The Development of a Multi-Modal Cancer Rehabilitation (including Prehabilitation) Service in Sheffield, UK: Designing the Active Together Service

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Posted Date: 25 December 2023

doi: 10.20944/preprints202312.1786.v1

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Article

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Abstract: Cancer patients undergoing major interventions face numerous challenges, including the adverse effects of cancer and the side effects of treatment. Cancer rehabilitation is vital in ensuring cancer patients have the support they need to maximise treatment outcomes and minimise treatment-related side effects and symptoms. The Active Together service is a multi-modal rehabilitation service designed to address critical support gaps for cancer patients. The service is located and provided in Sheffield, UK, an area with higher cancer incidence and mortality rates than the national average. The service aligns with local and regional cancer care objectives and aims to improve clinical and quality of life outcomes of cancer patients by using lifestyle behaviour change techniques to address their physical, nutritional, and psychological needs. This paper describes the design and initial implementation of the Active Together service, highlighting its potential to support and benefit cancer patients.

Keywords: Exercise prescription; exercise; physical activity; psychology; nutrition; cancer; oncology; rehabilitation; prehabilitation; barriers

Introduction

Cancer rehabilitation (including prehabilitation) is central to high-quality cancer care [1]. It enables patients to prepare well for treatment, maximise outcomes from treatment, and minimise treatment-related side effects and symptoms [1] leading to enhanced quality of life. The demand for rehabilitation services will continue to grow as the population ages and more people are diagnosed and survive cancer [2]. As cancer transitions from a terminal disease to a long-term health condition [3], there is a need for lifestyle support through cancer rehabilitation services (including prehabilitation) to be integrated into the cancer care continuum [4].

Within the growing population of cancer survivors, two significant health concerns exist. The first is the concern regarding cancer recurrence and mortality. The second is the persistent adverse effects of cancer and its treatment [5]. There is increasing evidence that physical activity, psychological,

 doi:10.20944/preprints202312.1786.v1

and nutritional state are related to prognosis and survival after cancer [6]. Observational studies have indicated that insufficient physical activity and poor nutrition are associated with disease-related outcomes such as recurrence, death from cancer, and overall mortality [7,8]. Evidence now highlights that regular exercise and a healthy diet before, during and after treatment decreases length of stay, the severity of treatment-related adverse side effects and is associated with a reduced risk of cancer recurrence and comorbid conditions such as cardiovascular disease and diabetes [9]. Meeting the physical activity guidelines following a cancer diagnosis is associated with a 21-35% lower risk of cancer recurrence, a 28-44% reduced risk of cancer-specific mortality and a 25-48% reduced risk of all-cause mortality [10].

Multi-modal cancer rehabilitation

Rehabilitation was cited as a central element of cancer care and a vital theme of the Achieving World-Class Outcomes Strategy [11]. The NHS Long Term Plan states the need to provide cancer patients with personalised care, including needs assessment, a care plan and health and well-being information and support [12]. However, rehabilitation (including prehabilitation) is not routinely offered to cancer patients.

Numerous attempts have been made to define "cancer rehabilitation" [13]. Herbert Dietz classified cancer rehabilitation into four categories that align with the different stages of the cancer journey: 1) preventative, 2) restorative, 3) supportive, and 4) palliative [14]. More recently, Silver and colleagues defined cancer rehabilitation as "medical care that should be integrated throughout the oncology care continuum and delivered by trained rehabilitation professionals who have it within their scope of practice to diagnose and treat patients' physical, psychological and cognitive impairments to maintain or restore function, reduce symptom burden, maximise independence and improve quality of life in this medically complex population" [13].

The volume of cancer rehabilitation studies has grown substantially over the last two decades [15]. However, the availability of rehabilitation services for cancer patients remains minimal in many countries [1,16,17]. Only 1 in 200 cancer patients is estimated to have access to cancer rehabilitation services [18]. Just 9% of hospitals in the United Kingdom, 6% in Canada, 19% in Australia, and 1% of hospitals in the United States offer exercise-based cancer rehabilitation services [18].

