

Exercise Throughout The Cancer Journey



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*ExWell Executive Officer of Cancer Services and
Research*

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@ExWell_



Exercise throughout the Cancer Journey

1. The cancer treatment pathway – why fitness is important
2. Exercise and cancer: what we know (research overview)
3. Overview of ExWell@Home



**Irish
Cancer
Society**

Cancer treatment pathway



**CANCER
DIAGNOSIS**



**CANCER
TREATMENT**



SURGERY



**CANCER
TREATMENT**



Cancer treatment reduces fitness



European Journal of Surgical Oncology
(EJSO)

Volume 40, Issue 10, October 2014, Pages 1313–1320



The effect of neoadjuvant chemotherapy on physical fitness and survival in patients undergoing oesophagogastric cancer surgery










European Journal of Surgical Oncology
(EJSO)

Volume 40, Issue 11, November 2014, Pages 1421–1428



The effects of neoadjuvant chemoradiotherapy on physical fitness and morbidity in rectal cancer surgery patients

M.A. West^{a, b, f}, , , , L. Loughney^{a, b, d}, , C.P. Barben^a, , R. Sripadam^e, , G.J. Kemp^f, ,
M.P.W. Grocott^{b, c, d}, , S. Jack^{b, d}, 

(West et al 2014, Jack et al 2014)

Importance of physical fitness in cancer



Contents lists available at [SciVerse ScienceDirect](#)

European Journal of Vascular and Endovascular Surgery



*People do better when
they are **FITTER***



**Pre-operative
anxiety/emotional distress
has a negative impact on outcomes**

- Recovery is longer in patients who reported anxiety, anger and depression;
- Patients with optimistic outcomes expectation or who received interventional support recovered faster (Mavros et al, 2011);

Patients do better when they feel better

Side effects associated with cancer treatment

Most documents side effects	Other side effects
Mouth and throat sores	Skeletal muscle wasting (cachexia)
Diarrhoea	
Nausea and vomiting	Physical fitness
Constipation	
Nervous system effects	Health related quality of life
Appetite loss	
Hair loss	Fatigue

Treatment Pathway for Cancer

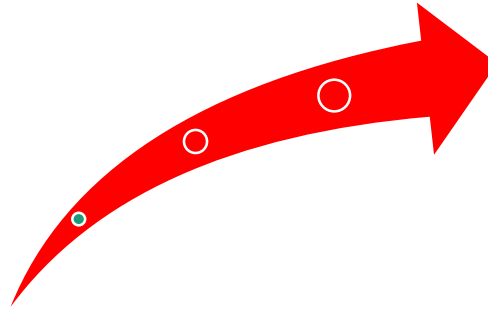


Vs. pathway for a marathon runner....

#FUELYOURBETTER vega SPORT

FULL MARATHON TRAINING PLAN

WEEK	PHASE	M	T	W	T	F	S	S
1	Build	Shakeout run 40-60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Speedwork (2 sets)	Shakeout run 40-60 minutes	Rest day	LSD 9 miles
2	Build	Shakeout run 40-60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Speedwork (3 sets)	Shakeout run 40-60 minutes	Rest day	LSD 11 miles (2.5 mile @ race pace)
3	Build	Shakeout run 40-60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Speedwork (4 sets)	Shakeout run 40-60 minutes	Rest day	LSD 13 miles (3 mile @ race pace)
4	Recover	Shakeout run 30-40 minutes	Tempo run 20 minutes	Rest day	Cross-training	Shakeout run 30-40 minutes	Rest day	LSD 5K
5	Build	Shakeout run 60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Hill Repeats (4 sets)	Shakeout run 60 minutes	Rest day	LSD 15 miles (3.5 mile @ race pace)
6	Build	Shakeout run 60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Speedwork (4 sets)	Shakeout run 60 minutes	Rest day	LSD 16.5 miles (4.5 mile @ race pace)
7	Build	Shakeout run 60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Speedwork (4 sets)	Shakeout run 60 minutes	Rest day	LSD 18.5 miles (5 mile @ race pace)
8	Recover	Shakeout run 40 minutes	Tempo run 20 minutes	Rest day	Cross-training	Shakeout run 40 minutes	Rest day	LSD 7.5 miles
9	Build	Shakeout run 60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Hill Repeats (2 sets)	Shakeout run 60 minutes	Rest day	LSD 20.5 miles (5.5 mile @ race pace)
10	Build	Shakeout run 60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Hill Repeats (3 sets)	Shakeout run 60 minutes	Rest day	LSD 22 miles (6 mile @ race pace)
11	Build	Shakeout run 60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Hill Repeats (4 sets)	Shakeout run 60 minutes	Rest day	LSD 23 miles (7 mile @ race pace)
12	Recover	Shakeout run 40 minutes	Tempo run 20 minutes	Rest day	Cross-training	Shakeout run 40 minutes	Rest day	LSD 9 miles
13	Build	Shakeout run 60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Hill Repeats (4 sets)	Shakeout run 60 minutes	Rest day	LSD 23 miles (7.5 mile @ race pace)
14	Taper	Shakeout run 60 minutes	Tempo run 30 minutes	Rest/Optional Cross-Train	Hill Repeats (4 sets)	Shakeout run 60 minutes	Rest day	LSD 12.5 miles (6 mile @ race pace)
15	Taper	Shakeout run 60 minutes	Race Day Prep set 10-30-10	Rest day	Race Day Prep set 10-30-10	Shakeout run 60 minutes	Rest day	LSD 9 miles (5 mile @ race pace)
16	Taper	Shakeout run 40 minutes	Race Day Prep set 10-20-10	Rest day	Race Day Prep set 10-20-10	Shakeout run 40 minutes	Rest day	RACE DAY



A person wearing blue athletic wear is running on a treadmill in a clinical or hospital setting. The treadmill is a VIA sprint 150 P model. The background shows a clean, bright environment with medical equipment.

PREHABILITATION

GETTING FIT FOR CANCER TREATMENT

“the process of enhancing the functional capacity of the individual to enable him or her to withstand a stressful event”

Oncology Times:

10 September 2010 - Volume 32 - Issue 17 - p 16, 18

doi: 10.1097/01.COT.0000388578.69348.ed

News

New Guidelines for Cancer Patients from American College of Sports Medicine: Exercising During & After Treatment Brings Health Benefits

Laino, Charlene

Avoid inactivity—That's the main message a roundtable convened by the American College of Sports Medicine (ACSM) wants oncologists to get across to their patients.



