

Moving research into practice: summary report of the Ex/Cancer meeting on physical activity, exercise, and rehabilitation in oncology

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ABSTRACT

The development of evidence-based exercise guidelines for people with cancer represents a major achievement in research and provides direction to programming initiatives. The prevalence of sedentary cancer survivors and the risk posed by inactivity suggests a knowledge-to-action gap for which the evidence has not led to increased exercise levels in that population. To address that gap, researchers continue to explore opportunities to improve the understanding of exercise within the oncologic context—from tumour biology to behaviour-change theories—to drive improved access and participation in exercise and rehabilitative activity. In Canada, such efforts have largely been invested by individuals and small teams across the country rather than by unifying stakeholders to drive nationwide impact. Accordingly, a national group of leading researchers, clinicians, and other stakeholders convened a meeting to discuss and strategize initiatives on how to conduct innovative research into the effects of exercise and rehabilitation in cancer survivors, to increase access to exercise and rehabilitation services in cancer survivors, and to reduce sedentary behaviour in cancer survivors. The 2-day meeting, titled Ex/Cancer, was held April 2017 in Toronto, Ontario, and was attended by 83 stakeholders from across Canada, representing knowledge end-users (cancer survivors), clinicians (oncologists, nurses, counsellors), a provincial cancer care agency, community-based exercise and cancer organizations, and researchers. Attendees participated in networking events, roundtable discussions, and breakout sessions to identify, discuss, and develop clinical and research experiences and opportunities. In addition to knowledge exchange between attendees, the meeting set the foundation for the development of a collaborative network to support the development, dissemination, and support of clinical and research activity in exercise and rehabilitation for cancer survivors. With unanimous support from attendees, a major product of the Ex/Cancer meeting was the formation of the Canadian Oncology Rehabilitation and Exercise Network—COREN.

Key Words Exercise, rehabilitation, physical activity, sedentary behaviour, knowledge translation

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BACKGROUND

Cancer is a chronic disease that has surpassed cardiovascular disease as the leading cause of mortality and morbidity in Canadians¹. An estimated 60% of all Canadian cancer survivors will live disease-free for more than 5 years after diagnosis¹. As survival rates continue to rise, attention has shifted to include short- and long-term survivorship issues. Physical and psychological health issues associated with the diagnosis and treatment of cancer have been well documented and include, but are not limited to, fatigue, pain, fear of recurrence, depression, and local or systemic impairments^{2,3}. Cancer treatment-related

adverse effects and their lingering nature throughout survivorship warrant strategies to prevent or minimize such burdensome outcomes⁴.

Physical activity, exercise, and rehabilitation are safe, feasible, and effective nonpharmacologic strategies that improve health and quality of life from cancer diagnosis to end of life^{5–8}. Recent research has also demonstrated numerous antineoplastic properties of exercise that might prolong survival^{4,9}. In contrast, sedentary behaviour has been independently associated with the progression of some cancers and poorer overall quality of life^{10–12}. Collectively, the evidence has contributed to endorsements, guidelines, and frameworks for exercise in oncology that

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support targets of 150 minutes of moderate-intensity aerobic exercise plus 2–3 days per week of resistance training of the major muscle groups for cancer survivors¹³—consistent with public recommendations for adult Canadians¹⁴. Despite the development of exercise guidelines and mounting evidence supporting the safety and effectiveness of exercise, a knowledge-to-action gap is apparent: Cancer survivors, in great proportion, are not meeting physical activity targets, and they spend approximately 70% of their waking hours sedentary^{12,15,16}. Furthermore, tailored physical activity, exercise, or rehabilitation programming is not widely accessible to significantly enable and engage survivors in achieving routine physical activity¹⁷.

Gaps in knowledge translation (KT) are in part attributable to a lack of public health strategies for increasing physical activity in cancer survivors because of a predominant focus on scientific discovery (for example, accumulation of randomized controlled trials and systematic reviews focused on exercise trials in cancer); limited designs for studies with “real world” relevance and effectiveness; and inadequate collaboration and coordination between researchers and stakeholders such as cancer survivors, cancer care clinicians, public health policymakers, and patient advocacy groups¹⁷. The absence of a cohesive national initiative from a breadth of experts and stakeholders could be limiting the advancement of research into practice. Efforts to advance the science and to change practice and policy in Canada stand to gain from the collective expertise and experience emerging across the country. Using strategies such as knowledge exchange, unified strategic planning, and resource sharing, the collective efforts of stakeholders in cancer and exercise might achieve greater impetus toward improved dissemination and implementation of useful and sustainable exercise oncology supportive care.

