Yorkshire Cancer Research

From Diagnosis to Recovery:

Embedding Exercise in Cancer Treatment Pathways

Updated December 2025

Foreword

At Yorkshire Cancer Research, we want people in Yorkshire to receive the very best prevention, diagnosis and treatment of cancer no matter who they are or where they live. Research shows that exercise can have a positive impact upon the treatment of cancer and Yorkshire Cancer Research are at the forefront of this work in the UK, working in collaboration with Shef eld Hallam University, to ensure people with cancer across Yorkshire have access to specialist exercise and wellbeing programmes.

In direct contrast to the old adage "rest is best", we advise that people with cancer follow a multi-modal personalised cancer exercise prehabilitation and rehabilitation plan to help the body prepare for, and recover from, cancer treatment. There is consistent evidence that following a cancer diagnosis, exercising before, during and after treatment can reduce side effects and complications, support recovery, improve survival and reduce the risk of cancer coming back. However, despite this growing body of evidence and the potential to significantly reduce the number of people losing their lives to cancer, specialist exercise services are not routinely available for people with cancer.

Yorkshire Cancer Research funded the exercise oncology programme Active Together, which was developed by the Advanced Wellbeing Research Centre at Sheffield Hallam University. The programme offers a personalised, specialist exercise service to people with cancer that is paired with nutritional and psychological support. The service is now delivered in partnership by NHS Trusts across the Yorkshire region, with Sheffield Teaching Hospitals the lead partner.

The evidence is clear: we are confident that exercise-based cancer prehabilitation and rehabilitation will make a significant impact in helping us to deliver the charity's mission to ensure that people in Yorkshire live longer and healthier lives, free from cancer.

Dr Kathryn Scott
Chief Executive,
Yorkshire Cancer Research

Academic endorsements

I welcome this report, which consolidates evidence for the role of exercise in supporting people living with and beyond cancer. The findings show that exercise can improve physical, psychological, and treatment-related outcomes, supporting both recovery and long-term health. Embedding exercise-based prehabilitation and rehabilitation into NHS cancer pathways aligns closely with the NHS 10 Year Health Plan's focus on personalised care and offers a practical approach to improving outcomes and reducing treatment-related adverse effects. The evidence presented here, alongside the outcomes from our own service, Active Together, demonstrate the clear case for ensuring that all people with cancer can benefit from structured exercise as part of their treatment and recovery journey.

Professor Robert Copeland,
Sheffield Hallam University

"This report is a timely contribution to the evolving landscape of the NHS and cancer care. It presents the evidence for embedding exercise-based prehabilitation and rehabilitation into NHS cancer pathways. As a researcher in exercise oncology, I welcome the call for high-quality trials to strengthen the evidence base. I also welcome the call for embedding exercise in cancer pathways. Yorkshire Cancer Research's effort in this space, particularly through the Active Together programme, demonstrates the potential of evidence-based interventions. This report presents the case for action to ensure that all people with cancer benefit from safe, effective, and accessible exercise support."

Dr Liam Humphreys,
Senior Research Fellow, Sheffield Hallam University

Summary and recommendations

Yorkshire Cancer Research's in-depth evidence review found that being active before, during and after cancer treatment is safe with tailoring to the person's condition. All people with cancer should avoid inactivity and return to normal daily activities as soon as possible following diagnosis.

The charity's review has concluded that exercise interventions before, during and after cancer treatment can:

- Improve common cancer-related health outcomes,
- Improve the chances of survival (both all-cause by up to 53% and cancer-specific by up to 44%) in people with cancer[1, 2]
- Reduce the risk of cancer recurrence by up to 66%[i, 3].

The charity recommends:

1. Multi-modal prehabilitation and rehabilitation to be prioritised within national health and cancer-related strategies and should be embedded as part of standard NHS cancer care pathways, available to all who are able to take part.

a. Exercise interventions should start as early as possible, in advance of any cancer treatment (not just the first treatment) and be integrated into all stages of a patient's treatment plan.
b. Exercise interventions should be personalised to the individual's needs and abilities based upon the disease, treatment-related adverse effects, anticipated disease trajectory and their health status.
c. Exercise interventions should aim to support people with cancer to achieve:
i. At least 150 minutes of moderate intensity or 75 minutes of vigorous intensity aerobic exercise (e.g. walking, jogging, swimming) each week.
ii. Two to three resistance exercise sessions each week.
d. Best practice cancer care should include referral to a group of cancer exercise specialists that include physiotherapists, specialist exercise physiologists and trained cancer exercise fitness instructors.