One of the critical barriers to the routine provision of cancer rehabilitation is the lack of funding, and where funding is available, it is often short-term and reliant on charitable organisations [1]. Multi-centre trials [19] and services [20] evaluating prehabilitation and rehabilitation have begun in the UK. These programmes aim to assess cancer rehabilitation on a large scale as part of accepted clinical practice in the NHS [20]. This paper describes the development of a multi-modal cancer rehabilitation (including prehabilitation) service in Sheffield, UK and the approach to embedding it within routine clinical practice.

The cancer landscape in Sheffield

South Yorkshire (Sheffield, Rotherham, Barnsley, and Doncaster) has a catchment population of approximately 1.4 million people, with over 580,000 residing in Sheffield. There are over 8,000 new cancer diagnoses per year in South Yorkshire, and in Sheffield alone, 3,038 new diagnoses per year [21]. South Yorkshire has a higher incidence (624 new cancer diagnoses for every 100,000 people per year) [21] of cancer and higher cancer mortality rates (270 people in every 100,000 died from cancer each year) than the national average [21] with similar one-year survival rates (71.5% compared to the national average of 72.3%) [22]. Sheffield has one of only four dedicated cancer centres in England with a world-leading reputation as a centre of excellence in cancer treatment, care and pioneering services for patients with late treatment consequences. Patients across South Yorkshire and North Derbyshire receive oncological care from Weston Park Cancer Centre, part of Sheffield Teaching Hospitals (the primary provider of acute cancer services for the South Yorkshire region). Cancer services and pathways are organised through the local Cancer Alliance, part of the recently established South Yorkshire (SY) Integrated Care Board (ICB). The ICB aims to integrate provision of health services across different organisations, including hospitals and community-based services, physical and

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mental health, and health and social care [23]. The SY and Bassetlaw (SYB)Cancer Alliance is one of 19 alliances across England. The SYB Cancer Alliance is responsible for coordinating and delivering key national and regional cancer priorities as part of the ICB. These priorities arose from the Cancer Taskforce's recommendations[11] and were drawn from health inequalities data for the geographical population. Despite the infrastructure in SYB, historically, people with a cancer diagnosis had no equitable access to rehabilitation services. The Active Together service aims to address this critical support gap, while aligning with the local and regional cancer care objectives of the SYB Cancer Alliance.

Development of the Active Together service

The Active Together service has been co-produced by cancer patients, clinical and professional stakeholders, and academics over a 2-year period. The service has also been informed by our previous work in cancer rehabilitation [24,25], where we identified the critical factors needed to create a model of exercise support for cancer patients [26,27]. These include time during consultations to discuss rehabilitation, sufficient knowledge of the benefits of rehabilitation for cancer patients, and trust in the services that professionals refer patients to [26-28]. We have also discussed the challenges that services face in terms of the financial sustainability of services[29].

The programme of co-production involved meaningful and extensive consultation with patients, health professionals, professional leaders, commissioners, and academic experts to consider what a rehabilitation (including prehabilitation) service could look like, how to shape it to meet the contextual needs of Sheffield and what elements are crucial in delivering an impactful and sustainable service. **Error! Reference source not found.** displays the different groups and professional roles that engaged in the co-production process.

Table 1. Professional roles involved in the development discussions.

Professional role category 1 (clinical)	**Number**
Anaesthetist	4
Surgeon	6
Clinical nurse specialist	4
Oncologist	4
Exercise medicine consultant	2
Physiotherapist	5
Occupational therapist	1
Dietitian	4
Clinical psychologist	3
Total	**29**
Professional role category 2 (non clinical)	
Researcher	2
Fitness professional	3
Charitable sector (Cancer Support Centre, Cavendish Centre)	2
Other (cancer alliance, prehabilitation lead)	4
Total	**11**

In total, 40 professionals supported the design process. Patient and professional groups and leaders communicated that the critical components of rehabilitation services included accessibility, safety, location, expertise, and capacity. The engagement of clinical teams across tumour groups was also deemed essential to foster buy-in from the programme's start. One key finding was the range of expertise required to deliver an effective multi-modal rehabilitation (including prehabilitation) programme. However, there were insufficient levels of allied health professional (AHP) capacity within existing teams (i.e., physiotherapists, occupational therapists, dietitians) to deliver a high-

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quality service. This was also the case for clinical psychologists and exercise professionals. Therefore, additional staff would need to be funded, recruited, and trained.

