PREHABILITATION
EVIDENCE AND INSIGHT REVIEW
Prehabilitation evidence and insight review

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Defining prehabilitation

Options for a definition of prehabilitation were developed by internal and external stakeholders (hereby referred to as subject-matter experts). However there is not yet a uniform Macmillan definition.

Key points emerged as important for a definition, it is a process in the continuum of care, it should be tailored to the individual and it is for anyone with cancer, not just limited to those undergoing surgery. A case is also made for prescribing prehabilitation, which could potentially make it more powerful.

It was also suggested that the definition may need to convey different messages to different audiences, namely patients, healthcare professionals, and commissioners and politicians.

So what? The key points must be incorporated into a definition or wider explanation of prehabilitation. Further work needs to be done to gain a consensus on a Macmillan definition for prehabilitation and adapt it to the different audiences.

Prehabilitation is the first stage in the rehabilitation pathway, otherwise known as preventative rehabilitation, and is followed by restorative rehabilitation, normally referred to simply as rehabilitation. It not only reduces the negative impact of treatment, but also gives increased return on investment in conventional rehabilitation.

So what? Prehabilitation should be considered as an integral part of the rehabilitation pathway, and not as a stand-alone intervention.

Prehabilitation model

Prehabilitation model is not well-defined, but the evidence suggests that it consist of three different stages:

1. Pre-assessment- used to measure the patients’ baseline, identify risk factors, inform the patient and make joint decisions, and establishing the interventions required to support patients so they achieve the maximum benefit from interventions associated with prehabilitation. It also contributes to individual level data on the outcomes of prehabilitation, which can ultimately add to the wider evidence base supporting prehabilitation.

2. Prehabilitation interventions- there are a range of interventions that make up prehabilitation. Physical Activity is always present, Dietary Support and Psychological Wellbeing are often present whilst other interventions are seen less frequently. Please see the following table.

3. Follow-up post-treatment- used to determine progress made and to ensure appropriate follow-up.
**Workforce**

Existing evidence suggests that there is no defined group of healthcare professionals required to deliver a prehabilitation service. However, it is clear that prehabilitation can be provided by a multidisciplinary team. This can consist of:

**Physiotherapists** - identified as the registered professionals most critical to Physical Activity, particularly for complex cases, while volunteers, as well as support workers, fitness instructors/personal trainers and rehabilitation/therapy assistants are identified as key unregistered professionals.

**Psychologists** - strongly identified as the most important professionals for Psychological Wellbeing, while volunteers have also been identified as having an important role in providing emotional support.

**Dietitians** - identified as the professionals most important for provision of Dietary Support.

*So what?* A multidisciplinary team is required to delivery a prehabilitation service. However, it is important to clarify what a prehabilitation programme consists of before it is decided who should deliver it.

**Policy environment**

Of the four UK nations, **Wales has the greatest policy opportunity** for leverage of prehabilitation services, explicitly mentioning prehabilitation within policy document *Cancer Delivery Plan for Wales 2016-2020*.

The key cancer and health policies in **England present some strong levers for prehabilitation** and **Scotland presents some possible levers**. However, **Northern Ireland has a weak cancer policy landscape** with only few potential levers.

Emphasis on ‘preventative rehabilitation’ in England’s *World Class Cancer Outcomes, 2016* policy document represents the clearest policy lever for prehabilitation in England, while focus on lifestyle and cancer care within the broader NHS 5-year plan also presents an opportunity.

**Scotland’s policy document Beating Cancer provides possible levers** for prehabilitation in the areas of post-treatment support and healthy lifestyles.

Northern Ireland’s most recent cancer policy document is from 2011 (with no explicit mentions of prehabilitation, although some potential levers around healthy lifestyles, e.g. physical activity, health eating, alcohol).

Prehabilitation **links with key elements of the Recovery Package**, with strong overlap seen with Health and Wellbeing Events, Information and Support, as well as potential link with the Holistic Needs Assessment.

*So what?* While Wales has a strong policy platform in place for prehabilitation, creating an opportunity for common understanding of the service and potential for creation of a strategy around it, opportunities in Scotland are more indirect, and would therefore need to be manufactured by proponents. The Recovery Package also presents an opportunity for leverage of prehabilitation, and has been proven to be a key enabler in gaining funding.
**Background**
- There is growing interest across a range of departments within Macmillan in the area of prehabilitation. There is a sense that prehabilitation is an important and valuable aspect of cancer care but is currently poorly understood and inconsistently provided.
- There is currently a lack of clearly understood, centralised knowledge on the topic within Macmillan. A range of evidence sources about prehabilitation are disparately held across the organisation but shared understanding of what these are, their rigour, value, and the overall insight from them is not known.
- A particular interest in the topic is in the context of proactive influencing and media activity to support external-facing priorities for the Welsh Policy and Public Affairs team, specifically as they seek to influence the physical activity agenda in Wales during 2017. This insight would support the wider developments in primary care in Wales, including the creation of a Community of Practice of GPs and Nurses to support Primary Care professionals in helping PLWC, and would link with opportunities to influence on the role of physical activity in cancer care. It would also support insight across the other geographies across the UK.
- There is broader interest, both UK-wide and within the geographies, from a workforce perspective to better understand where and how professionals can be better placed to support diagnosed PLWC at the right point in their cancer experience.
- There may be a further interest in this topic across the organisations and a need to support potential emerging UK-wide priorities on the topic at an organisational level later in the year.

**Primary objectives**
- To develop a centralised synthesis of prehabilitation sources to inform a shared understanding of the topic:
  - The extent of prehabilitation provision.
  - The range of models and approaches that may exist and potential best practice.
  - The role and potential impact prehabilitation provides within cancer care.
- To develop, if possible, a internally shared definition and understanding of prehabilitation.
- To understand, where possible, the role of addressing the wider wellbeing agenda in relation to prehabilitation e.g. nutrition.
- To understand Macmillan’s current provision of prehabilitation, and share knowledge and good practice.
- To understand the wider provision of prehabilitation (other organisations active in this area).
- Where possible, to consider international examples of evidence and learning.

**Secondary objective**
- To support potential organisational developments related to prehabilitation, should this emerge as a priority for Macmillan to explore/address.

**Approach**
- a) External and internal literature and data review
- b) Evidence scan.
- c) Interviews with key Macmillan professionals/advisors.
- d) Workshop with key stakeholders to identify and present the work underway in this area from different teams.
- e) Interviews with key external experts.

Key external and internal stakeholders were involved in discussion, interviews and a workshop held in July 2017. They are referred to as subject-matter experts.
Defining prehabilitation
Definitions for prehabilitation vary, but are consistent in stating that it is a pre-emptive preparation to reduce risks and enhance recovery after a stressful event.