Building on a previous KT event that publicly launched Exercise Guidelines for People with Cancer¹⁸ and aiming to enable the proverbial “the whole is greater than the sum of its parts,” we sought to facilitate collaboration and mutual support by convening a 2-day meeting for exercise and cancer survivorship KT and exchange. The meeting, called Ex/Cancer, was held in Toronto, Ontario, 6–7 April 2017, and was hosted by the University of Toronto and the Princess Margaret Cancer Centre. The primary objectives of Ex/Cancer were to present and discuss innovations in exercise and rehabilitation science for cancer survivors, cancer exercise and rehabilitation program accessibility and program development, and strategies to reduce sedentary behaviour in cancer survivors. Those objectives underscored the fundamental aim of creating cohesion and collaboration between Canadian researchers, clinicians, and stakeholders to advance exercise and rehabilitation care for cancer survivors. The meeting was held in conjunction with a public symposium aimed at disseminating knowledge about exercise and cancer.

EVENT SUMMARY

Ex/Cancer hosted 83 stakeholders from 5 provinces representing eastern (Newfoundland), central (Ontario, Quebec), and western Canada (British Columbia, Alberta).

Attendees included survivors (defined as an individual from the point of cancer diagnosis onward)¹⁹, oncology care providers (physicians, nurses, physiotherapists, occupational therapists), exercise professionals (for example, registered kinesiologists, exercise physiologists), community partners (program administrators and leaders), researchers, fundraisers, private industry, policymakers, trainees, and students. Table 1 describes the sessions and the speakers; the meeting was co-chaired by authors DSM and CMS.

Day 1: KT and Care Provider Training

The first day (6 April 2017) focused on models of exercise programming and the promotion of access to, and awareness of, the Exercise Guidelines for People with Cancer¹³. Presentations described a variety of national and regional initiatives to support guideline implementation, including facilitated discussions aimed at highlighting current KT and knowledge exchange strategies, and facilitators and barriers experienced by program providers in university, hospital, and community settings. A member from Cancer Care Ontario (the regional cancer care authority) described that organization's process for developing patient and clinician resources to support the dissemination strategy, including patient and family information pamphlets and an exercise log; informational posters for clinic areas, with exercise tips and facts; social media posts; and the development of a referral pathway for oncologists and nurses to use. Those approaches were contextualized in presentations describing a general lack of awareness among oncology health care providers about the exercise guidelines²⁰ and limited or absent exercise information for cancer survivors on cancer centre Web sites^{21,22} or in clinics.

In addition to resources directly connected to programming initiatives, 3 online platforms designed to increase physical activity and to reduce sedentary behaviour among cancer survivors were presented. ActiveMatch²³ is a resource that uses technology comparable to that for online dating to help women diagnosed with cancer find their close-to-ideal exercise partners. Within the ActiveMatch system (<http://www.activematch.ca>), exercise partners can receive exercise counselling and information about community events for partner-based exercise. The second program described was Project MOVE²⁴—a combination of “micro-grants” and financial incentives that help women diagnosed with breast cancer to develop their own exercise programs or initiatives in western Canada. Finally, the TruENTH Lifestyle Management platform for men with prostate cancer was highlighted (<https://lifestyle.truenth.ca/>). It includes a 12-week home-based program with remote support from a qualified exercise professional; educational resources related to exercise, diet, and stress management available online or in community-based group programs; and programmatic manuals for community-based organizations that would like to start a facility-based exercise program for men with prostate cancer.

An essential element to successful KT of lifestyle interventions in the clinical setting is engagement by the health care provider team. Noted challenges to exercise promotion and support in oncology include lack of awareness of the

benefits and safety of exercise after a cancer diagnosis, perceived lack of competence in discussing exercise with patients, and lack of time for exercise promotion during clinical interactions²⁰. Strategies to address those barriers were presented and focused on cancer-exercise education and training opportunities for exercise professionals and physicians. Thrive Health Services (<http://thrivehealthservices.com/>) and Wellspring described training programs targeted at exercise and rehabilitation professionals to advance their understanding of cancer as it pertains to physical activity and exercise. Additionally, advances in

medical school curricula aimed at counselling and addressing physical activity and nutrition behaviours were described as further opportunities for improved awareness and engagement in exercise promotion for patients by oncologists. Specifically, physician training related to exercise was suggested to support competence and involvement in discussing exercise with patients (including providing generalized exercise guidance and behaviour counselling), assessing patients for medical clearance to exercise, and offering appropriate referrals to qualified exercise professionals.