Patients should be at the centre of any discussions about their care [30], and so we ensured meaningful engagement was prioritised with patients throughout the design process. We held informal patient discussion groups to understand 'what mattered most' to patients and included patients in our project steering group. We held co-design sessions where prompts and service prototypes were used to tease out key service design features. We also created patient personas using insight from patient narratives to help guide service design. Personas create a shared and persistent view of the potential user, which can be referred to when making design decisions [31]. The personas were particularly valuable in ensuring the service did not exacerbate existing inequalities. In total, 18 cancer patients supported the design process.

The content of the Active Together service

Active Together is an evidence-based, person-centred, multi-modal rehabilitation (including prehabilitation) service for people with a cancer diagnosis. Active Together provides support that spans the rehabilitation continuum and covers preventive rehabilitation (prehabilitation) following diagnosis, maintenance rehabilitation (during treatment), restorative (immediately post-treatment) and supportive rehabilitation (after treatment and discharge). The service aims to improve patient, clinical and patient-reported outcomes such as fatigue, physical fitness before surgery, treatment-related side effects, treatment tolerance, postoperative complications, survival rates, and quality of life.

Referral

All patients with a primary diagnosis of lung, colorectal, or upper gastrointestinal (UGI) cancer, aged ≥18 years and scheduled for curative treatment in Sheffield, are referred to Active Together following diagnosis. Referrals are completed by HCPs (i.e., oncologists, cancer nurse specialists, and AHPs) from cancer services at STH. HCPs have previously identified the time taken to complete referral processes for services as a potential barrier to engagement [26]. Therefore, the Active Together service's referral process is deliberately simple, making the process easier for HCPs and ensuring the patient can access support quickly. Once a referral has been made, a member of the Active Together team contacts the patient by telephone within 48 hours and books the patient an initial assessment with a physiotherapist. This appointment will occur within seven days to both maximise the prehabilitation window and lower the risk of patient disengagement. Behaviour change principles underpin the initial contact telephone call with the patient and follow an 'ask, advise, assist' structure [32]. The consultation provides an opportunity to explore with the patient their attitude, motivation, and understanding of the benefits of engaging in the service. It is also an opportunity to empower patient choice, enhance patient control to enable patient action [32].

The initial patient needs' assessment

Patients attend an initial assessment with a specialist physiotherapist at Sheffield Hallam University's Advanced Wellbeing Research Centre (AWRC) or at combined health and physical activity centres in Sheffield (i.e., Move More Centres discussed below). During this initial assessment, each patient completes physical, nutritional, and psychological screening assessments to determine the level of support required in each area. A personalised care plan is then offered per the universal, targeted, and specialised model advocated in the prehabilitation guidance[33]. Patients may have different levels of need for each element (i.e., physical, nutritional, and psychological).

A screening algorithm is used to determine the patient's level of need for each rehabilitation element. The screening algorithm was developed through consultation with professionals in each area (physiotherapists, dietitians, and clinical psychologists) and academics. Additionally, recommendations from the existing literature on the screening process were incorporated, such as appropriate screening tools and how to determine the level of intervention required [6,33]. **Error!**

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Reference source not found. shows the measures used to determine the patient's level of need in each area. Each measure is entered into the screening algorithm, which determines the patient's need using a traffic light system of green, indicating low complexity, amber indicating moderate complexity, and red indicating high complexity (**Error! Reference source not found.**). The patient's level of need identified during this initial assessment determines the support they will receive and who delivers it. The patient's need is reassessed at key time points throughout the patient's treatment pathway, and the support provided is adjusted accordingly.

Table 2. Measures used to determine the patient's level of need.

Rehabilitation discipline	Measure
Physical activity needs criteria	• Age • Six-minute walk test (metres walked) • History of any cardiac or metabolic complication which would impact physical activity • Severe hypertension >200 mm Hg and/or a diastolic blood pressure of >110 mm Hg • Any other significant comorbidity or condition which in the opinion of a medical professional should be considered within the physical activity risk stratification that could compromise the safety of the patient
Nutritional needs criteria	• Percentage weight change (past 1 and 6 months). • Current food intake • Symptoms preventing normal food intake • Activities and function • Any other significant comorbidity or condition which in the opinion of a medical professional should be considered within the nutritional risk stratification that could compromise the safety of the patient
Psychological needs criteria	• Patient Health Questionnaire (PHQ-9) • Generalised Anxiety Disorder (GAD-7) • Current diagnosed mental health condition/s • Previous mental health condition/s • Any other significant factor which in the opinion of a medical professional should be considered within the psychological needs assessment that could compromise the safety of the patient

Table 3. Patient level of need matrix.