2. Education and awareness raising of the benefits of being active throughout a cancer diagnosis and beyond. This includes:

a. An exercise-based cancer pre and rehabilitation evidence review led by the Office of Health Improvements and Disparities should take place every three years, to inform national exercise guidelines for people with cancer. Public awareness campaigns by the Office for Health Improvement and Disparities (OHID) regarding the safety of exercise for people with cancer plus physical activity guidelines.
b. All members of a patient's multidisciplinary cancer team to promote physical activity and recommend people with cancer adhere to exercise guidelines.[4]
c. Education in exercise as an adjunct treatment for cancer to be integrated throughout the training of health and care professionals.

3. High quality, sufficiently powered randomised controlled trials and comprehensive service evaluations that aim to:

a. Determine how the impact of exercise upon survival and recurrence differs by cancer type, stage and/or treatment regimen.
b. Determine the optimal dose and type of exercise (i.e. modality, volume, intensity, and frequency) required to protect against mortality and recurrence.
c. Determine the optimal dose and type of exercise (i.e. modality, volume, intensity, and frequency) that is feasible and acceptable for people with cancer.
d. Investigate potential differences in the survival benefits associated with exercise across cancer types, stages and treatment regimens.
e. Ensure consistent service and outcome data collection from service evaluations. These should model the patient, clinical and economic impact across services and populations, in order to optimise service design.

The evidence base would also benefit from:

a. Guidelines following the EXACT framework proposed by Courneya and Friedenreich (2023) recommending a set of consistent reporting metrics for use across different studies/projects. This would allow for standardisation across different research, enabling smaller studies to be pooled together to create a larger evidence base. A project to co-design a national standard of outcome measures is now underway.[5]
b. The application of the EPiCC framework proposed by Courneya et al., (2024) which identifies distinct time periods for exercise during cancer treatment to promote a more targeted, treatment stage-specific approach to the study of exercise following a cancer diagnosis. Identifying the mechanisms of the effect of exercise is a critical part of this approach.
c. Shared learning by showcasing examples of work that have moved from research or a pilot service into being a commissioned service that is delivering impact in the local environment.
d. A NICE guideline for exercise prehabilitation and rehabilitation for all cancer patients, which includes guidance on the type, intensity and timing of exercise across treatment phases. Additional economic evaluations of UK-based exercise prehabilitation and rehabilitation programmes, which aim to further establish their cost effectiveness against NICE thresholds.
e. Further research into the barriers to attendance and adherence for people who are under-represented on cancer prehabilitation and rehabilitation programmes, with a focus on addressing health inequalities.

Definit ons

In the report, the terms physical activity and exercise are used. Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure and can be categorised in daily life into occupational, sports, conditioning, household, or other activities. Exercise is defined as a subset of physical activity that is planned, structured and repetitive and that has a final or an intermediate objective of improving or maintaining physical fitness. Both terms are used appropriately throughout this policy to reference the different concepts.

[i] when compared to those who are physically inactive

Current UK context

It is estimated that around one in four people living with and beyond cancer have at least one physical or psychosocial consequence from their cancer or its treatment that affects their lives on a long-term basis.[7] As the evidence review highlights, interventions aimed at improving physical health throughout a person's cancer journey are safe and could improve both clinical and quality-of-life outcomes.

Despite this, exercise oncology services are not routinely available. Although evidence on the benefits of exercise in relation to cancer outcomes has been growing for a number of years, with international bodies making firm recommendations on exercise as a treatment for cancer the UK has yet to fully integrate specialised exercise services into routine clinical practice.

Despite this, numerous charities and individual NHS trusts advocate for exercise as a treatment for cancer, producing relevant information and delivering services to people with cancer. Across the UK, the number of clinical trials and service transformation projects which put prehabilitation and rehabilitation into practice is rapidly expanding. This means there is an ever-growing community of expert providers.

The Charity's Active Together programme, an evidence-based service undertaken in Yorkshire designed by Sheffield Hallam University aims to help people with cancer to be as physically and mentally fit as possible before, during and after cancer treatment.[8] It offers fitness, nutrition and psychological wellbeing support for people following a cancer diagnosis. Delivered by a team of NHS specialists, the service helps people prepare for and recover from cancer treatment.[9, 10] Active Together services are currently operating in Sheffield, Wakefield, Barnsley, Doncaster, Rotherham, Pontefract and Dewsbury. A service is being planned around Airedale, whilst a new centre will shortly open in Hull.

Other examples include the lung cancer Prehab programme at Barts Health NHS Trust,[11] Fitness First at the Royal Marsden NHS Foundation Trust,[12] the PREPARE programme at Imperial College Healthcare NHS Trust,[13] the Prehab4Cancer Greater Manchester project at The Christie NHS Foundation Trust[14], the CanRehab Trust[15] and Active Against Cancer in Harrogate.[16]

Exercise-based cancer pre and rehabilitation

More people than ever before are surviving cancer in Yorkshire. Since current records of survival data began in 2003, 1-year survival in Yorkshire has improved by 9.5%, increasing from 63.9% of people surviving at least one year following a cancer diagnosis to 73.4%.[17] Also since 2003, 5-year survival improved by 8.8% from 46.2% to 55.0%.