- The word *prehabilitation* is **not in common use**, and many are not familiar with it. It is used in academic literature and some health care professionals are more familiar with the word, though **alternative terms** may be used to refer to prehabilitation. These includes *prophylactic prehabilitation* and *preoperative rehabilitation*.³

- Definitions often refer to prehabilitation as a process prior to a *stressful event* or more specifically *cancer treatment*. However, much of the existing literature around prehabilitation provision is specific to those undergoing surgery.

- Prehabilitation is **not limited only to those undergoing surgery** to treat their cancer, but could indeed be used for other treatments such as radiotherapy and chemotherapy.

- Some suggest that prehabilitation could also be used for those not undergoing acute treatment.

**Definitions**

In academic literature, there are two main definitions which are often quoted for prehabilitation: one cancer specific and the other non-cancer specific.

The non-cancer specific definition was considered too brief by many subject-matter experts:

**Non-cancer specific definition**

“The process of enhancing the functional capacity of the individual to enable him or her to withstand a stressful event”²

However, the cancer specific definition was preferred by subject-matter experts, as it is more thorough; it defines the timing, regime and mentions the possible outcomes:

**Cancer specific definition**

“A process on the cancer continuum of care that occurs between the time of cancer diagnosis and the beginning of acute treatment and includes physical and psychological assessments that establish a baseline functional level, identify impairments, and provide interventions that promote physical and psychological health to reduce the incidence and/or severity of future impairments.”¹

A Macmillan prehabilitation definition must convey key messages including that it is a process in the continuum of care, it should be tailored to the individual and it is for anyone with cancer, not just limited to those undergoing surgery.

**Key points**

Internal and external stakeholders, hereby referred to as **subject-matter experts**, developed key points for prehabilitation: they are core to prehabilitation and should be incorporated into a Macmillan definition for prehabilitation.

- **For all**
  - Prehabilitation is for **anyone with cancer**, provided that they are in the state to undergo the regimes. Even so, the individual interventions should be adapted to suit varying abilities.
  - Prehabilitation is **not limited to just those undergoing surgery**, it should include all treatment, and consider including those not put forward for active treatment e.g. palliative care.

- **Personal**
  - Prehabilitation is person-centred, so **tailored to the individual**. It aids the individual to build resilience, and empowers them.
  - Prehabilitation is associated with the **optimisation of a patient’s state**. However, maintenance should also be allowed. The words “optimise” or “maximise” should not be communicated to patients.
  - Prehabilitation is in **partnership** with the patient; **shared decision making** is crucial.

- **Process**
  - Prehabilitation is a **process in the continuum of care** and shouldn’t be limited to a defined period with a definitive start and end.
  - Possible need to **prescribe prehabilitation**. This could make it more powerful, lead to greater compliance/adherence.
  - Important to make it clear that physical fitness can be **enhanced in a short period** (i.e. as short as two weeks).

The key points must be incorporated into a definition or wider explanation of prehabilitation.
Options for a definition of prehabilitation were developed by subject-matter experts, but there is not yet a uniform Macmillan definition. Definitions developed should all include the key points, but be adapted to three different audience: patients, healthcare professionals, and commissioners and politicians.

The definition is important to inspire and convey the meaning of prehabilitation. To do this most effectively, different definitions may be required for different audiences. A Macmillan definition would need to be adapted for the three key audiences:

1 Patients

“The optimisation of individuals to deal with the physical and psychological consequences of disease and side effects of treatment.”

“Preparation around the time of cancer diagnosis, before [the] beginning of treatment that includes lifestyle interventions that promote physical and psychosocial health to prepare for treatment and future impairments.”

2 Healthcare professionals

“Work with patients and the people close to them, before treatment starts to prepare for, manage and reduce the impact of cancer and its treatments, to improve outcomes and quality of life”

“The process around the time of cancer diagnosis and beginning treatment that includes lifestyle, physical and psychosocial health to prepare for treatment, help recovery and reduce future impairments.”

3 Commissioners and politicians

“Work with patients and the people close to them before treatment starts to prepare for and manage the impact of cancer and its treatments before, during and after treatment”

Further work needs to be done to gain a consensus on a Macmillan definition for prehabilitation and adapt it to the three different audiences.
How could prehabilitation lead to improved outcomes compared to standard care?²³

With prehabilitation, patients have greater professional involvement and a personalised regime. This may make them feel more motivated than with standard care, as they are more actively involved in their own wellbeing and recovery. Combined with the effect of looking at a patient’s wider wellbeing, this could lead to better outcomes for the individual:

- Greater supervision
- Wider wellbeing-personalised regime
- Greater motivation
- Greater engagement
- More patient control
- Better compliance
- More thoroughly completed by patient
- Improved outcomes
- Improved patient experience

Understanding, communicating and educating healthcare care professionals on the difference between standard preoperative preparations and prehabilitation is key to gaining buy in and understanding from staff, as well as establishing prehabilitation as a defined part of the cancer pathway. The effect of increased active involvement from patients should not be underestimated in improving outcomes.

Prehabilitation as part of the rehabilitation pathway

Prehabilitation is the first stage in the rehabilitation pathway, otherwise known as preventative rehabilitation, and is followed by restorative rehabilitation, i.e. conventional rehabilitation. Rehabilitation maximises outcomes for patients by anticipating the problems they might face during their treatment and helping people to make changes to manage these before they happen therefore about providing personalised and proactive support. **Prehabilitation is integral to the rehabilitation pathway** as early interventions shortly after diagnosis can significantly improve the patient’s ability to cope with treatments they may have, improve quality of life and reduce length of stay. Prehabilitation forms one of the four main stages of cancer rehabilitation¹, which align chronologically with the stages cancer pathway, from diagnosis to living with and living with and beyond cancer/end of life:

1. **Preventative**: Aiming to reduce the impact of expected disabilities and provide assistance in learning to cope with any disabilities.
2. **Restorative**: Aiming to return the patient to pre-illness level of function without disability.
3. **Supportive**: Aiming to limit functional loss and provide support in the presence of persistent diseases and the continual need for treatment.
4. **Palliative**: Aiming to put in place measures to eliminate or reduce complication and provide support such as symptom management.

Prehabilitation
This is the first stage in the rehabilitation pathway. Not only does it reduce the negative impact of treatment, it also gives increased return on investment in conventional rehabilitation (restorative).²

Conventional ‘Rehabilitation’
Restorative rehabilitation is often referred to as simply rehabilitation: preventative, restorative, supportive and palliative rehabilitation make up a complete rehabilitation pathway.

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Prehabilitation stages
Prehabilitation typically takes place in the period between diagnosis and treatment, and involves three fundamental stages: pre-assessment, prehabilitation regime and follow-up post-treatment.