Exercise...
Image Tools

In general, the same 30 minutes a day, five days a week, of moderate-paced activity such as walking recommended for the general population is beneficial for cancer patients, even during treatment, according to the guidelines.

Your Prescription for Health

Exercise
is Medicine®

Effects of Exercise on Health-Related Outcomes in Those with Cancer









What can exercise do?

- **Prevention of 7 common cancers***
Dose: 2018 Physical Activity Guidelines for Americans: 150-300 min/week moderate or 75-150 min/week vigorous aerobic exercise
- **Survival of 3 common cancers****
Dose: Exact dose of physical activity needed to reduce cancer-specific or all-cause mortality is not yet known; Overall more activity appears to lead to better risk reduction

*bladder, breast, colon, endometrial, esophageal, kidney and stomach cancers

**breast, colon and prostate cancers

Overall, avoid inactivity, and to improve general health, aim to achieve the current physical activity guidelines for health (150 min/week aerobic exercise and 2x/week strength training).

Outcome	Aerobic Only	Resistance Only	Combination (Aerobic + Resistance)
Strong Evidence	Dose	Dose	Dose
 Cancer-related fatigue	3x/week for 30 min per session of moderate intensity	2x/week of 2 sets of 12-15 reps for major muscle groups at moderate intensity	3x/week for 30 min per session of moderate aerobic exercise, plus 2x/week of resistance training 2 sets of 12-15 reps for major muscle groups at moderate intensity
 Health-related quality of life	2-3x/week for 30-60 min per session of moderate to vigorous	2x/week of 2 sets of 8-15 reps for major muscle groups at a moderate to vigorous intensity	2-3x/week for 20-30 min per session of moderate aerobic exercise plus 2x/week of resistance training 2 sets of 8-15 reps for major muscle groups at moderate to vigorous intensity
 Physical Function	3x/week for 30-60 min per session of moderate to vigorous	2-3x/week of 2 sets of 8-12 reps for major muscle groups at moderate to vigorous intensity	3x/week for 20-40 min per session of moderate to vigorous aerobic exercise, plus 2-3x/week of resistance training 2 sets of 8-12 reps for major muscle group at moderate to vigorous intensity
 Anxiety	3x/week for 30-60 min per session of moderate to vigorous	Insufficient evidence	2-3x/week for 20-40 min of moderate to vigorous aerobic exercise plus 2x/week of resistance training of 2 sets, 8-12 reps for major muscle groups at moderate to vigorous intensity
 Depression	3x/week for 30-60 min per session of moderate to vigorous	Insufficient evidence	2-3x/week for 20-40 min of moderate to vigorous aerobic exercise plus 2x/week of resistance training of 2 sets, 8-12 reps for major muscle groups at moderate to vigorous intensity
 Lymphedema	Insufficient evidence	2-3x/week of progressive, supervised, program for major muscle groups does not exacerbate lymphedema	Insufficient evidence
Moderate Evidence			
 Bone health	Insufficient evidence	2-3x/week of moderate to vigorous resistance training plus high impact training (sufficient to generate ground reaction force of 3-4 time body weight) for at least 12 months	Insufficient evidence
 Sleep	3-4x/week for 30-40 min per session of moderate intensity	Insufficient evidence	Insufficient evidence

Citation: bit.ly/cancer_exercise_guidelines

Moderate intensity (40%-59% heart rate reserve or VO₂R) to vigorous intensity (60%-89% heart rate reserve or VO₂R) is recommended.

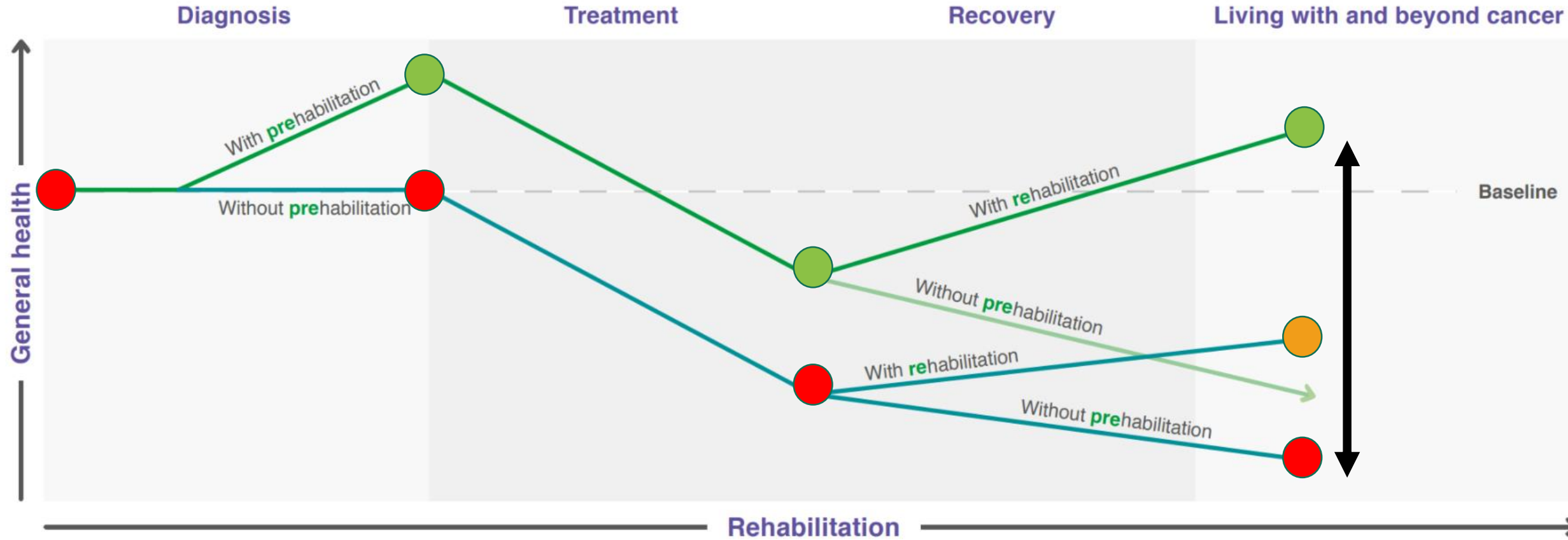
Exercise
is Medicine™

AMERICAN COLLEGE
of SPORTS MEDICINE



EMPOWERMENT

IMPROVING CANCER CARE BEFORE TREATMENT EVEN STARTS



Rehabilitation

Preventative

Prehabilitation includes screening, assessment and, where appropriate, the development of a Personalised Prehabilitation Care Plan (PPCP) as part of an overall care plan.