Whilst this progress is commendable, this means that one in four people in the region do not survive more than a year after their diagnosis and around one in two people do not survive more than five years. These data masks the significant variation of survival outcomes for different types of cancer as well as large differences between areas within Yorkshire. For example, lung cancer has the lowest survival with only 19% of people surviving lung cancer for five years or more in Yorkshire.[17] There is over 11% difference between the Yorkshire areas with the highest and the lowest 1-year survival for lung cancer, with Hull having the lowest and Leeds the highest. The data also masks variation in survival outcomes according to socio-economic status, with differences in five year survival between the most and least deprived groups evident for cancer types including breast, bowel, lung and prostate cancer.[18, 19]

Exercise-based cancer prehabilitation and rehabilitation aims to incorporate appropriate exercise programs into the overall management of people with cancer, to take advantage of the numerous health benefits (both physical and psychological) associated with exercise. Figure 1 shows the elements of the cancer pathway where exercise has a clinical benefit.

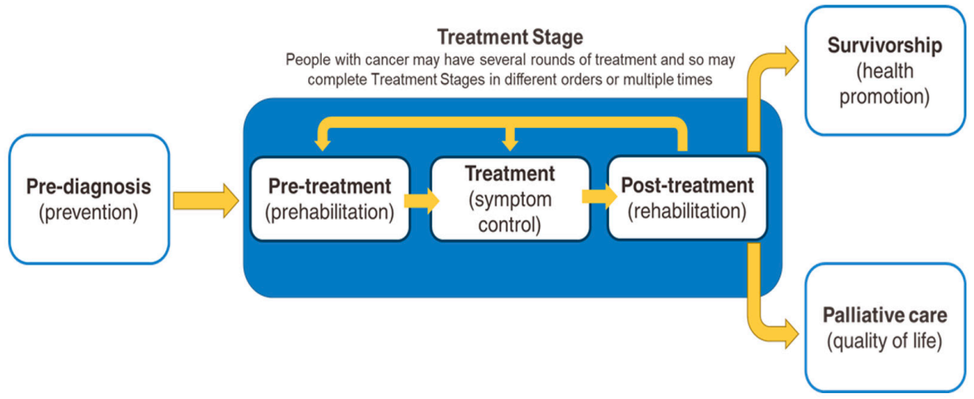

Figure 1: The role of exercise at different stages of the cancer pathway.[20]

Pre-diagnosis (prevention): One in two people will be diagnosed with cancer in their lifetime.[21] Evidence suggests that being physically active can reduce the risk of developing at least seven types of cancer.[22] Being active can also support being a healthy weight, which reduces the risk of developing 13 types of cancer and could prevent 2,004 cases of cancer in Yorkshire each year. [23, 24]

Pre-treatment (prehabilitation): Exercise can help people prepare for treatment, potentially increasing the treatment options may be available to them. Following an exercise programme for two weeks in the time before treatment starts can be enough to deliver improvements in fitness.[25]

Treatment: Exercise during treatment can help alleviate common side effects such as anxiety and fatigue.[26] A reduction in severe side effects may also help people to tolerate higher doses of treatment or help people to complete their treatment.

Post-treatment (rehabilitation): Exercise after treatment can help people recover from treatment, improving their ability to do activities of daily living, enhancing quality of life as and helping to instil life-long healthy behaviours.[26, 27]

Survivorship: After the rehabilitation phase, continued exercise may help to further reduce the risk of mortality and the cancer returning and promote a healthy lifestyle more generally. For those people who do experience a recurrence of their cancer, or a second primary diagnosis of cancer, previous active rehabilitation and positive behaviour change will better prepare these patients for future treatment.

Figure 2 below visualises the potential impact that exercising throughout cancer treatment and beyond has on health. Overall, an uplift to general health is seen with the addition of exercise across these key points in time.

Multi-modal care

Cancer outcomes may be further impacted by the addition of other adjunct therapies that sit alongside exercise interventions. These include, but are not limited to, nutrition and psychological support which can help patients before, during and after cancer treatment to be as healthy as possible, both physically and mentally, and help them to achieve the most they can from the exercise programme. Furthermore, inclusion of support to stop smoking as part of a multi-modal prehabilitation and rehabilitation service can further improve outcomes, particularly in relation to the outcome and effectiveness of treatments such as surgery, radiotherapy and chemotherapy.[30-33] These adjunct therapies may be of clinical benefit across any stage of the cancer pathway.