Prehabilitation stages
1. Pre-assessment
2. Prehabilitation regime
3. Follow-up post-treatment

The following slides will explore these stages further.

Prehabilitation diagram*
As is illustrated in the adjacent diagram, prehabilitation is part of the cancer care continuum leading into immediate recovery (peri), rehabilitation (post) and living with and beyond cancer (long term).

Prehabilitation conventionally begins at any point from diagnosis, giving the patient a ‘head start’ in optimising their general health compared to those who undergo rehabilitation alone. This typically lasts 4-6 weeks: however long the period between diagnosis and starting treatment.

There is a suggestion that prehabilitation could start at an the earlier stage in the cancer pathway, prior to a confirmed diagnosis (not shown on the diagram), giving the patient a further head start. However, only a small proportion of patients at this time will go on to receive a cancer diagnosis.

Prehabilitation is applicable for any treatment option including surgery, radiotherapy and chemotherapy, however, the vast majority of the evidence base is for those undergoing surgery. In University of Leicester, OT Helen Fieldson runs Enhanced Recovery group session prior to radiotherapy, and there is potential for more involved rehabilitation interventions in this area.

It is important to note that the cancer pathway is not linear. It is possible for patients to be undergoing treatment during prehabilitation (e.g. neoadjuvant chemotherapy). For some, during this time the patient may be delayed in deciding on, and starting treatment, making it an ideal time for patients to start improving their general health.

For Macmillan, prehabilitation could be introduced at the time of diagnosis, which would have the benefit of giving patients a ‘head’ start compared to those undergoing rehabilitation alone.


*Diagram adapted from: Figure 4: Silver JK. Cancer prehabilitation and its role in improving health outcomes and reducing healthcare costs. Seminars in Oncology Nursing, 2015; 31(1): 13-30.
1. Pre-assessment

It is important to identify the patient’s pre-treatment state in order to ensure that the prehabilitation regime results in the best possible outcomes for the patient.

Pre-assessment is crucial in prehabilitation to ensure the safety of the patient and the best possible outcomes as a result of prehabilitation, but also to ensure that the limited cancer prehabilitation evidence base is built upon. The aims of the pre-assessment are:

**Measure baseline**
This ensures that progress can be measured from across the length of the prehabilitation regime, enabling the individual to understand the effects of the prehabilitation regime, as well as ultimately building upon the wider evidence base for cancer prehabilitation. Prehabilitation is a data-driven process, and the sharing of data collected is vital to broadening the evidence base.

**Identify risk factors**
This enables the prehabilitation regime to be personalised to suit the individual’s needs prior to treatment, in order to improve, and set goals for, peri- and post-treatment outcomes. This can include identification of the patient’s pre-treatment physical activity levels, as well as identification of any other associated lifestyle factors such as alcohol consumption and smoking. Ultimately, this means that the regime is best suited to avoid or attenuate future cancer treatment induced disabilities.³

**Inform and make joint decisions**
It is important that the patient is aware of the process that they are about to undertake, and also understand how they will be affected peri- and post-treatment and the help that will be offered to them at each stage. It is important to understand what to expect and when to expect it.¹ Joint decision-making was identified as particularly important by subject-matter experts, as it means patients are actively involved in their own wellbeing and recovery.¹

Pre-assessment forms an integral part of the prehabilitation model. There is a lack of depth in the evidence-base, so there is a need for more evidence to be gathered in order to determine a model for best practise.

2. Prehabilitation regime

There are four important elements to consider when looking at a prehabilitation regime. This includes the interventions of the regime itself (tailored to meet the individual's needs), the length of the regime (typically 4-6 weeks) the setting (largely depends on the facilities available) and whether it follows an opt-in or opt-out system (strong argument for opt-out).

**Personalised regime**

The regime should be **personalised for the individual** to best meet their needs in order to maximise improvement in post-treatment outcomes. However, there is not currently a model of best practice for prehabilitation. *The individual interventions are explored in the following slides.*

**Length of regime**

The length of the prehabilitation regime varies from 1 week - 2 months; the typical regime is **4-6 weeks**.

**Setting**

There is **not a consensus** around which is the ideal setting for carry out prehabilitation, and indeed the ideal setting **depends on the facilities available**. In more rural areas, there can be difficulties around the availability of cancer services and transportation which can have an impact on the ability to carry out prehabilitation interventions; each area must be treated differently.

**Opt-in vs opt-out**

Prehabilitation could follow an **opt-in or opt-out** system, but there is not yet a decided model for delivery. There is a strong argument from subject-matter experts for **prescribing prehabilitation**; it should be considered as a **treatment**. This could make it more powerful and lead to greater adherence and compliance. Nevertheless, with an **opt-in** approach, individual interventions should be provided depending on the severity of the patient’s needs.
3. Follow up post-treatment

Follow up post-treatment is essential to determine the progress made by the patient and ensure that appropriate follow-up is provided post-treatment.

The follow up post-treatment is essential to round off prehabilitation. The objectives are as follows:

1. **Determine progress**

   It is important to link up the baseline measurements from the initial pre-assessment with a follow-up assessment in order to determine the progress made as a result of the prehabilitation regime.

   The importance of this is twofold: to further understand and develop prehabilitation models, and to share the successes with the patients. Evidence from a pilot service (WESFIT) suggests that patients like to receive their fitness monitoring scores (e.g. Cardio Pulmonary Exercise Testing scores) as they are proud to see improvements and see that the prehabilitation team are happy with their progress.¹

2. **Ensure appropriate follow up**

   It is important that patients receive support to return safely to exercise. There was a general consensus among patients in the ‘WESFIT’ pilot that it was important to at least have one conversation post treatment to discuss ‘getting back on track’ with exercise safely and manage their symptoms.¹

   This can include a follow up assessment with an exercise specialist, with extensive knowledge of existing local services, ensuring exercise continuation following prehabilitation.¹ Patients could be linked into rehabilitation programmes, therefore it is important to establish a strong connection between the two services.

   This helps to ensure minimal pain after surgery, comfort, decreased hospital length of stay and returning back to normal life.

Post-treatment follow-up must be incorporated into prehabilitation as this engages patient’s in their own progress and adds to the prehabilitation evidence base, in particular in understanding the efficacy of each individual intervention.

Prehabilitation interventions
Prehabilitation interventions vary in their composition, with some interventions seen in literature and service example always, some seen often and others sometimes.