This includes exercise, nutrition

Restorative

Prehabilitation can significantly improve the patient's ability to cope with effects of treatment of all kinds, including surgery, chemotherapy, radiotherapy, immunotherapy and treatment for palliative care.

People with treatable but not curable cancer may also benefit. It can help reduce the amount of time spent in hospital and lead to better quality of life.

Supportive and/or palliative

At this stage, we continue to reinforce the core principles of the programme, with health and wellbeing activities and cancer care reviews.

The patient can enjoy lifelong benefits from behaviours learned earlier. If there

How to measure physical activity levels?

Questionnaires vs. physical activity monitors

90% of people with cancer (150min/week of moderate PA) – self reported

Vs.

<50% using PA monitors

Using physical activity monitors/FIBITS may be helpful



The important role of physical activity

MET is scored as:

- <3 (light intensity - SLOW WALKING);
- 3-6 (moderate intensity - WALKING BRISKLY);
- ≥ 6.0 (vigorous intensity - RUNNING, SWIMMING)

Engaging in 27 MET-hours/week (6HRS OF BRISK WALKING)

Vs.

engaging in <3 MET-hours/week (3HRS OF SLOW WALKING)

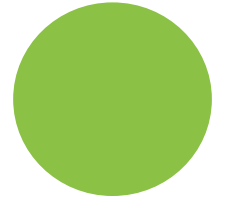
**50% reduced risk of colorectal cancer-specific death
and death from any cause (Meyerhdart 2006)**

TARGET STEP COUNT PER DAY

**7,000 – 10,000
steps/day**

- People with COPD (2237steps/day)

(Tudor-Locke et al, 2009)



Physical activity variable	Pilot Study 1 (Loughney 2017, Perioperative Medicine)	RCT Study 2 (EMPOWER trial)
Baseline step-count (pre-CRT)	5276 (5754)	5352 (3912)
Post CRT step-count	3725	no change
MET score during/after CRT	1.2-1.5	1.2-1.5

30-50% less active than that recommended: 7,000 – 10,000 steps/day

Cancer Services



- **Cancer Prepare Programme**

- People with a new cancer diagnosis
- Runs daily Mon-Fri at 10am
- Supervised/home-based exercise sessions

- **Move On Programme**

- People who have finished treatment
- Runs in 12 week cycles twice weekly
- Supervised exercise sessions

Get patients
physically &
psychologically
prepared
for the “event”



Research programme of work in cancer



Cancer Prepare Programme

- Lung
- Colorectal
- Oesophageal and gastric
- Prostate

Move On Programme

- Breast
- Colorectal
- Prostate

Exercise Training Prescription

Frequency

- 2-3 session/ week

Intensity

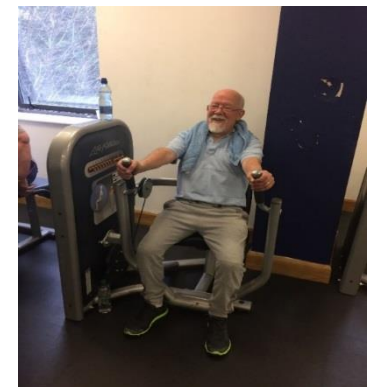
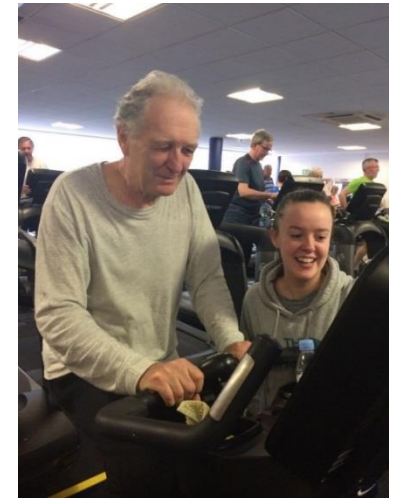
- Moderate

