, department-, & institute level administrators within primary → tertiary healthcare settings; Persons within all levels of government (municipal → federal)]; **Qualified exercise professionals** [QEPs; e.g., kinesiologists, physiotherapists]; **Researchers** (e.g., behavioural, medical, psychosocial, rehabilitation); **Survivors & Support persons** (i.e., any person still alive following a cancer diagnosis & any person who supports them (e.g., friends, family, colleagues)).

**TABLE 1** | Participant Characteristics.

Characteristics	Workshop		Round 1		Round 2		Round 3	
	No.	%	No.	%	No.	%	No.	%
Total participants	29		251		146		137*	
<b>Stakeholders</b>								
Healthcare providers	9	31	60	24	26	18	22	16
Policy makers	5	17	13	5	12	8	25	18
Qualified exercise professionals	9	31	125	50	70	48	53	39
Researchers	15	52	94	37	54	37	44	32
Survivors & Support persons	4	14	78	31	55	38	48	35
<b>Demographics</b>								
Age [mean (SD)]	–	–	39.9	(10.5)	39.3	(10.3)	40.3	(10.7)
Sex								
Female	20	69	191	76	112	77	98	72
Male	9	31	60	24	34	23	22	16
Not Reported	0	0	0	0	0	0	17 <sup>†</sup>	12
Country								
Australia	1	3	13	5	4	3	3	2
Canada	25	86	102	41	71	49	62	45
Germany & Austria	0	0	3	1	3	2	3	2
Other European (Denmark, Sweden, Netherlands)	0	0	8	3	4	3	3	2
United Kingdom (England, Ireland, Scotland)	1	3	56	22	38	26	31	23
United States	2	7	67	27	24	16	18	13
Other (Brazil, Turkey)	0	0	2	1	2	1	0	0
Not Reported	0	0	0	0	0	0	17 <sup>†</sup>	12

\*116 original respondents + 17 supplemental policy maker respondents.

<sup>†</sup>Demographic data was not collected from supplemental policy maker respondents.



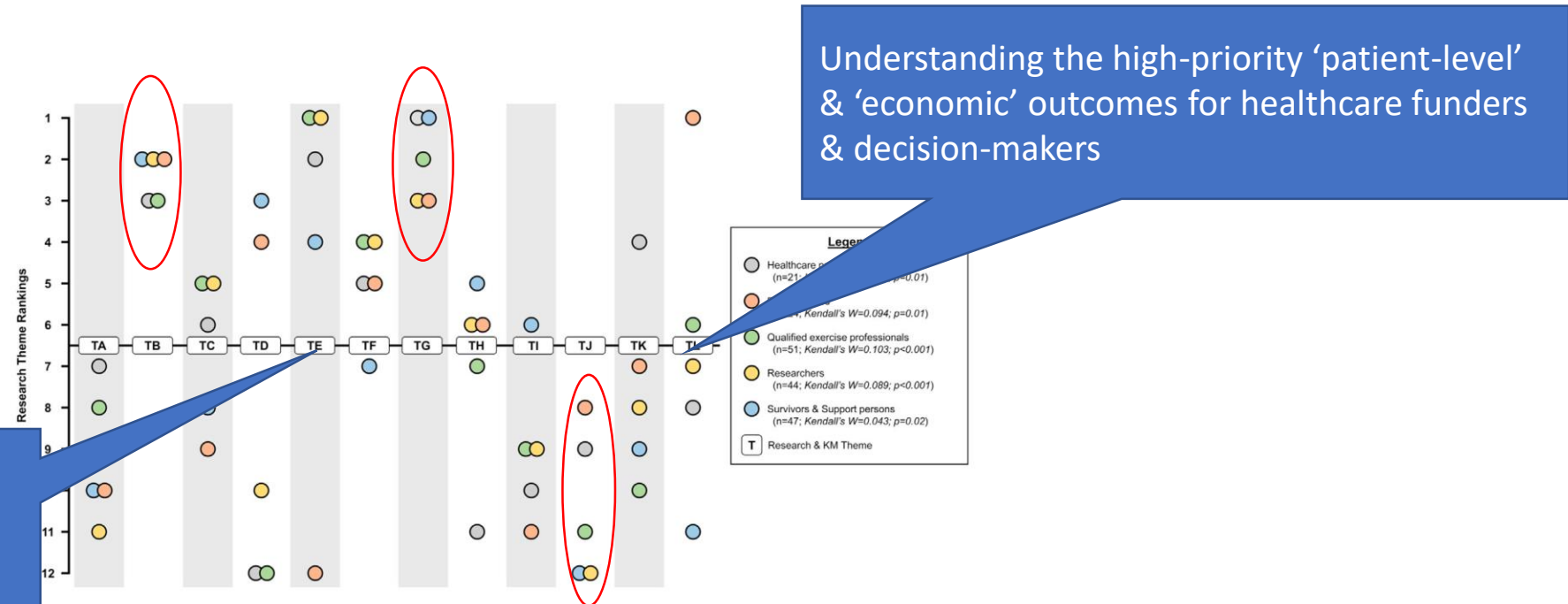


## Top 5 themes

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1. Integrate exercise professionals into cancer care teams
2. Develop & promoting evidence-based exercise oncology education HCPs
3. Improve accessibility and diversity of cancer exercise services
4. Establish referral strategies between medical & community-based cancer exercise services
5. Establishing exercise oncology training standards for exercise professionals

# ...but it depends who you ask!



**FIGURE 2** | Research theme ranking per stakeholder group. Kendall's W values reflect degree of agreement within individual stakeholder groups. **Survey Round 3**  
**Titles:** **TA** = Enhancing communication strategies to increase cancer survivors' exercise engagement throughout the survivorship trajectory; **TB** = Developing & promoting evidence-based exercise oncology education models for HCPs working with cancer survivors; **TC** = Establishing exercise oncology training standards for QEPs across training environments; **TD** = Enhancing technology-based strategies to improve the delivery of exercise support to demographically-, culturally-, & geographically diverse communities of cancer survivors; **TE** = Integrating QEPs into primary cancer care teams; **TF** = Establishing resources for referring cancer survivors between medical- & community-based cancer exercise services; **TG** = Improving accessibility of medically supervised & community-based cancer exercise support services for diverse groups of cancer survivors; **TH** = Developing & sharing of evidence-based resources to support academic & community partners in providing exercise services for cancer survivors; **TI** = Improving cancer survivor transitions across medically supervised, community-based, & self-directed exercise settings; **TJ** = Establishing the appropriateness & benefits of community-based cancer exercise support services; **TK** = Optimizing approaches & resources to facilitate sustained exercise behaviour change in cancer survivors; **TL** = Understanding the high-priority 'patient-level' & 'economic' outcomes for healthcare funders & decision-makers.



# Summary

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With decades of research on exercise in cancer, more attention is now being placed on HOW we integrate exercise as standard evidence—based practice in oncology

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Implementation science complements efficacy-based designs by understanding how interventions work in ‘real’ conditions

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Frameworks can help guide and interpret implementation and effectiveness analyses

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Implementation Science is iterative and dynamic and should have practical impact

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# Thank You

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