TABLE I Session highlights from the Ex/Cancer national meeting

Theme	Session topic	Session details
<i>Knowledge translation (KT)</i>		
	National KT initiatives in exercise and cancer	<p><i>Presenter:</i> Dr. Catherine Sabiston</p> <ul style="list-style-type: none"> ■ Moving On cohort study ■ ActiveMatch ■ ProjectMOVE <p><i>Discussion or developments:</i> First attempt to increase exercise levels among cancer survivors by building capacity for exercise out of the laboratory setting</p>
	Ontario KT initiatives in exercise and cancer	<p><i>Presenter:</i> Mhairi Kubko</p> <ul style="list-style-type: none"> ■ Cancer Care Ontario update <p><i>Discussion or developments:</i> Current guidelines are clinician-facing, current efforts are focused on dissemination (patient-facing guide, monitoring interventions, and evaluating impact of guidelines in practice)</p>
<i>Programming in practice: approaches to implementation</i>		
	Hospital-based programming	<ul style="list-style-type: none"> ■ Outpatient programming ■ Inpatient programming <p><i>Presenter:</i> Dr. Daniel Santa Mina</p> <ul style="list-style-type: none"> ■ CaRE Program <p><i>Presenters:</i> Danielle Barry-Hickey and Gerilyn Sheppard</p> <ul style="list-style-type: none"> ■ HEALTH Program at Toronto Rehabilitation Institute <p><i>Presenter:</i> Dr. Martin Chasen</p> <ul style="list-style-type: none"> ■ Oncology Rehabilitation in Palliative Care <p><i>Discussion or developments:</i> Focus on evaluating adherence, tracking patient progress, following a cardiac rehab model, and building multidisciplinary teams</p>
	Community-based programming	<p><i>Presenter:</i> Kate Smith</p> <ul style="list-style-type: none"> ■ Wellspring <p><i>Presenter:</i> Caryl Russell</p> <ul style="list-style-type: none"> ■ UW Well-Fit (University of Waterloo) <p><i>Discussion or developments:</i> Highlighted the importance of social support by creating a sense of community; programs described align with guidelines, support promotion of exercise after discharge, and rely on hospital partnership for referrals</p>
	Online programming	<p><i>Presenter:</i> Dr. Lauren Capozzi, for Dr. Nicole Culos-Reed</p> <ul style="list-style-type: none"> ■ TrueNTH <p><i>Discussion or developments:</i> Online network connecting men to health professionals (secure messaging) and community-based programs; prostate cancer survivors can connect with each other and access a health library or resources</p>