Type

- Aerobic & strength

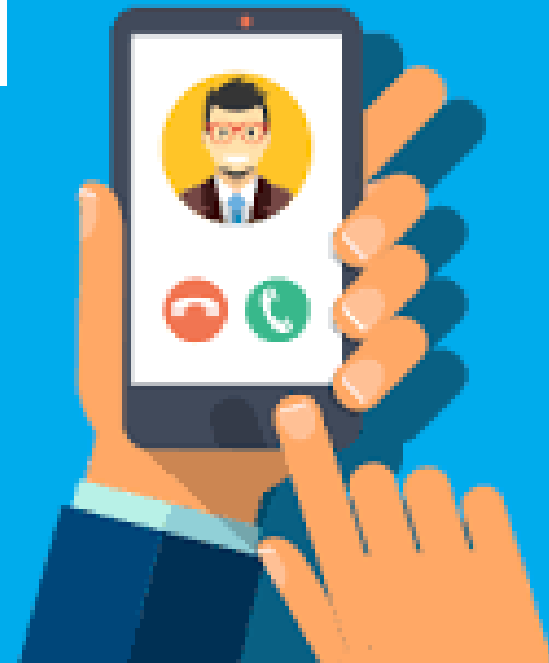
Time

- 60 minute session

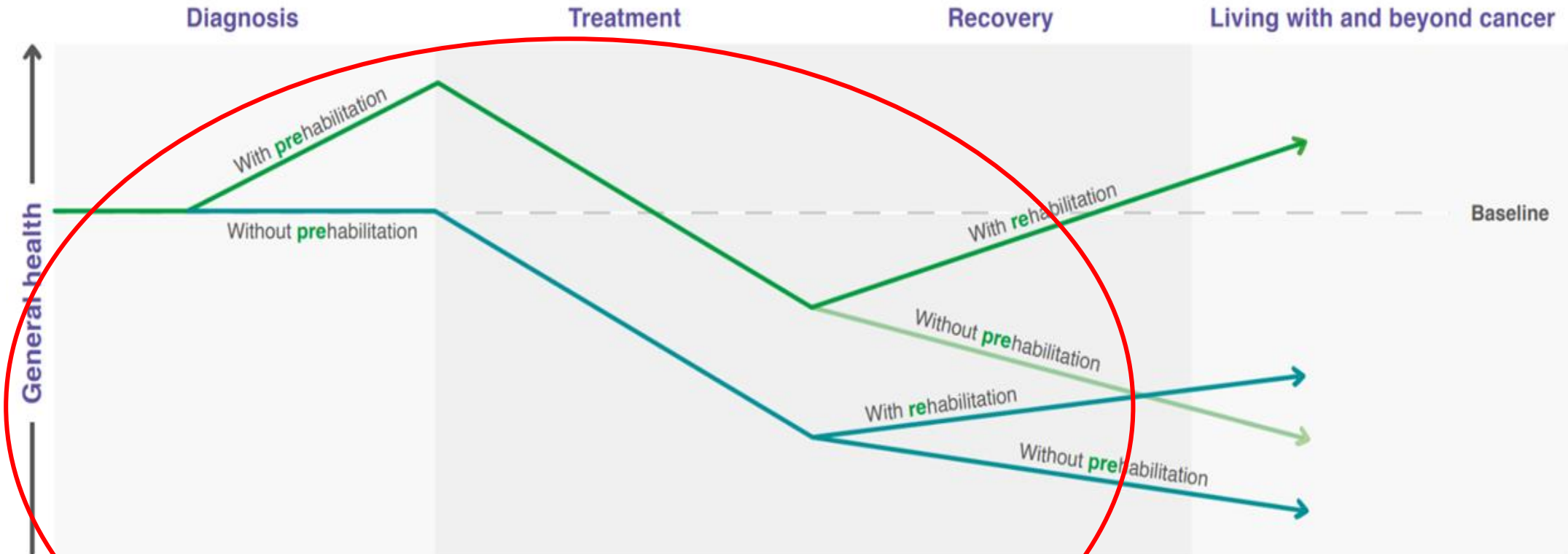




Exercise Prehabilitation



The role of exercise in the cancer treatment pathway



Cancer Prepare Programme



LUNG CANCER

Pre-surgery

- 4 weeks between diagnosis and surgery
- 12.5% ↑ in fitness
- 15 % ↑ in health related quality of life

Post-surgery

- 2-4 weeks following surgery x 6 weeks
- 10% ↑ in fitness
- 12 % ↑ in health related quality of life



COLORECTAL & PROSTATE CANCER

Pre-surgery

- 3 weeks between diagnosis and surgery
- 12% ↑ in fitness
- 10 % ↑ in health related quality of life

Research | [Open Access](#) | Published: 02 December 2019

Compliance, adherence and effectiveness of a community-based pre-operative exercise programme: a pilot study

[Lisa Loughney](#) , [Ronan Cahill](#), [Kiaran O'Malley](#), [Noel McCaffrey](#) & [Brona Furlong](#)

[Perioperative Medicine](#) 8, Article number: 17 (2019) | [Cite this article](#)

1514 Accesses | 2 Citations | 9 Altmetric | [Metrics](#)

A white circle with a thick black border containing the text "PROSTATE CANCER" in red, uppercase, sans-serif font.

PROSTATE
CANCER

Pre-surgery

- 3-4 weeks between diagnosis and surgery
- Participation provided participants with:
 - a teachable moment; It gave rise to ***greater health awareness*** and efforts to make positive health changes
 - acted as a vehicle to recovery; as a stepping stone towards the ***road to recovery from cancer***
 - provided them with a ***sense of optimism***
 - ***social connectedness***



OESOPHAGEAL
& GASTRIC
CANCER

Phase 1:

To assess the feasibility and effectiveness of a community-based pre-operative exercise programme in patients scheduled for neoadjuvant cancer treatment followed by surgery for oesophageal and gastric cancer

3 Clinical sites

7 Exercise sites

71 Participants



ClinicalTrials.gov registration
number:
NCT03807518

**Oesophageal &
gastric cancer**

Multi-modal prehabilitation

```
graph TD; A[Multi-modal prehabilitation] --> B[Exercise & physical activity]; A --> C[Nutritional optimisation]; A --> D[Psychological wellbeing]; B --- E[Goals]; C --- F[Goals]; D --- G[Goals];
```

Exercise & physical activity

Goals

- To prescribe a targeted and individualised exercise programme (cardiovascular, resistance, flexibility and balance training)
- To encourage daily physical activity that totals at least 30 min per day
- To reduce sitting or sedentary time
- To change long term behavior to include a more active lifestyle

Nutritional optimisation

Goals

- To better understand how the patient is eating and to identify where deficiencies are occurring
- To provide feedback as to how the patient can optimise their nutrition
- To identify patients who are malnourished
- To provide nutritional supplementation for patients who have been identified as having deficiencies

Psychological wellbeing

Goals

- To identify patients who require psychological intervention (using e.g. SF-36, HADS)
- To provide anxiety reducing techniques for all patients, based on preference

Phase 1:


To observe **physical, psychological and nutritional** outcomes in Irish patients with metastatic peritoneal malignancy cancer

- Pilot work showed a significant ↓ in fitness 12 weeks following surgery

A large, empty oval with a thick black border is positioned on the left side of the slide. Inside the oval, the text "Peritoneal Malignancy Cancer" is written in a red, sans-serif font, centered vertically and horizontally.

Peritoneal
Malignancy
Cancer

Physical, psychological and nutritional outcomes in a cohort of Irish patients with metastatic peritoneal malignancy scheduled for cytoreductive surgery (CRS) and heated intraperitoneal chemotherapy (HIPEC): An exploratory pilot study

Lisa Loughney , Noel McCaffrey, Claire M. Timon, Joshua Grundy, Andrew McCarren, Ronan Cahill, Niall Moyna, Jurgen Mulsow