<table>
<thead>
<tr>
<th>Prehabilitation interventions</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activity*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary Support*</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Psychological Wellbeing*</td>
<td></td>
<td></td>
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<tr>
<td>Anaemia Management</td>
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<tr>
<td>Smoking Cessation and Alcohol Reduction</td>
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<tr>
<td>Respiratory Exercises</td>
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<tr>
<td>Lymphoedema Management</td>
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<tr>
<td>Medication and Comorbidities Review</td>
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<tr>
<td>Other (See Appendix A)</td>
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</table>

*Based on current evidence, it is suggested that patients should have access to physical activity, dietary and psychological support as a minimum.

Physical activity always forms part of the prehabilitation regime. Macmillan need to consider the importance of other interventions in order to best design a prehabilitation process with a consistent model.
Physical Activity is a fundamental intervention of prehabilitation, and can be categorised into cardiovascular fitness and muscular strength.

**Cardiovascular fitness**

- This element exists across existing prehabilitation studies and services, but the specific **type of exercise varies**. It is a fundamental part of prehabilitation, and for this reason some associate prehabilitation solely with exercise.
- Cardiovascular fitness is also referred to as general fitness and aerobic fitness.
- It improves pre-treatment fitness enhances, post-treatment recovery, and is important for lung and heart health, bone density, joint mobility and mental health.
- The activities can include more **formal exercises**, often stationary **cycling**, and/or more **informal exercises**, such as walking, dancing, gardening, cycling and using stairs at home; these informal exercises been identified by patients as particularly helpful.

“As long as the activity means you feel hot, sweaty and a bit out of breath afterwards it will be of benefit.”

Bristol prehabilitation programme

**Muscular strengthening**

- The type of strength exercises required **varies by cancer type**, as specific muscle groups are **targeted** depending on the patient’s needs.
- Prehabilitation provides the opportunity to give the patient advice and **check that they are doing the exercises correctly** and thus strengthening the muscles effectively (as opposed to just giving the patient an information leaflet). This ensures the best possible outcomes as a result of the exercises.
- Examples include:
  - Head and neck - prophylactic exercises and the teaching of swallowing.
  - Prostate cancer - pelvic floor exercises to reduce risk of incontinence.

*During a prehabilitation pilot in Belfast for prostate cancer, it was found that 50% of the patients were performing pelvic floor exercises poorly prior to the prehabilitation programme, which had a negative impact on their continence.*

Physical Activity is a key intervention of prehabilitation, but what differentiates it from standard care is increased involvement of professionals and an organised plan of exercise. This can lead to greater engagement of patients as they are actively involved in their own wellbeing, which can lead to improved outcomes as a result.

References:
A Macmillan report looked in the barriers and enablers of getting active for people with cancer, with individual level drivers being the most influential driver on physical activity.

There are many complex influences on behaviour. However, in a 2015 Macmillan report shows that across all respondents—regardless of age treatment stage, or cancer type—the most important drivers related to four areas: (1) individual drivers, (2) social network, (3) physical symptoms and the (4) physical environment.

**Physical Activity - barriers and enablers**

**Individual**
Individual level drivers are highly influential on behaviours and a predictor of whether or not a person will be physically active during and after their cancer treatment.

- Regaining control
- Confidence
- Self-identity
- Motivation
- Mental wellbeing
- Positive achievements

**Social network**
Having a strong social network and the support of family and friends are strong drivers of physical activity.

- A sense of duty
- Support from close friends and family
- Social stigma
- Someone to do it with

**Physical symptoms**
The physical symptoms and side effects of cancer and its treatments are identified as barriers to physical activity.

- Treatment
- Rest
- Understanding what is safe
- Physical limitations vs. strategy planning
- Activity
- Proximity of facilities
- Appropriateness of facilities, trained staff
- Spending time outdoors

It is not enough to simply enforce a regime onto patients, the drivers are key to ensuring engagement in physical activity.

Prehabilitation interventions: Dietary Support

Dietary Support can mitigate risks of negative impact on clinical outcomes such as unfavourable prognosis, increased toxicity of anticancer treatments and continuous deterioration of overall state and well-being.

The ESPEN (European Society for Clinical Nutrition and Metabolism) guidelines outline the recommendations for identification, prevention and treatment of reversible elements of malnutrition in adult cancer patients, as well as outlining the underlying causes. They are a respected set of guidelines that can be used when looking at dietary support for prehabilitation.

Underlying cause

- Muscle protein depletion (hallmark of cachexia)
- Inadequate nutritional intake
- Systemic inflammation syndrome (affects metabolism of proteins, lipids and carbohydrates).

Direct impact

- Negative impact on physical function
- Negative impact on treatment tolerance
- Severely impinges QoL
- Weight loss
- Fatigue
- Impaired physical activity

Effects on clinical outcomes

- Unfavourable prognosis
- Increased toxicity of anticancer treatments
- Continuous deterioration of patients overall state and well-being.

ESPEN guidelines outline the importance of initiating interventions early, and lists interventions which can broadly be categorised into ‘Eat well’ and ‘Nutritional interventions’.

**ESPMEN guidelines outline the interventions that should be used for Dietary Support of cancer patients. The guidelines suggest that relevant parameters must be monitored regularly in all cancer patients, and interventions must be initiated early in order to reduce incidence of nutritional deficits and metabolic derangements. The recommended interventions and their aims are as follows:**

**Intervention**

<table>
<thead>
<tr>
<th>Nutrition counselling</th>
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<tbody>
<tr>
<td>Dedicated and repeated professional process with the ultimate aim to maintain or increase energy and protein intake with normal food.</td>
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</table>

<table>
<thead>
<tr>
<th>Oral nutritional supplements</th>
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</thead>
<tbody>
<tr>
<td>Most often recommended to supplement volitional food intake.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Artificial nutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of nutrients via enteral tubes (enteral or parental).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutritional care should always be accompanied by physical activity – see slide 19.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drug therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used in severely malnourished patients with advanced disease. Pharmacological agents are used to stimulate appetite and/or gut motility (contractions), to decrease systematic inflammation and/or hypercatabolism (abnormally high rate of substance or body tissue breakdown, which can lead to extreme weight loss), or to increase muscle mass and/or improve anabolism (synthesis of molecules to store energy).</td>
</tr>
</tbody>
</table>

**Aim**

- Treat malnutrition
- Maintain or improve food intake
- Mitigate metabolic derangements
- Maintain skeletal muscle mass and physical performance
- Reduce risk of reduction or interruptions of scheduled anticancer treatment and reduced quality of life

**Important considerations**

- Nutrition, and especially artificial nutrition, are associated with risks, burdens, and costs that need to be weighed against the expected benefits, with the knowledge and consent of the patient.
- Theoretical arguments that nutrients “feed the tumour” are not supported by evidence related to clinical outcome and should not be used to refuse, diminish or stop feeding; patients should not diet. It is important to have clear communication in this area, as patients can receive conflicting information around dieting.
- Each institution involved in treating cancer patients is recommended to define standards in operating procedures, responsibilities, and a quality control process.