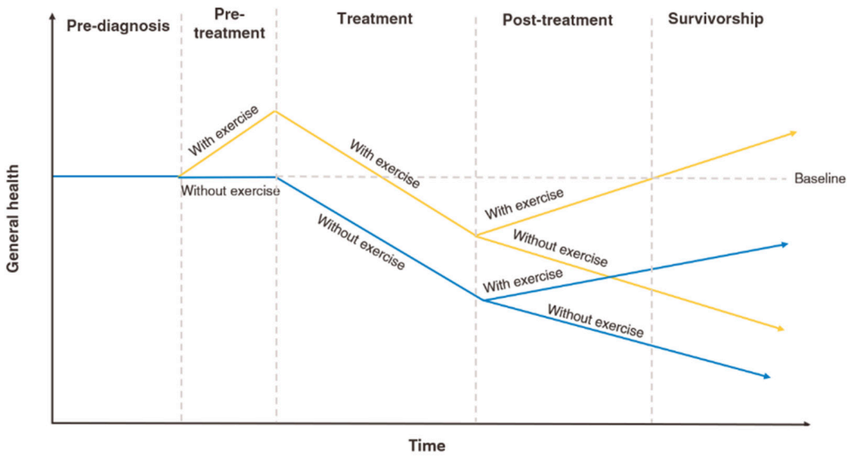

Figure 2: The impact of exercise before, during and after cancer treatment on general health.[4]

Impact of exercise

Surgical outcomes

Taking part in exercise interventions before surgery has been shown to reduce the number of days spent in hospital and may lower the risk of postoperative complications, as well as help patients to maintain functional capacity.[34-37] Furthermore, increasing fitness levels and in some cases, increased endurance, physical fitness and muscle strength may allow people with cancer to access treatments that were not previously available to them, increasing their chances of survival. A decline in physical activity due to ageing or critical illness significantly increase in perioperative risk.[38-40] Interventions to improve post-surgical recovery have usually been targeted at intra-operative and postoperative periods but it may be better for most patients to take part in an intervention before surgery.[41, 42] Both postoperative complications and longer bed rest might make people less able to take part in an intervention post-surgery, and therefore retain less function.

The Yorkshire Cancer Research Active Together programme was designed by Sheffield Hallam University's Advanced Wellbeing Research Centre and funded by Yorkshire Cancer Research.[8, 43] The programme is delivered in partnership with the NHS across Yorkshire. The programme provides evidence-based exercise, nutrition and psychological support to people with cancer both before, during and after treatment.

The service started in South Yorkshire and initially supported adults with a primary diagnosis of lung, colorectal or upper gastrointestinal cancer types. It expanded to cover nine cancer types as the service grew. A 2024 service evaluation of Active Together South Yorkshire found that participation was associated with a reduced average length of hospital stay.[44] Participants spent an average of 0.66 fewer days in hospital overall and 0.65 fewer days in critical care, compared to those who declined to participate.[44, 45]

Exercise interventions that optimise preoperative fitness prior to major cancer surgery could reduce postoperative complications, although much of the existing literature focuses specifically on people with lung cancer.[34, 46] A lack of standard outcome measures and intervention heterogeneity hinders the ability to draw firm conclusions from the literature.[47, 48] Further trials can improve understanding of the impact that exercising before cancer surgery has on clinical outcomes.[46]

Treatment related side-effects

There are a range of common therapeutic approaches employed in the treatment of cancers. These include, but are not limited to, surgery, radiotherapy, chemotherapy, hormone therapy and tumour specific immunological therapies. There is a consistent pattern of side effects experienced by patients during treatment including a loss of cardiovascular and muscular fitness, fatigue and a significant impact on psychological well-being.[49] These negatively impact an individual's quality of life and can also result in reduced survival.[50]

Engaging in exercise during cancer treatment can help to reduce common treatment side effects [26] In addition, lessening the severity of these side effects may allow patients to tolerate greater doses of anti-cancer treatment and facilitate higher treatment completion rates, in turn increasing the chances of survival and reducing the risk of cancer returning.[51]

In 2019, the American College of Sports Medicine Roundtable concluded that exercise training and

testing was generally safe[ii] for people with cancer and that they should avoid inactivity.[26] Specific doses of aerobic training, combined aerobic plus resistance training, and/or resistance training could improve common cancer related health outcomes, including anxiety, depressive symptoms, fatigue, physical functioning and health-related quality of life. More recent findings have shown that the way in which exercise/physical activity is conducted may be important: shorter and more frequent exercise sessions may significantly reduce cancer-related fatigue while increasing functional capacity and also reducing pain and kinesiophobia.[iii] Evidence also suggests that more people who take part in an exercise intervention return to work compared to those who were not part of an exercise intervention.[27]