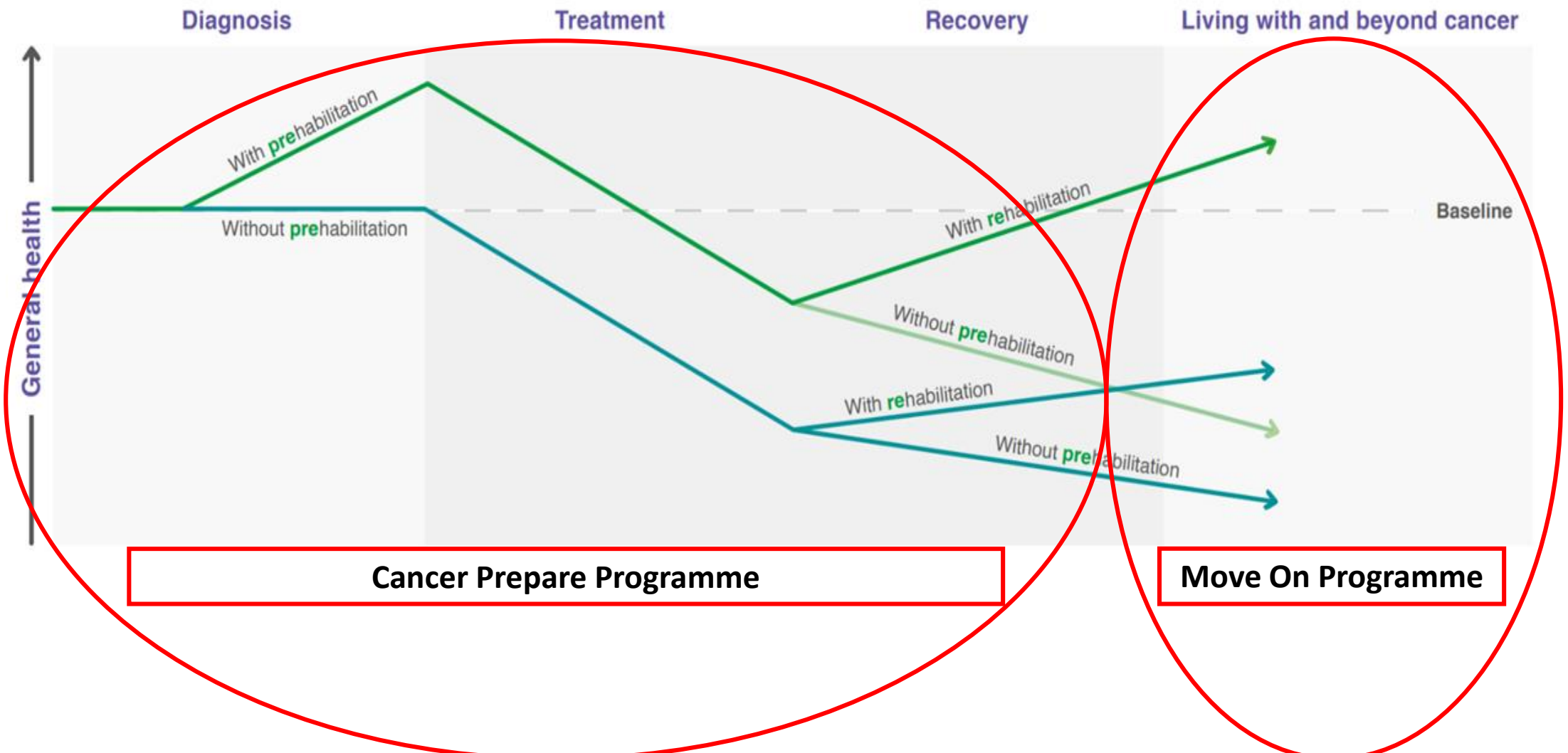


Phase 2:

Peritoneal
Malignancy
Cancer

To implement a **prehabilitation programme** to optimize physical, psychological and nutritional outcomes in Irish patients with metastatic peritoneal malignancy cancer