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The NICE guidelines are the industry recognised core document when assessing and designing interventions that deliver psychological support to cancer patients, and are organised by level of psychological support required. They closely match the stratification found in the evidence and from subject-matter experts.

### NICE guidelines

<table>
<thead>
<tr>
<th>Level</th>
<th>Group</th>
<th>Assessment</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All health and social care professionals</td>
<td>Recognition of psychological needs</td>
<td>Effective information giving, compassionate communication and general psychological support</td>
</tr>
<tr>
<td>2</td>
<td>Health and social care professionals with additional expertise</td>
<td>Screening for psychological distress</td>
<td>Psychological techniques such as problem solving</td>
</tr>
<tr>
<td>3</td>
<td>Trained and accredited professionals</td>
<td>Assessed for psychological distress and diagnosis of some psychopathology</td>
<td>Counselling and specific psychological interventions such as anxiety management and solution-focused therapy, delivered according to an explicit theoretical framework</td>
</tr>
<tr>
<td>4</td>
<td>Mental health specialists</td>
<td>Diagnosis of psychopathology</td>
<td>Specialist psychological and psychiatric interventions such as psychotherapy, including cognitive behavioural therapy (CBT)</td>
</tr>
</tbody>
</table>

The NICE guidelines should be used to deal with psychological distress, determine interventions and professionals. Low level psychological support can be provided by any prehabilitation professional, and indeed low level support can be provided informally, for example from peers.

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### Literature and subject matter experts

Please note, these do not align with the NICE levels.

### Peers and buddies

Provide low level support and an invaluable insight into the cancer experience.

### Information centre

Visiting a Macmillan information centre (or Maggie’s centre depending on location).

### Stress management training

Training in relaxation techniques, such as breathing, progressive muscle relaxation and meditation, ‘guided imagery’, problem solving and coping strategies.

### Professional support

Emotional and basic psychological support from the CNS, or counselling from a trained professional such as a clinical psychologist.

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See Appendix A for other psychological support interventions listed by subject-matter experts.
Prehabilitation interventions: Additional interventions

Certain additional interventions can ensure a holistic approach to prehabilitation, taking into account lifestyle factors and clinical wellbeing.

Smoking Cessation and Alcohol Reduction

Patients should be advised to quit smoking. There are general health risks associated with smoking: it can increase likelihood of suffering complications during and after surgery. Research shows that stopping smoking prior to surgery can reduce risk of post-operative heart and lung complications, decrease wound healing time and reduce hospital length of stay.¹

It is recommended to reduce alcohol intake prior to surgery, as alcohol can reduce heart function and cause mild dehydration. However, this requires plenty of time as reducing alcohol intake suddenly can cause serious health problems.¹

Anaemia Management

Anaemia can be a side effect of cancer and its treatments, such as chemotherapy and radiotherapy. There is a widely accepted correlation between higher pre-operative haemoglobins and reduced need for peri-operative transfusion. Preoperative teams can investigate and treat anaemia, helping to avoid unnecessary blood transfusions and unnecessary costs.² Patient assessment should aim to determine whether there is an underlying cause of the iron deficiency anaemia, and whether the person has any complications, through history, examination, and appropriate investigations.³

Iron deficiency should be managed in the following ways:³

• Refer for further investigation to the appropriate speciality (for example gastroenterology, surgery, or gynaecology).
• Treat the underlying cause, if appropriate to do so in primary care.
• Treat iron deficiency anaemia with ferrous sulphate first-line and advise about diet.

Respiratory Exercises

Respiratory exercises are performed to reduce the risk of lung problems by opening up the airways and moving phlegm.

They should be performed both pre- and post-operatively, and practising them pre-operatively makes them easier to perform afterwards.⁴

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Lymphoedema Management

Cancer related lymphoedema is a consequence of cancer and its treatment. It may not be visible for some time and can occur many years later.

Proactive risk factor management of lymphoedema results in minimisation of the risk of lymphoedema developing. When lymphoedema develops, early intervention improves outcomes (financial, clinical and patient reported) and improves patients’ experience. The aims of any lymphoedema management programme are:

- To stabilise and ideally reduce the limb volume and address any skin changes
- To ensure that the patient and their family are empowered to manage the lymphoedema proactively

Pre-treatment limb measurements provide an objective way to monitor changes in limb volume over time as well as providing a means of evaluating outcomes of treatment.

There are four main approaches to the management of lymphoedema which are:

- Skin care and cellulitis prevention
- Exercise
- Lymphatic drainage
- Compression therapy

For every £1 spent on lymphoedema treatments, by limiting swelling and preventing damage and infection, it is estimated the NHS could save £100 in reduced hospital admissions.

Medication and Comorbidities Review

Medical history is critical in determining suitability for individual interventions of a prehabilitation regime. Optimising co-morbid conditions such as hypertension and diabetes and reviewing medication are important parts of prehabilitation.

70% of people with cancer are also living with one or more other potentially serious long-term health conditions, which could lead to reduced survival and a higher level of need. It is important that these complex needs are addressed during prehabilitation.

Key times to review medication and comorbidities are pre, peri and post-treatment as the potential risks and needs change.

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The PREPARE programme at Imperial is an award winning prehabilitation programme for cancer patients undergoing surgery for oesophago-gastric cancers.

About PREPARE
PREPARE is a prehabilitation programme at Imperial College Healthcare NHS Trust, founded in 2013, that help patients prepare for oesophago-gastric surgery. Core to the programme, is measurements for each part, looking at functional wellbeing, nutritional status and psychological wellbeing. It has a strong focus on quality of life and patient engagement.

It has won both the Royal College of Nursing Nurse of the Year and Innovation Awards.

Outcomes
- Reduced median post-operative hospital length of stay from 12 to 8 days
- Reduced post-operative complications rates (Clavien-Dindo from 80% to 29%)
- Reduced rates incidence of post-operative pneumonia from 60% to 29%
- Prevented the anticipated deterioration in physical function and QoL (in patients receiving neo-adjuvant chemo(radio)therapy)
- Improvement in physical function (METS 4.6-5.1)
- Improvement in self-confidence (self-efficacy 8.1-9.2)
Workforce
Workforce: Physical Activity

Physiotherapists are identified as the registered professionals most critical to Physical Activity, particularly for complex cases, while volunteers, as well as support workers, fitness instructors/personal trainers and rehabilitation/therapy assistants, are identified as key unregistered professionals.