Patient need (Support provided)	Intervention for each level of need (What?, Who?, Where?)
	What?
Low complexity/need (Universal) *Patient is healthy, with no additional physical, nutritional*	**Physical activity** • Home-based independent exercise • Community-based facilities

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and/or psychological risk factors and requires no specialist support.	**Nutrition** • Signposting to dietary management tools **Psychological** • Alleviate distress from cancer and prepare patient psychologically for treatment by signposting to psychological management tools.
	Who? **Physical activity** • Self-guided exercise • Technology supported • Project Officers **Nutrition** • Provided written information provided by cancer teams **Psychological** • Self-referral to Improving Access to Psychological Therapies (IAPT) for example online or group
	Where? • Individual preference of the patient
Moderate complexity/need (Targeted) *Patient has some physical, nutritional and/or psychological risk factors and requires monitoring and some specialist support and monitoring.*	What? **Physical activity** • Group or supervised exercise programme 2 x per week **Nutrition** • Referred to generic NHS dietitian support • Group-based nutrition support sessions **Psychological** • Alleviate distress from cancer and prepare patient psychologically for treatment
	Who? **Physical activity** • Level 4 exercise instructors with guidance from Physiotherapists **Nutrition** • Some dietitian support **Psychological** • Psychological support via workshops and self-directed learning
	Where? • AWRC fitness suite/clinic rooms • Some home-based
High complexity/need (Specialist) *Patient has significant physical, nutritional and/or psychological risk factors and requires frequent specialist support.*	What? **Physical activity** • Physiotherapist/SEM registrar to give clearance • Supervised exercise programme 2 x per week **Nutrition** Access to dietitian 1 x per week telephone or face-face) **Psychological**

 doi:10.20944/preprints202312.1786.v1

	Alleviate distress from cancer and prepare patients psychologically for treatment
	Who?
	Physical activity • Physiotherapist • SEM registrar • Support from cancer exercise specialist **Nutrition** • Specialist cancer dietitian support **Psychological** • One to one psychological support with project officer and signposting to additional support if needed. Workshops can be attended as long as patient are psychologically stable.
	Where?
	• AWRC fitness suite • AWRC clinic rooms

Active Together service delivery style and behaviour change approach

Initiating and maintaining a healthier lifestyle is complicated, and patients often require support to succeed [34]. The quality of this support can be enhanced by utilising behaviour change theory as part of the design of a complex intervention [35]. Despite this, rarely do interventions in the cancer rehabilitation context adequately describe the content and approach to behaviour change as part of their intervention [36], with some exceptions [37,38]. The behavioural change content of the Active Together programme, including the style of intervention delivery, has been developed using the behaviour change wheel[39] to target specific behaviours and identify the most appropriate behaviour change techniques (BCT's) to support lifestyle change amongst people with a cancer diagnosis.

As a key part of the behaviour change wheel, intervention functions were chosen to drive the desired changes [39]. The Active Together service includes six intervention functions: education, training, persuasion, enablement, modelling, and environmental restructuring. These functions aim to empower patients and provide them with the necessary tools and support [39]. For example, education is provided to patients about the benefits of regular exercise, nutrition, and psychological well-being. Training is provided to equip patients with the skills and knowledge necessary to perform the exercises effectively and safely. Enablement ensures patients can access necessary resources, such as exercise equipment or supportive programmes, to facilitate behaviour change.

After determining the appropriate intervention functions, the next step was selecting specific behaviour change techniques (BCTs) aligned with the chosen functions. The Behaviour Change Taxonomy [40] provides a comprehensive list of 93 BCTs, allowing the Active Together service to tailor its approach to suit patients' individual needs. For example, previous studies have demonstrated the importance of promoting self-efficacy as part of cancer recovery [41], which might include the promotion of mastery of behaviours such as exercise [42], setting achievable goals [43], and the inclusion of graded tasks, helping promote lifestyle change [38]. **Error! Reference source not found.** shows the multi-modal BCTs used in the Active Together service aligned with the intervention functions, with examples describing how they are applied within the service.