Currently, there is a larger body of evidence for some cancer types such as lung cancer than for less common cancer types.[26, 52] However, in the absence of significant risk, there is sufficient evidence that physical activity/exercise is of general health value and it could do more harm than good to wait until further research is complete before prescribing physical activity/exercise to these less studied populations.[26]

Mortality

Studies attempting to understand the relationship between physical activity/exercise before, during or after cancer treatment and subsequent mortality measure this in two ways: deaths from cancer specifically (cancer-specific mortality) and death from any cause (all-cause mortality). The evidence shows a consistent association between physical activity/exercise before, during and after cancer treatment and a reduction in risk of cancer-specific and all-cause mortality. Meta-analyses have found that physical activity/exercise before, during or after cancer treatment was associated with up to 44% reduction in the risk of cancer-specific mortality while the risk of all-cause mortality could be reduced by up to 53%.[1, 2]

A recent randomised controlled trial by Courneya et al., (2025) evaluated the relationship between exercise-based cancer rehabilitation and mortality risk.[53] The study included a total of 889 people with colon cancer who had completed adjuvant chemotherapy treatment. Half of the participants were assigned to an exercise rehabilitation programme. There were also sessions to support participants to make lasting positive lifestyle changes, which were informed by behaviour change theory. The other half of the participants were assigned to a control group which received health education materials. At 8 year-follow-up, the risk of dying was reduced by 37% for people participating in the exercise group, in comparison to the group assigned health education materials.

[ii]"Generally safe" refers to limitations in the generalisability of the evidence rather than findings that exercise is unsafe for participants. Please see 'Limitations of the Research' for more detail.
[iii]The fear of pain due to movement. Kinesiophobia can hinder rehabilitation and prolongs disability and pain.

Evaluation of the first two years of data from Active Together South Yorkshire found that the one-year survival rate for participants on the programme was 95%, compared to 85% for patients who declined to participate.[44] The largest difference in one-year survival rates between the participants and the declined groups was for upper gastrointestinal patients, as shown in Table 1. It is important to acknowledge the size of the samples, particularly for the declined group, which was too small to be matched for procedure or whether the tumour was malignant or non-malignant. As the Active Together service expands, this will enable future evaluations on a larger scale.

Cancer site	Statistic	Active Together	Declined Group
Colorectal	**Sample size**	**162**	**31**
	1-year survival (95% CI)	97% (94%-100%)	86% (72%-100%)
Lung	**Sample size**	**81**	**51**
	1-year survival (95% CI)	93% (77%-99%)	89% (80%-99%)
Upper GI	**Sample size**	**62**	**14**
	1-year survival (95% CI)	91% (83%-100%)	68% (45%-100%)
Total	**Sample size**	**305**	**96**
	1-year survival (95% CI)	95% (92%-98%)	85% (77%-93%)

Table 1: Survival rates for Active Together South Yorkshire [54]

Although the majority of evidence agrees that physical activity or exercise can have positive effects on mortality risk, questions remain regarding how the reduction of mortality risk changes according to the cancer type, stage and/or treatment regimen as well as the modality, volume, intensity, and frequency of exercise required.

Cancer recurrence

Recurrence is defined as when someone's cancer returns after anti-cancer treatment. A growing body of research suggests an association between physical activity/exercise before, during and after cancer treatment and a reduction in the risk of cancer recurrence. The reduction in risk of recurrence ranges up to 66% depending on the intensity of physical activity/exercise and type of cancer.[3]

Research continues to support the principle that exercise reduces the risk of cancer recurrence.

A randomised controlled trial by Courneya et al., (2025) which examined the impact of exercise-based rehabilitation after chemotherapy also examined the impact of cancer rehabilitation on cancer recurrence.[53] At five-year-follow-up, the exercise group had a 28% reduced risk of cancer recurrence or of a new cancer developing, compared to the group which were given health education materials.

As with mortality outcomes, questions remain regarding how effective exercise is depending on cancer type, stage and treatment, and also exercise type frequency and intensity. One of the key limitations of the evidence base for exercise oncology and cancer recurrence is that the definition of recurrence differs throughout the literature. Despite this limitation, the evidence does suggest a consistent finding of reduction in the risk of recurrence with exercise.[1, 55] Exercise interventions should be incorporated into cancer treatment pathways given that they are safe rather than waiting for more evidence on recurrence outcomes.

Mechanisms of effect

The reasons why exercising before, during and after cancer treatment influences cancer survival and recurrence are not fully understood but there are several emerging theories based on the research. All or a mix of these theories may prove correct as further research is undertaken.