The role of exercise in the cancer treatment pathway



Move On





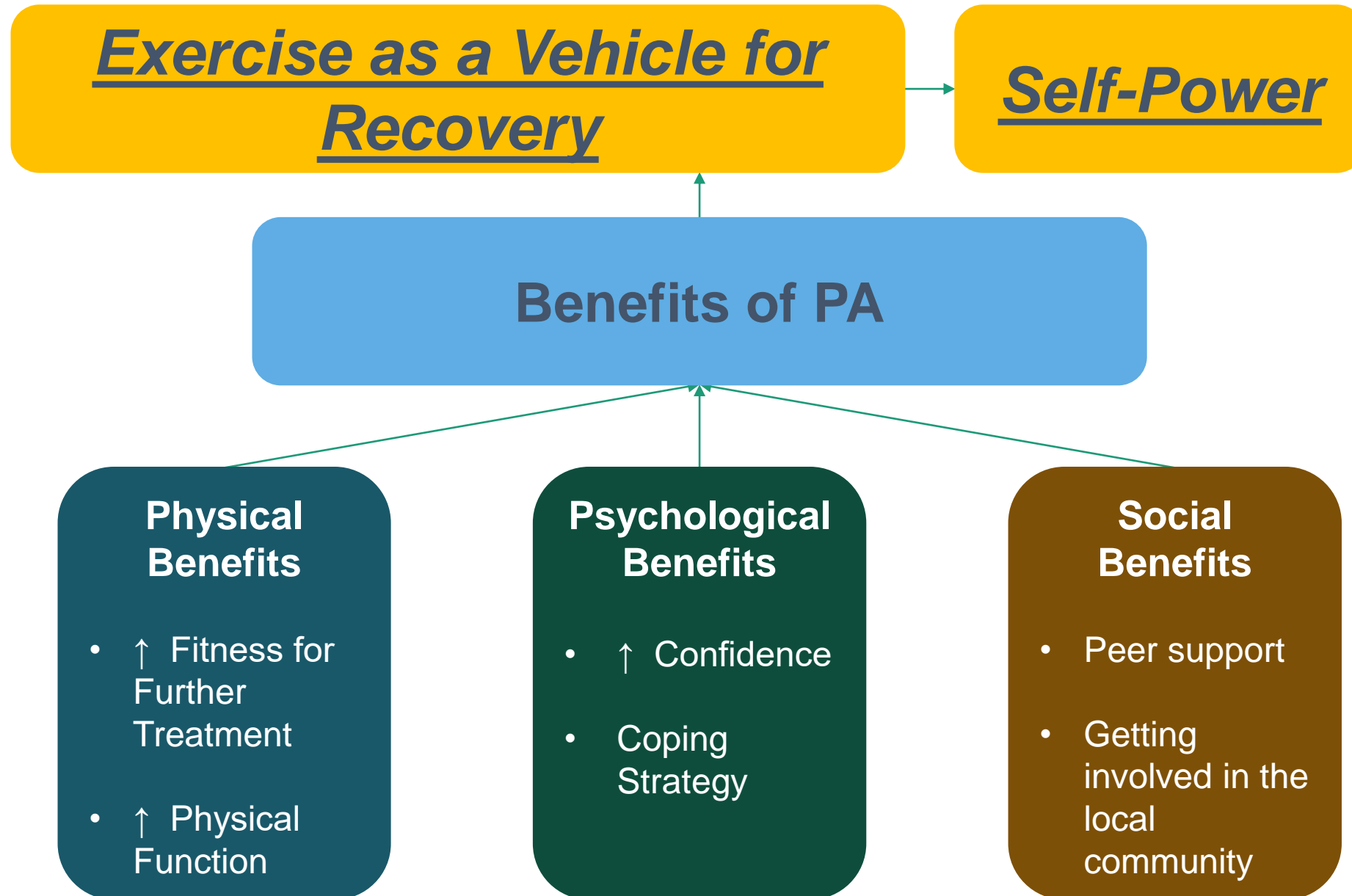
Irish Cancer Society
Research



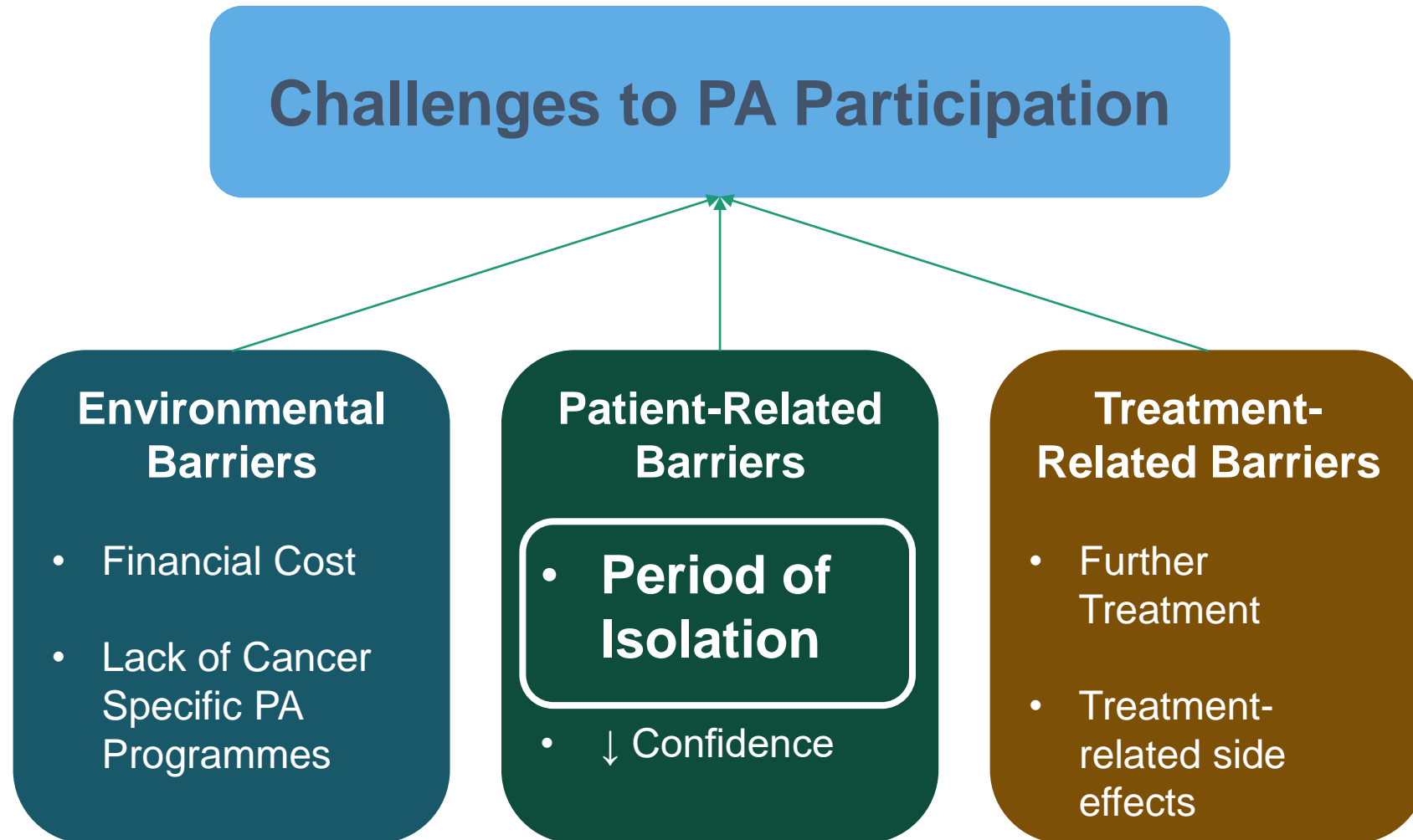
MedEx
Wellness

Work by Dr Mairéad Cantwell

Benefits of PA



Challenges to PA Participation



Strategies to Support Habitual PA and Adherence to CBERP Recommendations from Focus Group Participants

Fitness Assessments



Face-to-face PA counselling



Quantifying and measuring PA



Goal setting and action planning



Individualised exercise prescription



Information regarding additional health behaviours



Combined supervised and home-based exercise



Exercising as part of a group of survivors of cancer



MedEx IMPACT:

The feasibility and clinical effectiveness of a physical activity behaviour change intervention for individuals living with and beyond cancer