To promote patient empowerment and control, all patient interactions within the Active Together service are i) delivered in a motivational interviewing (MI) style [44], adopting the principles of collaboration, compassion, evocation, and acceptance (known as the spirit of MI) and ii) incorporate the "What Matters to You?" approach, a method of implementing patient-centred care and shared decision-making [45]. Practitioners who deliver the Active Together service have received training to deliver the intervention and associated behaviour change techniques, with competencies assessed via a process evaluation described in a forthcoming publication.

Table 4. Multi-modal behaviour change techniques used in Active Together aligned with intervention functions.

Intervention function	Behaviour Change Technique (BCT no. (BCTTv1))	Example of application within the multi-modal Active Together service
Education	Information about emotional consequences (5.6)	• All staff delivering the service are trained to support patient psychological needs. • Patients attend a workshop on managing psychological health.
	Feedback on behaviour (2.2)	• Dieticians provide feedback to the patient on changes made to diet and eating behaviour. • Fitness instructors or physiotherapists provide feedback on behaviour during exercise sessions.
	Self-monitoring of behaviour (2.3)	• Patients are encouraged to log exercise sessions in a logbook. • Heart rate monitors and RPE are used to measure exercise intensity during supervised sessions. • Patients are encouraged to keep a food diary where they record their daily meals and snacks, enabling them to track their eating patterns and identify areas for improvement.
	Reduce negative emotions (11.2)	• Patients are advised and helped to develop strategies for ways to reduce negative emotions.
	Information about health consequences (5.1)	• Participants are informed of the benefits of enhancing their fitness, optimising nutrition, and managing mental well-being prior to cancer treatment.
Persuasion	Credible source (9.1)	• Trained professionals deliver all aspects of the service (see figure 1).
	Information about emotional consequences (5.6)	• Patients attend a workshop on managing psychological health. • All staff delivering the service are trained to support patient psychological needs.
	Feedback on behaviour (2.2)	• Dieticians provide feedback to the patient on changes made to diet and eating behaviour. • Fitness instructors or physiotherapists provide feedback on behaviour during exercise sessions.
	Verbal persuasion and capability (15.1)	• Fitness instructors provide verbal support and encouragement during exercise sessions. • At the start of each session fitness instructors discuss how the patient felt after the previous session.
Training	Demonstration of the behaviour (6.1)	• Fitness instructors/physiotherapists demonstrate the correct exercise techniques during sessions. • Dieticians show the patients the practical application of healthy eating principles. • Psychologists demonstrate relaxation techniques in psychological workshops.
	Instruction on how to perform a behaviour (4.1)	• Dietitian instructs patients on correct nutritional balance (e.g., eat well plate) and provide step-by-step instructions on how to read food labels to make informed choices. • Fitness instructors provide exercise programmes for patients to follow at home.
	Feedback on behaviour (2.2)	• Dieticians provide feedback to the patient on changes made to diet and eating behaviour. • Fitness instructors or physiotherapists provide feedback on behaviour during exercise sessions.
	Self-monitoring of behaviour (2.3)	• Patients are encouraged to log exercise sessions in a logbook. • Heart rate monitors and RPE are used to measure exercise intensity during supervised sessions.