The first theory is that exercising can optimise treatment outcomes:

- Less severe side effects may help patients tolerate greater doses of treatment and/or help them to complete their treatment.[56, 57]
- In some cases, exercising before treatment may allow patients to access treatments that were not previously available to them. [4, 26, 54]
- Exercising before surgery could improve outcomes by reducing postoperative complications and length of hospital stay.[58-60]
- Exercise increases blood flow around the body and may help to transport anti cancer treatments to cancer cells more effectively.[61, 62]

The second theory is that exercise could affect the tumour microenvironment, indirectly hindering cancer's ability to grow and spread:

- Fasting plasma insulin and chronic low-grade systemic inflammation can cause cancer to grow.[63, 64] Regular exercise could reduce the levels of these growth factors and proteins in the body that help cancers to grow and spread.[60, 65]
- Exercise may help the immune system to increase the amount of natural killer cells in the blood that kill circulating tumour cells.[66]

The third theory is that exercise could directly affect cancer cells, preventing them from growing and spreading:

- Exercise can increase vascular shear stress which may impact a cancer cell's viability and cause it to die.[67, 68]

The final theory is that exercise positively changes the body's composition, which may have a direct or indirect impact on the growth and spread of cancer cells. [69-71]

These theories are largely based upon research from breast and bowel cancer; however, it is likely that they apply to other cancers.

Cost-effectiveness

An increasing number of studies evaluate the cost effectiveness of exercise-based cancer prehabilitation and rehabilitation programmes.

A service evaluation of the Yorkshire Cancer Research-funded Active Together service showed that participation was associated with a net saving compared to patients who declined the service.[54] The mean difference in healthcare costs between participating and declined groups was £1,079.22. The cost of delivering the Active Together service[iv] was £712.96, resulting in a net saving of £366.36.

Research has also reviewed the cost effectiveness of other exercise-based cancer prehabilitation and rehabilitation programmes. A 2023 systematic review of economic evaluations found evidence to show that these programmes are cost effective in the long term.[72]

There is a clear need for additional economic evaluations of exercise-based cancer pre and rehabilitation services based in the UK. The Macmillan clinical implementation guidelines for prehabilitation for people with cancer strongly recommend that formal economic evaluations should be incorporated into clinical studies of prehabilitation.[73]

Health inequalities

There are social inequalities in access to exercise-based prehabilitation and rehabilitation services, both in terms of deprivation and ethnicity. A narrative review by Stewart et al., (2025) evaluates the inequalities of prehabilitation before cancer surgery.[74] The study explains that participation and access to prehabilitation services is lower for people from socio-economically deprived backgrounds and from some ethnic minority groups.

Research has explored explanations for lower participation levels in people from a socioeconomically deprived background. Stewart et al., (2025) explain that prehabilitation interventions require a financial commitment, such as purchasing exercise clothing, buying healthier food products[v] and the cost of traveling to the service.[74] These additional commitments may act as a barrier to access for people from deprived backgrounds.

Studies have identified that there is limited qualitative research with ethnic minority groups which explores the barriers that they face when accessing exercise-based cancer prehabilitation and rehabilitation services.[75] Further research is needed with ethnic minority groups which are typically underrepresented, in order to ensure inclusive access to these services.[54]

In line with the Active Together service design, it is crucial that exercise-based cancer prehabilitation and rehabilitation programmes are collaboratively developed to address barriers to attendance and adherence to services, in order to ensure that they are as inclusive as possible to people who experience health inequalities. The Macmillan clinical implementation guidelines strongly recommend that health inequalities should be considered in the design, delivery and implementation of prehabilitation services.[73]

[iv] As stated above, it is important to acknowledge the limitations of the sample size, particularly for the declined group, which was too small to be matched for procedure or tumour malignancy.

[v] For more information on the cost of healthy versus unhealthy foods, please see Yorkshire Cancer Research's Excess body weight and cancer policy report.

Physical activity guidelines for people with cancer

In 2014, a review of evidence-based physical activity guidelines for cancer populations in Australia, Europe, and the United States concluded that physical activity is safe and should be an integral and continuous part of care for all individuals.[76]

It has since become commonly accepted that people with cancer should:

- Avoid inactivity and return to usual activities as soon as possible.
- Aim to continue physical activity as far as possible while undergoing treatment.
- Build up to age-appropriate guidelines for health-enhancing physical activity after treatment.

In 2020 the World Health Organization released updated physical activity guidelines which provided recommendations for adults with chronic conditions, such as cancer.[77]

The recommendations are as follows:

- All adults and older adults should undertake regular physical activity.
- Throughout the week, aim to do between 150-300 minutes of moderate intensity activity, 75 to 150 minutes of vigorous intensity activity, or an equivalent combination of both.
- On two or more days each week, aim to do muscle strengthening activities that include all the major muscle groups.
- For older adults (65+), on three or more days each week, aim to do varied multicomponent physical activity that emphasises functional balance and strength training, to enhance functional capacity and prevent falls.