TABLE I Continued

Theme	Session topic	Session details
<i>Training in exercise and cancer</i>		
	Creating expertise in exercise and cancer for practitioners	<p><i>Presenter:</i> Dr. Lauren Capozzi</p> <ul style="list-style-type: none"> ■ Thrive Health Services <p><i>Discussion or developments:</i> Cancer and exercise training program for health and fitness professionals (9 at-your-own-pace online modules); can be supplemented with in-person training</p>
	Training for the rehabilitation professional	<p><i>Presenter:</i> Kate Smith</p> <p><i>Discussion or developments:</i> Supplementing the knowledge base for exercise professionals in two parts:</p> <ul style="list-style-type: none"> ■ CancerSmart training for personal trainers provides foundational knowledge about exercise guidelines ■ CancerSmart advanced rehabilitation techniques in oncology manualize therapy techniques
	Training for the physician	<p><i>Presenters:</i> Dr. Eugene Chang and Dr. Lauren Capozzi</p> <p><i>Discussion or developments:</i> Barriers to implementation were presented (current physician culture of treating the disease, and individual physician factors such as lack of time or referral pathways); implementation of evidence-based online curriculum for physical training (WellnessRx); need to increase communication between physicians and allied health professionals to define roles and develop referral pathways</p>
<i>The future of exercise programs</i>		
	Researcher breakout group	<ul style="list-style-type: none"> ■ What do we need and how do we get it? <p><i>Facilitator:</i> Dr. Daniel Santa Mina</p> <p><i>Discussion or developments:</i> Priorities to build capacity: training cancer and exercise professionals, connecting survivors, strategic plans for developing resources, developing sustainable permanent programming that is facility-specific</p>
	Trainee breakout group	<ul style="list-style-type: none"> ■ Clinical-research ambitions in exercise and cancer (trainee to professional) <p><i>Facilitators:</i> Anika Petrella and Darren Au</p> <p><i>Discussion or developments:</i> Focus on improving training (undergraduate curriculum, placement opportunities, accreditations), designing sustainable and imbedded programming (following cardiac rehabilitation models, connecting patients with trained professionals), and improving factors at the health systems level (mandatory surveys, survivorship nurse navigators, educational rounds for both patients and clinicians, and usual care referrals)</p>
	■ The future of exercise research in Canada	<p>Roundtable discussion and presentations</p> <p><i>Discussion or developments:</i> Overcoming barriers: recruitment, transitioning from laboratory or hospital setting into the community, and choosing appropriate outcome measures</p>
<i>Collaboration and networking</i>		
	Networking lunch	<p><i>Coordinators:</i> Dr. Daniel Santa Mina and Dr. Catherine Sabiston</p>
	Connecting researchers and clinicians for collaborations (laboratory presentations by principal investigators)	<p><i>Presenters:</i> Dr. Meghan McDonough, Dr. Erin McGowan, Dr. Cristina Caperchione, Dr. Jennifer Brunet, Dr. Nicole Culos-Reed, Dr. Kristina Karvinen, Dr. Kristin Campbell, Dr. Kerry Courneya, Dr. Jeff Vallance, Dr. Marina Mourtzakis, Dr. Jennifer Tomasone, Dr. Lise Gauvin, Dr. Christopher Perry, Dr. Amy Deckert</p> <p><i>Discussion or developments:</i> Primary investigators outlined their laboratory focus, objectives, current research, and future directions; collaboration was encouraged and welcomed</p>

A public symposium given during the evening of day 1 at the University of Toronto attracted more than 300 attendees, including community partners (16%), health care specialists (13%), patients (8.3%), media representatives (1.3%), and members of the public (61.4%). The public symposium can be accessed at <https://vimeo.com/212588663>.

Day 2: Collaborating for Innovation in Exercise and Cancer Research

The morning of day 2 of Ex/Cancer included a closed meeting to discuss progress related to a specific project by attending co-investigators. Concurrent to the closed meeting, a breakout group consisting of 10 research trainees

and graduate students was tasked with envisioning the future of exercise and cancer from their perspective, including research directions, training for health professionals, programming design, and facilitation of the system-level changes needed to accommodate exercise in usual cancer care.

Participants in the breakout group identified three key areas in which to advance the field of exercise and cancer. First, improving education and training related to exercise and cancer for exercise and health professionals was considered essential, including offering early exposure to concepts of exercise and cancer at the undergraduate level, increasing placement or practicum opportunities throughout the undergraduate and graduate years, and promoting existing cancer and exercise training and certification. The second area involved improving the accessibility of exercise and rehabilitation programming with mechanisms that support or formally embed any or all of discussion, education, and referrals into standard cancer care. Triage models that assign patients to hospital- or community-based programs according to medical complexity were discussed as opportunities to make efficient use of resources. To complement that integration into the oncology standard of care, systematic data collection about exercise (including prescription parameters) or sedentary behaviours (or both) was suggested as a potential method to identify patients in need of education or assistance to be able to incorporate exercise into self-management strategies. Third, common barriers to successful research trials were discussed, including recruitment, the research environment (for example, finding appropriate “real world” settings) and selecting the ideal measures to capture essential patient-reported outcomes without overburdening participants. Table 1 summarizes key developments from those discussions.

The Ex/Cancer meeting concluded with an afternoon session dedicated to facilitating collaboration between researchers across Canada in an effort to increase scientific and clinical impact. The principal investigator or delegate provided a brief summary of the laboratory focus. Each laboratory generously shared their current and planned trials in exercise and cancer to foster a collegial and collaborative relationship between peers from across Canada. Those presentations were followed by group discussions of key strategies for improving knowledge and resource-sharing that would help to achieve the bottom-line objective of increasing the exercise level of cancer survivors across Canada. With emphatic and unanimous endorsement from the attendees, it was agreed that a formal network of colleagues and stakeholders invested in exercise and rehabilitation in cancer would significantly advance the goal of sharing research, resources, and support.