Breast, prostate & colorectal cancer



**Irish
Cancer
Society**

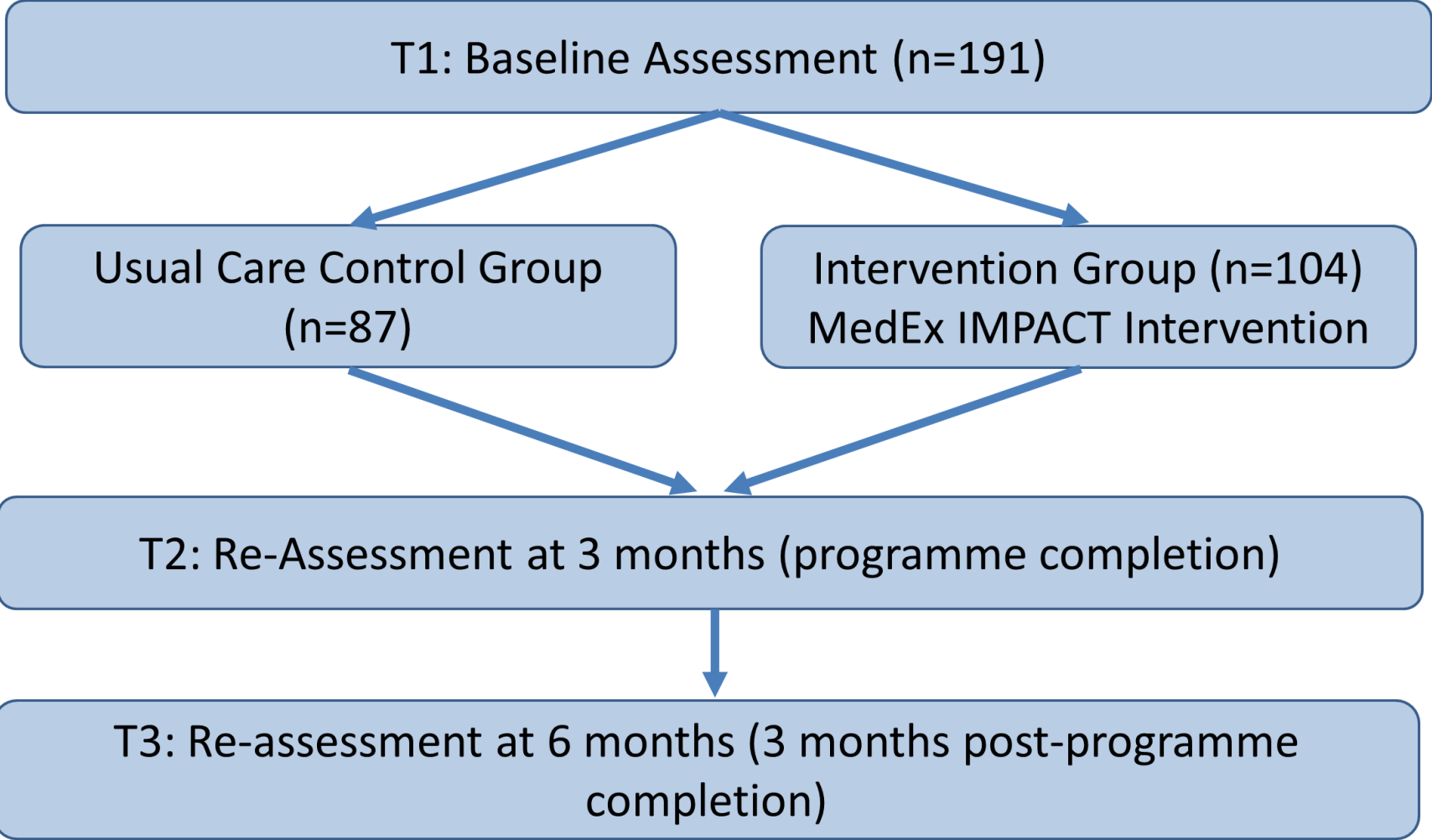


DCU



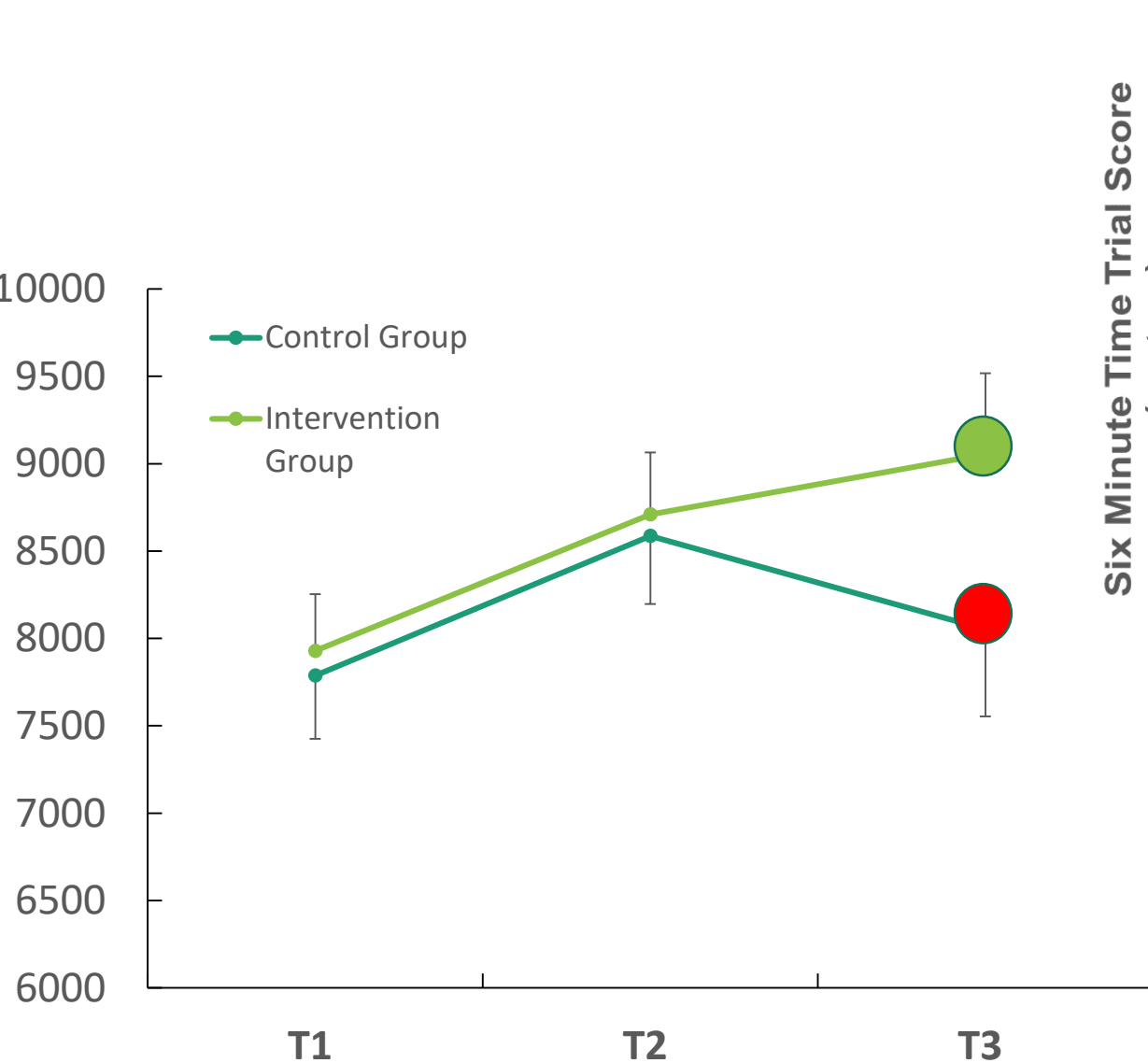
MedEx
Wellness

Dr Mairéad Cantwell



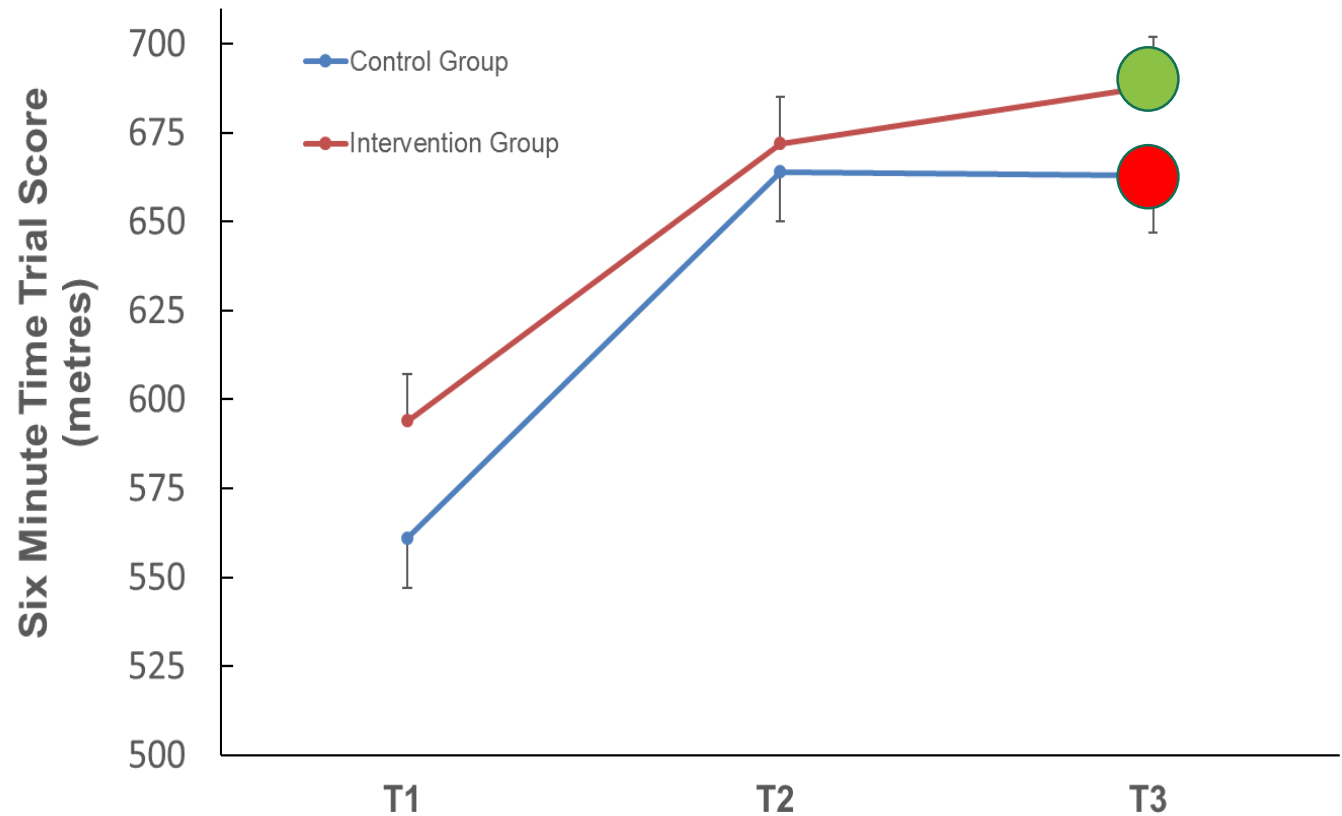
Physical Activity Levels

Mean Daily Steps



Cardiorespiratory Fitness

6 Min Time Trial Score



ExWell@Home For Cancer

A home-based exercise programme
to support people with cancer



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DELIVERY PARTNERS



Waterford Institute of Technology

Participant Testimonials

Male, Aged 51

Gastric cancer treated by chemotherapy followed by surgery

“The physical and emotional benefits that I got from the programme were immense. It clearly set me up to be in the best condition possible for my op and beyond. It also complemented the great work that was carried out by my oncologist and surgeon”.

Male, Aged 37

Colon cancer treated by surgery

“Receiving a cancer diagnosis in your 30s is a surreal experience. Time seems to both slow down and to speed up. Daily life quickly becomes a baffling treadmill of consultations, assessments, and examinations, while the wait for a surgery date can seem endless.

Amidst the shock and bewilderment following the diagnosis, the regular exercise sessions provided a much-needed sense of structure to me.

WHAT MEDICAL EXPERTS SAY ABOUT THE EXWELL PROGRAMME



Professor Karen Redmond

Thoracic & Lung Transplant Surgeon, Mater Misericordiae University Hospital

“Exercise in prehabilitation or rehabilitation is life changing. By doing exercise, I can change what might perceived to be an inoperable candidate to an operable candidate and that can be life changing, you can cure people of cancer. **I would say to people, I don’t want you coming in in a night gown, I want you coming in in a tracksuit and runners”**