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		• Patients are encouraged to keep a food diary where they record their daily meals and snacks, enabling them to track their eating patterns and identify areas for improvement.
	Graded tasks (8.7)	• Exercise sessions are progressed during individual sessions. Exercise dose is increased towards 150 minutes per week. • Patients are shown how to gradually introduce healthier alternatives and/or reduce portion sizes.
	Behavioural practice/rehearsal (8.1)	• Exercise techniques are practised in sessions (supervised and unsupervised). • Dieticians and patients practice portion control by using visual aids, or portion plates to understand appropriate serving sizes.
	Biofeedback (2.6)	• Heart rate monitors and wearables are used to provide patient with feedback during supervised and independent sessions on exercise intensity.
Environmental restructuring	Adding objects to the environment (12.5)	• Patients can access heart rate monitors, wearables, logbooks, and resistance bands to facilitate unsupervised sessions. • Patients are recommended to have a fruit bowl or other healthier snacks readily available.
	Reduce negative emotions (11.2)	• Patients are advised and develop strategies for ways to reduce negative emotions.
Modelling	Demonstration of the behaviour (6.1)	• Fitness instructors/physiotherapists demonstrate the correct exercise techniques during sessions. • Showing patients, the practical application of healthy eating principles. • Demonstrating relaxation techniques in psychological workshops.
Enablement	Goal setting (behaviour) (1.1)	• The goal of the exercise programme is for patients to exercise 150 minutes per week. • Collaborating with patients to set specific behaviour-related goals, such as consuming five servings of vegetables per day or reducing sugar intake. • Setting behaviour-related goals with patients, such as practicing mindfulness exercises for ten minutes each day.
	Goal setting (outcome) (1.3)	• The patient sets SMART goals for exercise or nutrition, based on what matters most to the individual (e.g., functional goals). • Collaboratively setting outcome-related goals, such as achieving or maintaining a certain weight or body mass index (BMI), to monitor progress and motivate patients.
	Adding objects to the environment (12.5)	• Patients can access heart rate monitors, wearables, logbooks, and resistance bands to facilitate unsupervised sessions. • Patients are recommended to have healthier snacks readily available (e.g., a fruit bowl).
	Problem-solving (1.2)	• The patient is prompted to identify barriers and solutions to lifestyle change with the Active Together team (physiotherapist, dietitian, fitness instructor).
	Action planning (1.4)	• Patients are supported to identify specific times and days of the week when they will undertake exercise sessions (supervised and unsupervised).

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	• Helping patients create specific action plans for implementing healthy eating habits during busy workdays or social events.
Self-monitoring of behaviour (2.3)	• Patients are encouraged to log exercise sessions in a logbook. • Heart rate monitors and RPE are used to measure exercise intensity during supervised sessions. • Patients are encouraged to keep a food diary where they record their daily meals and snacks, enabling them to track their eating patterns and identify areas for improvement.
Generalisation of target behaviour (8.6)	• Patients are advised to perform the exercises in unsupervised sessions. • Patients are advised to apply nutritional and psychological techniques they have learnt at home.
Review behaviour goal(s) (1.5)	• Physiotherapists and fitness instructors review exercise sessions with patients. • Dietician and psychologists review patients progress in achieving behaviour-related goals, providing support, and adjusting strategies as needed.
Review outcome goal(s) (1.7)	• Fitness instructors/physiotherapists/dieticians/psychologists discuss with patients how they are working towards their goals. Decisions are made on whether to update the goal or create a new goal.
Social support (emotional) (3.3)	• Patients have access to supervised group-based exercise sessions. • Patients have access to psychological workshops, which are group based. • Patients are encouraged to seek support from friends and family to enact nutritional changes.

doi:10.20944/preprints202312.1786.v1

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Phases of the rehabilitation continuum

Phase 1: Prehabilitation

Cancer prehabilitation is a process on the continuum of care that occurs between the time of cancer diagnosis and the beginning of acute treatment [46]. Patients enter the Active Together service prehabilitation phase after the initial needs assessment. The duration of the prehabilitation phase will depend on how soon after diagnosis the patient enters the service and how long after diagnosis the patient begins their acute cancer treatment. As a result, the degree to which a patient's physical and psychological health can be improved before the start of treatment will vary between individuals. Even in cases where the prehabilitation phase is very short (≤2 weeks), it is hoped that the advice and support provided during the prehabilitation phase will bring about changes in behaviour that can be continued during and after treatment, enabling people to live well beyond their treatment [33].

To reduce the risk of patients contracting COVID-19, adaptations to programmes and procedures are made in line with NHS COVID and infection control policies at the time. Patients are also given guidance and nutritional supplements to support them from a dietetic perspective, as well as access to paper-based or online materials and regular phone calls with Active Together staff to support their psychological well-being.

Phase 2: Maintenance rehabilitation

During their acute treatment, patients enter the maintenance phase of Active Together. Although evidence suggests that physical activity is safe and feasible during cancer treatment[47], participation has been shown to reduce significantly [48]. During the maintenance phase, the service aims to support patients in maintaining their current physical, nutritional and psychological status as much as possible, supporting them to cope with any distress caused by cancer and its treatment whilst reducing the impact of any treatment-related side effects [47]. The duration of the maintenance phase will depend on the type and duration of the treatment patients receive. Each patient receives a personalised exercise plan that can be completed in various settings depending on patient preference (gym setting, park or open space, at home). Active Together will maintain contact with them via telephone or text or email, depending on patient preference.