Registered Professionals

- **Physiotherapist**: Particularly for:
  - increased risk patients
  - patients with fatigue

- **Occupational therapist**

- **CNS**: With appropriate training, can signpost

- **Clinical Scientist**

- **Speech & Language therapist**

- **Clinical exercise physiologist**

- **Consultant**

- **MISS**

- **Radiographer**

- **Oncologist**

- **Surgeon**

- **Boots Macmillan Pharmacist**

- **District Nurse**

- **Practice Nurse**

- **Volunteer/buddy**: In health centres and information centres

- **Nurse Associate**

- **Rehab/therapy assistant**: Provide support to increase activity

- **CISS**

- **MISS**

- **Walk leader**

- **Exercise professional (e.g. in leisure centres)**

- **Physiotherapy assistant**

- **Other patients**

- **Practice Nurse**

Core Roles

- It is suggested that professionals can be attributed according to the level of patient need.

- Occupational Therapists and Physiotherapists potentially overlap, for example on pain management and fatigue.

- Subject-matter experts suggest that all registered professionals can give physical activity advice to some degree.

- Best practice for the workforce around physical activity prehabilitation includes being encouraging, friendly, knowledgeable, have good communication skills, being genuinely proud of patients, supportive of progressive and showing empathy.

- It has been suggested that pushing patients too hard should be avoided, as this can result in disengagement.
Psychologists are strongly identified as the most important professionals for Psychological Wellbeing, while volunteers have also been identified as having an important role in providing emotional support.

### Workforce: Psychological Wellbeing

**Registered Professionals**

<table>
<thead>
<tr>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychologist</td>
</tr>
<tr>
<td>Psychiatrist</td>
</tr>
<tr>
<td>CNS Level 2</td>
</tr>
<tr>
<td>Registered Dietitian</td>
</tr>
<tr>
<td>Speech &amp; Language Therapist</td>
</tr>
<tr>
<td>Medical Photographer</td>
</tr>
<tr>
<td>District Nurse</td>
</tr>
<tr>
<td>CNS</td>
</tr>
<tr>
<td>Registered Dietitian</td>
</tr>
<tr>
<td>Speech &amp; Language Therapist</td>
</tr>
<tr>
<td>Medical Photographer</td>
</tr>
<tr>
<td>District Nurse</td>
</tr>
<tr>
<td>Cognitive Behavioural Therapist</td>
</tr>
<tr>
<td>Social Worker</td>
</tr>
<tr>
<td>Volunteer</td>
</tr>
<tr>
<td>Support Worker (Or similar – to provide emotional support)</td>
</tr>
<tr>
<td>MSL and other helplines</td>
</tr>
</tbody>
</table>

**Counsellor**

Can support long-term conditions including psychological support

**Physiotherapist**

Can support long-term conditions including psychological support

**Occupational therapist**

**Radiographer Practice Nurse**

**Nurse Associate**

**Boots Macmillan Pharmacist**

**Physios**

Sometimes support long-term conditions including providing psychological support.

**Volunteer**

To provide emotional support

**Support Worker**

(Or similar – to provide emotional support)

**CORE ROLES**

- It is suggested that professionals can be attributed according to the level of patient need.
- High complexity patients should be directed towards psychologists/psychiatrists. Medium complexity patients would potentially have care provided by Occupational Therapists, Counsellors and CNSs.
- Physios sometimes support long-term conditions including providing psychological support.
Dietitians have been identified as the professionals most important for provision of Dietary Support.

Although there are several core professionals, there was a consensus among subject-matter experts that Dietitians are the most important professional for dietary support.

- It is suggested that professionals can be attributed according to the level of patient need.
- Dietitians who would develop standard essential issues for others to use. Anyone needing more support than this would be referred directly to a Dietitian.
- Medium and low complexity patients would potentially have care provided by CNSs, Nurses, and other Allied Health Professionals, amongst registered professionals, and Dietetic Assistant and Rehabilitation Assistants amongst unregistered professionals. They may be among the ~80% of patients who are encouraged to ‘eat well’ as opposed to being given a ‘nutritional intervention’ (see slide 22).
Workforce: Other

In other areas (i.e. aside from Physical Activity, Psychological Wellbeing and Dietary Support), few core roles are identified beyond Occupational Therapist, reflecting a notion that all professionals can play a role in raising issues and signposting.

- Many of the suggested roles could be categorised as Allied Health Professionals (e.g. Occupational Therapists, Prosthetists, Speech and Language Therapists, Podiatrists, Orthotists).

- Several of the professionals would be able to undertake medication and comorbidity review roles (e.g. Nurse, GP, Pharmacist, Nurse Prescriber).

- It would be worth exploring how a ‘Prehabilitation Assistant’ role would align with what a CNS or Key Worker already does.

- Governance Safety Quality has been identified as an area of importance, particularly amongst unregistered professionals.

A multidisciplinary team is required to deliver a prehabilitation service. However, it is important to clarify what a prehabilitation programme consists of before it is decided who should deliver it.
There is a suggestion that a pyramid of care can be used to help identify the appropriate professional to deliver appropriate care, while other general points to emerge include the need for further evidence around the professional prehabilitation workforce, and the role of AHPs.

**ASSIGNING OF PROFESSIONALS TO PATIENTS:** It is suggested that professionals can be attributed according to the level of patient need (as reflected in the pyramid).

- The types of professionals who assist patients at different levels can potentially vary according to type of prehabilitation need:
  - **Physical Activity:**
    - High complexity patients - Physiotherapists
    - All registered professionals can give advice to a degree
  - **Psychological Wellbeing:**
    - High complexity patients – Psychologists, Psychiatrists
    - Medium complexity – Occupational Therapists, Counsellors, CNSs
  - **Dietary Support:**
    - High complexity patients – Dietitians
    - Medium and low complexity patients – CNSs, AHPs, Nurses, Volunteers

**Key points**

- **ROLES FOR ALL PROFESSIONALS:** Workshop attendees have highlighted that all professionals can raise issues and signpost, and that most professionals deliver a range of support, rather than being limited to specific roles, depending on patient needs.

- **EVIDENCE AVAILABILITY:** There is not a vast amount of literature specifically on workforce roles regarding prehabilitation, and as such this is an area in which it would be useful potentially to commission research.

- **DEFINITION NEEDED:** Interviews with subject-matter experts suggest that an agreed definition of prehabilitation may be needed before assessments can be made of who should deliver it.

- **ROLE FOR AHPs:** Literature strongly suggests that Allied Health Professionals (AHPs) are highly important workforce members in the deliver of rehabilitation, and given the similarities and occasional overlaps between rehabilitation and prehabilitation, this suggests that AHPs can be important workforce components in the delivery of prehabilitation. Expert opinions gathered from subject-matter experts reiterate this notion, with several specific AHP roles highlighted as important to delivery of several prehabilitation elements.

- **GOVERNANCE:** Governance Safety Quality has been identified as an area of importance, particularly amongst unregistered professionals.