ATTENDEE FEEDBACK

At the end of the meeting, attendees were asked to provide anonymous feedback about the event. Of the 78 in-person attendees, 23 offered responses to the feedback questionnaire (29.5% response rate). Using a 7-point Likert scale (from 1, not at all satisfied, to 7, very satisfied), attendees were satisfied with the meeting (6.6 ± 0.49), felt that the

objectives were met (6.4 ± 0.72), and felt that the meeting was worthwhile (6.7 ± 0.47). Two open-ended questions asked attendees to describe what they liked most and to comment on the take-home points and outcomes of the meeting. In general, attendees enjoyed the generation of new ideas and the diversity of topics discussed. Overall, attendees believed that the take-home points of the meeting were related to collaborative and coordinated efforts by community members, health professionals, and researchers and an understanding of the referral pathways for exercise for survivors. Table 2 summarizes the coded responses.

After the meeting, a survey was sent to the attendees to help decide on a name for a national network of stakeholders and parties interested in physical activity, exercise, and rehabilitation research and programming. The proposed name with a majority of favourable responses was the Canadian Oncology Rehabilitation and Exercise Network—COREN (<http://www.oncrehabexercise.ca/>).

CONCLUSIONS

Exercise improves health-related fitness and overall quality of life, and can affect cancer outcomes in cancer survivors. The field of exercise oncology has grown rapidly since the late 1980s, with considerable attention from a growing group of stakeholders spanning multiple disciplines. One question at the forefront of the field is how to integrate, into usual care, comprehensive programming that focuses on increasing exercise and reducing sedentary behaviour. To advance such initiatives, Ex/Cancer aimed to bring together a group of key stakeholders connected to physical activity, exercise, rehabilitation, and cancer to discuss the current state and future development of related research and clinical care in Canada. Through $\kappa\tau$ activities that included presentations, discussions, and networking activities, several themes and action items emerged. Specifically, it was agreed that $\kappa\tau$ strategies will be advanced through exercise and rehabilitation programmatic development and evaluation, and by improved training related to cancer and exercise for qualified exercise professionals and health professionals. The most significant impact of the Ex/Cancer meeting was likely the emergence of a working collaborative for clinicians, researchers, and other stakeholders to address gaps in clinical research priorities. Looking forward, communication, collaboration, consistency, and cohesion are crucial in fostering and facilitating change in clinical oncology practice toward exercise and rehabilitation programs that are embedded in standard cancer care. The launch of COREN is intended to support such initiatives.

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TABLE II Summary of codes of open responses (2 items) from attendee feedback questionnaire

Question	Response
What did you like most about the event?	<ul style="list-style-type: none"> ■ Networking and collaboration ■ Generation of new ideas ■ Highlighting current research ■ Diversity and breadth of topics covered ■ Experts from different levels (for example, community, hospital, research)
Please describe the main take-home points from this meeting.	<ul style="list-style-type: none"> ■ Increased collaboration and coordination between researchers, health practitioners and community ■ The challenge is understanding how to scale-up research to reach cancer survivors and stakeholders ■ Understand how and where to refer cancer survivors for exercise ■ Understanding the best way to use different medical professionals when referring and implementing exercise

Dr. Jennifer Brunet, Dr. Kristin Campbell, Dr. Cristina Caperchione, Dr. Lauren Capozzi, Dr. Eugene Chang, Dr. Kerry Courneya, Dr. Amy Deckert, Dr. Isabelle Dore, Dr. Christine Friedenreich, Dr. Lise Gauvin, Dr. Kristina Karvinen, Katelyn Kauffeldt, Mhairi Kubko, Dr. Melanie Keats, Dr. Meghan McDonough, Dr. Erin McGowan, Dr. Marina Mourtzakis, Dr. Michelle Nadler, Dr. Chris Perry, Caryl Russell, Gerilyn Sheppard, Kate Smith, Dr. Jennifer Tomasone, and Dr. Jeff Vallance. CMS holds a Canada Research Chair in physical activity and mental health. Funding for this event was provided in part by the Canadian Cancer Society (grant no. 316288), the University of Toronto, and the Princess Margaret Cancer Foundation.

CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology's* policy on disclosing conflicts of interest, and we declare the following interests: SNCR is the co-founder of Thrive Health Services. The remaining authors have no conflicts to disclose.

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