There is not yet enough published evidence to determine a tailored prescription of exercise that gives the best chances of survival and reduces the risk of cancer returning. In 2025, a systematic review of physical activity guidelines for people with cancer found that most reported a dosage of 150 minutes per week of moderate intensity or 75 minutes of vigorous intensity aerobic training plus resistance training twice per week.[78] The review noted that guideline recommendations are typically general and rarely make detailed recommendations on exercise frequency, intensity and duration.[78] The review calls for further high quality research, in order to precisely determine guidelines according to exercise type, frequency, intensity and duration, along with cancer type, treatment type and outcomes.[78]

Based upon studies of breast and bowel cancer, it is currently estimated that around 150 minutes of moderate intensity activity or 75 minutes of vigorous intensity activity a week postdiagnosis is associated with significant reductions in risk of cancer-specific and all-cause mortality up to 25% and 28% respectively.[79]

In October 2025, Macmillan Cancer Support[vi] and partner organisations published Prehabilitation for people with cancer: clinical and implementation guidelines.[73] Under these guidelines, prehabilitation refers to a "needs-based multi-modal intervention, before and during cancer treatment, to optimize physical, nutritional and psychological status, enhance readiness for and tolerance of treatment and improve recovery and/or quality of life".[73]

The guidelines make a series of recommendations across 11 topics relating to prehabilitation, including exercise, nutrition, psychology and health inequalities. The guidelines strongly recommend "multimodal interventions with behaviour change techniques that combine nutrition, exercise and psychological support to enhance functional outcomes".[73] They also strongly recommend a "combination of aerobic and strength exercise be prescribed to patients undergoing surgery" and that "patients undergoing adjuvant or neoadjuvant cancer treatment receive a combination of aerobic and strength exercise, delivered early in the treatment pathway", to improve patient reported and clinical outcomes.[73]

On the workforce required to deliver prehabilitation, the guidelines strongly recommend that "cancer prehabilitation is multidisciplinary and that all members of the cancer workforce are trained in the principles of prehabilitation, understand the provision of local prehabilitation services and be able to direct patients to these services".[73]

To effectively address health inequalities, the guidelines strongly recommend that they are "considered in the design, delivery and implementation of prehabilitation services and the associated interventions to avoid exclusion".[73]

[vi]The guidelines were developed in collaboration with NIHR Southampton Biomedical Research Centre, the Centre for Perioperative Care, the Royal College of Anaesthetists, the NIHR Cancer Nutrition Collaborative and the World Cancer Research Fund.

Position of international bodies

In response to the increasing body of evidence on exercise oncology, several national and international bodies have released position statements on the role of exercise in cancer, taking into account the strengths and limitations of the evidence base.[vii]

Arguably, the most progressive position statement was released by the Clinical Oncology Society of Australia in 2018,[80] who recommended that exercise should be embedded as part of standard practice in cancer care and viewed as an adjunct therapy that helps counteract the adverse effects of cancer and its treatment. The guidelines recommend that people with cancer progress towards at least 150 minutes of moderate intensity aerobic exercise and two to three moderate intensity resistance sessions each week.

In 2020, the Spanish Society of Medical Oncology published a position statement.[81] Their review of the exercise oncology evidence led them to conclude that exercise is feasible, effective and safe in patients with cancer throughout the course of the disease.

The American Society of Clinical Oncology (ASCO) published their official guidelines on Exercise, Diet, and Weight Management During Cancer Treatment in 2022.[82] The guidelines were developed for both oncology professionals and people living with cancer to provide evidence-based recommendations to optimise quality of life and cancer control in people undergoing treatment. ASCO strongly advocated that oncology providers recommend aerobic and resistance exercise to people receiving systematic therapy or radiotherapy in order to mitigate side effects of the treatment. Further, oncology providers may recommend exercise training in the lead-up to surgery in order to reduce the length of hospital stay and post-surgery complications. The review panel found significant gaps in the literature, including the impact of exercise on cancer recurrence and mortality.

Policy enablers

Recognition of the importance of exercise for people affected by cancer is becoming increasingly more evident in both local and national policy.

This section will explore the Government's key health reforms and how they represent an opportunity to embed exercise-based cancer pre and rehabilitation as a part of standard care for all cancers.

10 Year Health Plan

The 10 Year Health Plan was published in July 2025 and centres around three strategic shifts for the NHS:[84, 85]

From hospital to community:
The Plan aims deliver a wider range of health services closer to where people live. The Plan commits to establishing multidisciplinary Neighbourhood Health Centres in every community. These will offer a wide range of health services, including post operative care and rehabilitation.

From analogue to digital:
The goal of this shift is to improve how technology is used across the NHS. It includes reform to how data is managed by the NHS and an expansion of the NHS App. Importantly, Wearable technologies which monitor key health metrics will be standard in preventative, chronic and post-acute NHS care by 2035.