- **COLLABORATION:** Subject-matter experts highlighted that it will be particularly important for unregistered professionals to build trust in one another’s skills, in order to work together. Joint clinics can potentially assist with this.

- **UNREGISTERED PROFESSIONALS:** Workshop attendees have highlighted that amongst primary roles of unregistered professionals will be to support self-management, and assist with stratifying and screening.
The prehabilitation multidisciplinary team must be able to talk about prehabilitation confidently in order to gain buy-in from patients, other healthcare professionals and commissioners.

The workforce for prehabilitation is varied in its composition, however all professionals need to be able to talk confidently about prehabilitation and make a case for its integration in the cancer care pathway.

### Need

<table>
<thead>
<tr>
<th>Ability to talk about prehabilitation</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take time to define cancer prehabilitation for the entire team. Many health professionals believe that they are already offering prehabilitation when in fact they are offering standard preoperative preparations, or standard care with education.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Make a case for timing</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are two approaches to the timing of prehabilitation. One is to avoid delays in starting cancer treatment and the other is to accept the delay if the benefit outweighs the risk. When surgery carries a greater risk, it is advisable that treatment is delayed in favour of prehabilitation. Delays can occur due to further diagnostic testing or getting a second or third opinion, and provides a perfect time for prehabilitation. If prehabilitation is initiated sooner after diagnosis, benefit could still be seen in cases where delay of treatment is not possible.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Make a case for cost</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional expenses can be justified by considering the financial burden on cancer patients after treatment. If patients develop significant impairments, this may result in a greater need for rehabilitation visits, lost time from work, and sometimes permanent disability.</td>
<td></td>
</tr>
</tbody>
</table>

It is important, especially for healthcare professionals, to be able to explain and justify the timings and the cost for prehabilitation, but in order to do this there must be convincing evidence and education around the case for prehabilitation.

Policy environment
Of the four UK nations, Wales has the greatest policy opportunity for leverage of prehabilitation services, explicitly mentioning the service within its Cancer Deliver Plan.

The different health and cancer policy documents across the four nations vary in their possible levers for promotion of prehabilitation:

**Wales**
- **Strong Levers**
  - Prehabilitation
  - Healthy Lifestyles
  - Person-centred care
- **Possible Levers**
  - Prevention
  - Self-management

**Scotland**
- **Possible Levers**
  - Post-Treatment support
  - Healthy Lifestyles

**Northern Ireland**
- **Potential levers**
  - AHP workforce professional workforce report in progress
  - No policy levers in place
  - Most recent cancer policy literature dates back to 2011

**England**
- **Strong levers**
  - Preventative Rehabilitation
  - Obesity and Lifestyle
  - Cancer Care
- **Possible Levers**
  - Self-Management
  - Prevention
  - Cancer Prevention
  - Surgery

Emphasis on ‘preventative rehabilitation’ in England’s World Class Cancer Outcomes, 2016 policy document represents the clearest policy lever for prehabilitation in England, while focus on lifestyle and cancer care within the broader NHS 5-year plan also presents an opportunity.

The Wales policy document *Cancer Delivery Plan for Wales 2016-2020* represents the only policy across the four nations that explicitly mentions and champions Prehabilitation.

Wales is the only country that explicitly mentions prehabilitation within its cancer or health policies, and is therefore best placed for systemic leverage of prehabilitation services. There is a strong lever for prehabilitation in England through emphasis on ‘preventative rehabilitation’ in the principle cancer strategy, as well as opportunities through strong focus on lifestyles and cancer care. However, there are few policy leveraging opportunities for prehabilitation in Scotland and Northern Ireland.

The following slides will explore these levers in more detail.
The key cancer and health policies in England present some strong levers for prehabilitation.

<table>
<thead>
<tr>
<th>Policy area</th>
<th>Policy document</th>
<th>Key points</th>
<th>Leverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Management</td>
<td>• NHS 5-Year¹</td>
<td>Strongly emphasised, one of the first priorities raised</td>
<td>Possible lever. Case for Prehab can be linked to Self-Management</td>
</tr>
<tr>
<td>Innovation</td>
<td>• NHS 5-Year¹</td>
<td>Strongly emphasised, backing to notion of ‘diverse solutions’, and to new models of care that will allow services to be integrated around the patient. Emphasis on out-of-hospital care.</td>
<td>Tenuous link. Prehab could be highlighted as an example of a ‘diverse solution’ or ‘new model’. but strong evidence base would be needed to make this compelling</td>
</tr>
<tr>
<td>Reducing Demand</td>
<td>• NHS 5-Year¹</td>
<td>Emphasised, to tackle issues of sustainability of NHS</td>
<td>Very tenuous link. Evidence would be needed of how Prehab reduces demand for services.</td>
</tr>
<tr>
<td>Long-Term Conditions</td>
<td>• NHS 5-Year¹, NHS Next Steps²</td>
<td>Emphasised, noted that LTCs account for 70% of NHS budget</td>
<td>Tenuous link. A more obvious lever exists through emphasis on cancer care</td>
</tr>
<tr>
<td>Cancer Care</td>
<td>• NHS 5-Year¹, NHS Next Steps²</td>
<td>Strongly emphasised, explicitly mentioned in ‘5-Year Forward View’ and ‘Next Steps’ docs</td>
<td>Strong lever. Case for Prehab can be linked to emphasis on cancer care</td>
</tr>
<tr>
<td>Prevention</td>
<td>• NHS 5-Year¹, NHS Next Steps²</td>
<td>Strongly emphasised, including mentions of incentivising and supporting healthier behaviour, targeted prevention. A diabetes prevention programme is in place, including education on healthy eating and lifestyle, bespoke physical activity programmes</td>
<td>Possible lever. Case for Prehab can be linked to Prevention. Prehab might be able to leverage elements of diabetes prevention programmes, either through linking to them or aligning to the principles behind them.</td>
</tr>
<tr>
<td>Cancer Prevention</td>
<td>• NHS 5-Year¹</td>
<td>Some explicit mention, but not necessarily a key priority</td>
<td>Possible lever. Case for Prehab can be linked to Cancer Prevention, but Cancer Prevention itself is not a top priority</td>
</tr>
<tr>
<td>Urgent and Emergency Care</td>
<td>• NHS Next Steps²</td>
<td>Emphasised. Aims include removing bed-blocking in hospitals while waits occur for community health and social care</td>
<td>Very tenuous links. Prehab could help achieve this, but indirectly, would be difficult to evidence.</td>
</tr>
<tr>
<td>Integrating Care Locally</td>
<td>• NHS Next Steps²</td>
<td>Strongly emphasised, initiatives include freeing up 2,000 to 3,000 beds, obtaining best value from medicines and pharmacy</td>
<td>Very tenuous links. Prehab could help achieve these initiatives, but indirectly, would be difficult to evidence.</td>
</tr>
<tr>
<td>Obesity and Lifestyle</td>
<td>• Cancer Outcomes³</td>
<td>Strongly emphasised, albeit as preventative rather than prehabilitative (i.e. pre-treatment) Physical activity emphasised as a post-treatment measure</td>
<td>Strong lever. Healthy lifestyles, including tackling obesity and undertaking exercise are valued in other contexts (e.g. prevention, recovery) – but it would be a short step from these to making the case for Prehab.</td>
</tr>
<tr>
<td>Surgery</td>
<td>• Cancer Outcomes³</td>
<td>Emphasis on surgery as treatment.</td>
<td>Possible lever. Would be a short step to add case for Prehab to case for value of surgery.</td>
</tr>
<tr>
<td>Preventative Rehab</td>
<td>• Cancer Outcomes³</td>
<td>Emphasis on preventative rehabilitation, delivered before and during cancer treatment, including Recommendation review of cancer rehabilitation workforce.</td>
<td>Strong lever. Explicit mention of value of preventative rehabilitation, and its benefits. Strong opportunity to capitalise on this.</td>
</tr>
</tbody>
</table>