Phase 3: Restorative rehabilitation

Following the patient's acute clinical treatment, they enter the restorative rehabilitation phase of the Active Together pathway. The restorative phase aims to support the patient in achieving optimal function following acute treatment[49]. At the start of the restorative phase, the patient repeats their initial needs assessment. The outcome of this review determines the patient's prescribed exercise programme, nutrition plan, and psychological/behaviour change support strategies. The restorative rehabilitation phase can last up to 12 weeks following the end of the cancer treatment, depending on individual patient needs. The emphasis in the restorative phase is on helping individuals to return to their pre-treatment levels of health and well-being. This is achieved by setting functional goals involving strength and fitness within the context of what matters most to the patient (e.g., return to work or being able to play with their grandchildren).

Phase 4: Supportive rehabilitation

The final phase of the Active Together programme is supportive rehabilitation, which aims to empower patients to achieve optimal health and well-being while living with long-term health conditions [50]. The supportive phase can last up to 12 weeks, depending on individual patient needs and might involve referring patients to existing community exercise schemes such as walking groups. This phase culminates with a final assessment of patient outcomes, with the goal that the patient will have surpassed their pre-diagnosis fitness levels and can self-manage their physical, nutritional, and psychological well-being.

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Active Together workforce

Rehabilitation (including prehabilitation) guidance from Macmillan Cancer Support states that rehabilitation should be delivered by a multidisciplinary team [33]. Led by academics at Sheffield Hallam University and supported by professional leaders and clinicians at STH, funding was secured from Yorkshire Cancer Research to recruit the core Active Together team. This team consists of a consultant AHP, two physiotherapists, a dietitian, a clinical psychologist, two researchers with expertise in cancer exercise prescription and health behaviour change, two fitness instructors, a project manager, and an administrator. The team also includes a sustainability manager whose role is to explore the long-term future of the service (this role was funded by the SYB Cancer Alliance). Figure 1 shows the staffing structure of the Active Together service.

A clinical advisory group (CAG) was established to support Active Together's design, development, and ongoing implementation. The purpose of the CAG is to provide clinical leadership and governance oversight to ensure the successful delivery of Active Together. Responsibilities of the CAG include addressing service issues and risks and their resolution. The CAG comprises clinical leads from each cancer pathway, medical specialists from cancer services, including anaesthetists, surgeons, oncologists, senior nursing and AHP leads, academic leads for the programme and patient representatives.