“Exercise has a major impact on perioperative outcomes, both in relation to sense of wellbeing, ability to get up and get moving and prevent life changing conditions or problems. I would encourage people to get involved within exercise programmes... with family, with a friend where you can be educated about how much exercise is important and what types of exercise is important”.



Professor John McCaffrey

Medical Oncologist, Mater Misericordiae University Hospital

“Our experience with ExWell has been very positive, very easy to access programme, we weren’t prepared for the patient feedback which was, to a person, phenomenally positive”.

“Patients were very keen to stay with the programme, they found it was very useful to get their independence back, to the point that **we felt they could tolerate it during chemotherapy as well”**.

What's the prescription?



How active do I need to be?



Every little helps, but the more activity the better.

- Aim for at least **30 minutes of moderate physical activity** most days of the week.
 - Activity that makes you a **little out of puff**, but where you are able to talk comfortably.
 - It doesn't have to be strenuous to be effective. Anything that makes you **breathe a little deeper** and your **heart beat a little faster** is ideal.
- Try and build up the exercise you are doing gradually. You can do this by **walking a little farther each week** or getting a little faster.
- Consult with doctor if undergoing treatment

[For tips check out irishcancersociety.ie](http://irishcancersociety.ie)

SOMETHING
IS **BETTER**
THAN

NOTHING





EVERY.

STEP.

COUNTS.

Take home message

Exercise training throughout the cancer care journey and beyond is important



Resources

- www.cancer.ie/cancer-information-and-support/staying-well-while-staying-home/home-exercises-for-cancer-patients-and-survivors
- www.exwell.ie
- **My email:** lloughney@exwell.ie