From sickness to prevention:
This shift aims to address the causes of ill health, with the intention of supporting people to stay healthy and independent for longer and reduce the pressures currently facing the NHS. The Plan confirms the Government's commitment to halving the gap in healthy life expectancy between the richest and poorest regions of the country. The Plan includes a "moonshot" to reduce obesity prevalence, through actions including mandatory reporting of the healthiness of food sales by major retailers and manufacturers. It also aims to reduce the prevalence of other preventable causes of ill health, including smoking and alcohol consumption.

Exercise-based prehabilitation and rehabilitation and specifically the Active Together service is closely aligned with the strategic shifts established by the 10-Year Health Plan. Firstly, Active Together is delivered at community centres across Yorkshire. This community-based model supports people living with cancer to live healthier lives by facilitating a more rapid and complete recovery from treatment. Secondly, Active Together is preventative by nature, integrating behaviour change around physical activity, nutritional advice and psychologically informed care. The service aims for positive health behaviours such as increased physical activity, reduced alcohol consumption and smoking cessation to be maintained into the long term, beyond cancer treatment.

National Cancer Plan

The National Cancer Plan is expected to be published in 2026.[86] The National Cancer Plan will cover the entirety of the cancer care pathway, across diagnosis, treatment and post-treatment. It will be based upon the three strategic shifts established by the 10 Year Health Plan.

The National Cancer Plan represents a critical opportunity to embed exercise-based prehabilitation and rehabilitation into cancer care pathways. This should be comprehensive, evidence-based and aligned to best practice.

[vii] Although the British Association of Sports and Exercise Science position statement was released in 2011 and is outdated.

Limitations of the research

Although the emerging evidence from the exercise oncology research is encouraging, the current limitations of the evidence base are as follows:

- Most of the evidence base is founded on breast, bowel, lung and prostate cancers.[87] Though there are various smaller studies in other tumours that suggest exercise can result in reducing recurrence and improve mortality, care still needs to be taken when generalising the results.
- Recommending tailored exercise programmes for people with other cancer types is unlikely to do harm, but the effect size in the reduction of mortality and recurrence is unknown.

Numerous organisations recommend that exercise as a treatment for cancer is offered to most people with cancer, even in the absence of site-specific evidence.[82, 88, 89]

Much exercise oncology evidence comes from observational studies, which:

- are not designed to confirm a causal relationship between exercise and cancer survival or recurrence.
- collect data on a patient's general physical activity levels, not exercise as a prescribed treatment.
- ask patients to self-report their physical activity levels, a data collection method that is prone to error.
- measure physical activity post treatment and not throughout a patient's cancer treatment journey.
- might not be able to define whether exercise improves cancer survival and recurrence outcomes because active patients are more likely to have early-stage, treatable disease.
- may not have controlled for other changes to health behaviours that patients may make as a result of a cancer diagnosis, such as quitting smoking.

Observational studies should adhere to the Courneya and Friedenreich (2023) framework, but the preference should be for more Randomised Control Trials that are designed to test the effectiveness of specific exercise interventions throughout the treatment pathway on the primary outcomes of mortality and recurrence (or suitable surrogate measures).[90] Research is likely to not be generalisable to the broad population of people with cancer as study inclusion criteria may recruit people that have a higher physical function and motivation to exercise, and exclude those more severely affected by cancer.

Conclusion

The current evidence suggests that exercise can play a critical role in cancer care. There is a growing body of research which shows that exercise-based cancer prehabilitation and rehabilitation can improve cancer survival outcomes and reduce the risk of cancer recurrence. It also improves physical, psychological and treatment-related health outcomes in people with cancer.

Well designed and powered research trials are required to understand how protection against mortality varies by cancer type, stage and/or treatment regimen.

Questions also remain as to the optimal and acceptable modality, volume, intensity, and frequency of exercise.

There is encouraging research to suggest that exercise interventions before, during and after cancer treatment consistently reduces the risk of cancer returning. Although these results are promising, the evidence base could be improved further to draw stronger conclusions. High quality research trials in different tumour sites that measure recurrence as a primary outcome are required to improve the certainty of evidence regarding the impact of exercise on cancer recurrence.

Yorkshire Cancer Research recommends that exercise oncology should be embedded as part of standard NHS cancer care pathways. Exercise-based projects and services for people with cancer do exist across the country but access to this support often depends on where you live. Exercise interventions should start as early as possible, in advance of any cancer treatment (not just the first treatment) and be integrated into all stages of a patient's cancer care journey. There are hundreds of thousands of people with cancer who will benefit from exercise interventions and a nationwide programme should be introduced as swiftly and comprehensively as possible.

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