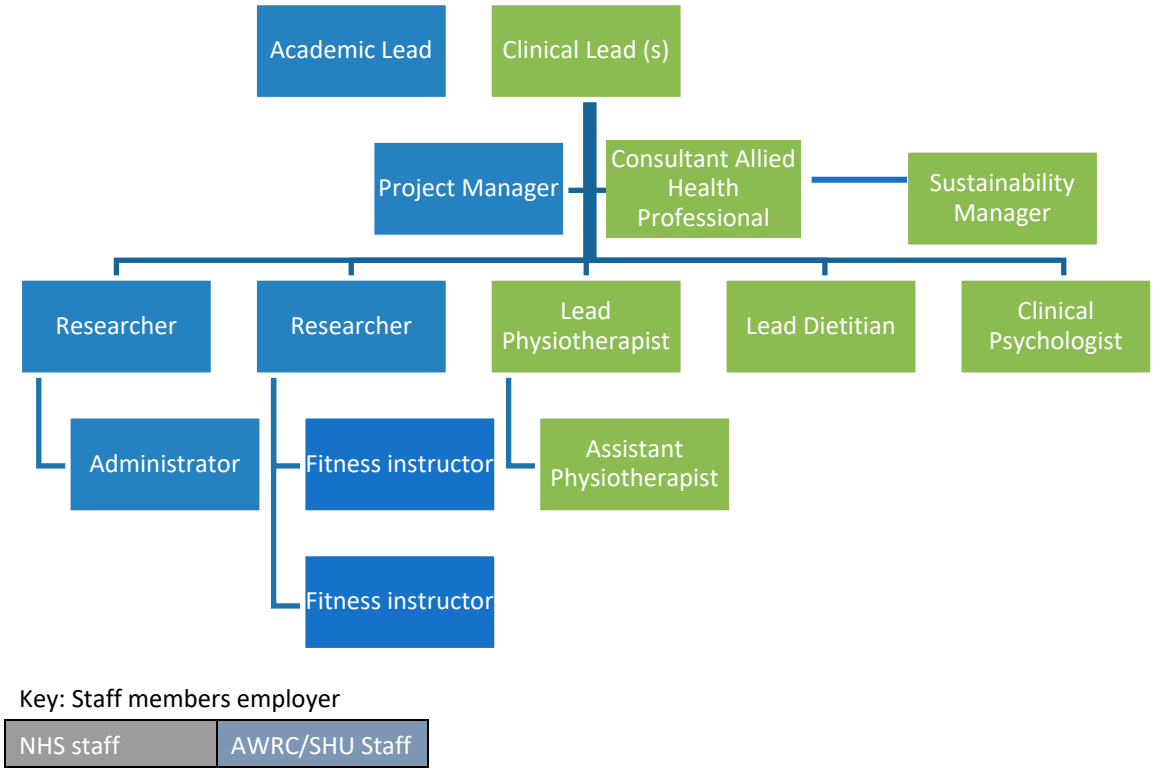

Figure 1. Active Together staffing structureService delivery setting.

The programme development stakeholder discussion groups stressed that any service must be delivered outside of the hospital setting. As part of the city-wide 'Move More' strategy [51], which adopts a whole system approach to increasing population physical activity, Sheffield has three Move More centres that co-locate health care services with exercise opportunities as part of a patient's recovery and rehabilitation [52,53]. These centres currently deliver 100,000 clinical appointments per year, and the AWRC is a fourth centre taking the capacity up to 120,000. The AWRC and the three Move More centres include NHS clinical consulting rooms, education and training facilities and exercise facilities within a leisure and sports facility. Located across the city in communities of high economic disadvantage, the three centres enable the co-location of patients, researchers, clinicians,

allied health professionals, and sports and exercise medicine specialists, providing an ideal hub and spoke model to deliver an equitable service for patients across the city [54].

Pilot phase

Implementation of Active Together began in January 2022, and a pilot phase of the service was undertaken to set up, test and refine processes and procedures between February and June 2022. By June 2022, 112 patients receiving treatment in Sheffield had been referred to the service. Of those referred, 79 (71%) agreed to attend their initial assessment. Reasons for not wanting to attend include work commitments, travel arrangements to get to AWRC for assessment, not currently feeling psychologically ready, and patients feeling that they are already managing their health sufficiently. Of the 79 who attended their initial appointment, 100% engaged in the programme, suggesting initial acceptability for people diagnosed with cancer in Sheffield. Most referrals have been male (60%); the average age of the service users is 68 years. For upper GI, the mean age of patients entering the service is 65 years (range = 36 - 84 years), with 76% male. For colorectal patients, the mean age is 69 years (range = 35 - 89 years), with 53% male. For lung, the average age of patients entering the service is 69 years (range = 45 - 88 years), with 51% male. Initial participant feedback on the service has generated positive support for Active Together. Since completing the pilot phase in June 2022, the service has been running at full capacity. A robust process and outcome evaluation has been embedded into the service (described in a forthcoming publication), and the service will be continually refined based on the results.

Conclusion

Cancer rehabilitation (including prehabilitation) is vital in ensuring patients have the support they need to maximise treatment outcomes and side effects associated with cancer and its treatment. Although there is growing evidence of the importance of rehabilitation, the availability of services across England is sporadic [1]. We identified an unmet need for cancer rehabilitation (including prehabilitation) in Sheffield and are addressing this by implementing the Active Together service. The service was co-designed using insight from previous research [26], service delivery [24], and robust stakeholder engagement, which prioritised the voice of patients. Robust evaluation is now needed to evidence the service's acceptability and effectiveness.

Acknowledgements: The authors express gratitude to all people who have helped design and deliver the Active Together Service. We express thanks to the patients currently engaging in the service. The authors also thank Macmillan Cancer Support for funding the design phase of the service, and Yorkshire Cancer Research for funding the ongoing implementation and delivery of the service.

Conflict of Interest: The authors declare no competing interests.

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