**External policy: Wales**

Wales has the most advanced policy lever in place for prehabilitation, highlighting the benefits of the service within its Cancer Delivery Plan.

<table>
<thead>
<tr>
<th>Policy area</th>
<th>Policy document</th>
<th>Key points</th>
<th>Leverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prehabilitation</td>
<td>• Cancer Delivery Plan¹</td>
<td>Prehabilitation explicitly mentioned, in context of MDTs needing to engage with primary care, to ensure GPs are supported by specialist services.</td>
<td>Strong lever: Explicit case made for use of Prehab.</td>
</tr>
<tr>
<td>Healthy Lifestyles</td>
<td>• Cancer Delivery Plan¹</td>
<td>Strongly emphasised in context of Prevention, constitutes first key action of Prevention area</td>
<td>Strong lever. Case for Prehab can be linked to Healthy Lifestyles, although would need to be extended from Prevention to preventative rehab.</td>
</tr>
<tr>
<td>Person-centred care</td>
<td>• Cancer Delivery Plan¹</td>
<td>Importance emphasised, particularly under the prudent healthcare approach.</td>
<td>Strong lever. Case for Prehab can be linked to individualised care pre-treatment.</td>
</tr>
<tr>
<td>Co-production</td>
<td>• Cancer Delivery Plan¹</td>
<td>Strongly emphasised in the context of equalising the relationship between people and healthcare professionals in agreeing a joint set of actions appropriate to their values and to achieve their personal expectations of care.</td>
<td>Strong lever. Case for Prehab can be linked to empowering patients to be actively involved in their own wellbeing.</td>
</tr>
<tr>
<td>Self-management</td>
<td>• Cancer Delivery Plan¹</td>
<td>Mentioned as an action, although more in the context of end of life care.</td>
<td>Possible lever. Case for Prehab can be linked to Self-Management</td>
</tr>
<tr>
<td>Post-Treatment Support</td>
<td>• Cancer Delivery Plan¹</td>
<td>Some emphasis on need for post-treatment support, in terms of psychological and physical support.</td>
<td>Tenuous link: Prehab can potentially tap into notion of post-treatment physical and psychological support, by extolling virtues of preventing these needs from arising</td>
</tr>
<tr>
<td>Prevention</td>
<td>• Primary Care Plan²</td>
<td>Some emphasis on preventing people from being admitted to hospital unnecessarily, in context of how primary care services should be focused</td>
<td>Possible lever: Case can be made for Prehab to help prevent unnecessary hospital admissions.</td>
</tr>
</tbody>
</table>

The Welsh Government identified ‘Primary Care Oncology’ as a priority area for Wales and this presents a strong lever for prehabilitation in cancer care. The **Macmillan Primary Care Framework for Cancer programme** is a five-year initiative which is supporting primary care professionals to diagnose, care and support people with cancer in order to improve cancer services, patient outcomes and experience in Wales. Crucially, this programme of work spans from initial consultation through to diagnosis and treatment and beyond, so encompasses the prehabilitation timeframe.

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External policy: Scotland & Northern Ireland

Scotland has some possible levers for prehabilitation in cancer care. In Northern Ireland the health policy environment is generally weak, but a pending Allied Health Professional workforce report will provide a possible lever for prehabilitation.

<table>
<thead>
<tr>
<th>Scotland</th>
<th>Policy area</th>
<th>Policy document</th>
<th>Key points</th>
<th>Leverage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Post-Treatment Support</td>
<td>• Beating Cancer¹</td>
<td>Some emphasis on need for pre- and post-treatment support, through primary and community care and via local hospitals, across the most appropriate range of care needed.</td>
<td>Possible lever: A case can be made for the concept of prehab as providing pre-treatment support. There appears to be sufficient flexibility re setting within the scope of this area to allow for Prehab.</td>
</tr>
<tr>
<td></td>
<td>Healthy Lifestyles</td>
<td>• Beating Cancer¹</td>
<td>Strong emphasis (including reference to strong investment) on alcohol reduction, within a Prevention agenda. Additional emphasis on physical activity, including a legacy of programmes, as well as a diet and obesity.</td>
<td>Possible lever: These elements are core to Prehab, and although emphasised here within the context of Prevention there is potential for the principle to be transferred to Pre-Treatment.</td>
</tr>
</tbody>
</table>

Northern Ireland

Most recent policy document is from 2011 (with no explicit mentions of prehabilitation, although some potential levers around healthy lifestyles, e.g. physical activity, healthy eating, alcohol).

A specialist Allied Health Professional workforce report had just been finalised which provides an overview of this workforce across Northern Ireland. This report is now with the Chief AHP officer at the department of Health for presentation to Ministers, and provides a possible lever for prehabilitation.

While Wales has a strong policy platform in place for prehabilitation, creating an opportunity for common understanding of the service and potential for creation of a strategy around it, opportunities in Scotland are more indirect, and would therefore need to be manufactured by proponents. There is no obvious opportunity at present in Northern Ireland, suggesting little likelihood of adoption of prehabilitation.

The elements of the Recovery Package and how they link to prehabilitation

Prehabilitation links with key elements of the Recovery Package, with strong overlap seen with Health and Wellbeing Events, Information and Support, as well as potential link with the Holistic Needs Assessment.

- **The Holistic Needs Assessment**, as part of the Recovery package, can identify specific needs, that can then be supported as part of prehabilitation.
- **Health and Wellbeing information and support** - can be given during prehabilitation shortly following diagnosis.
- **Health and Wellbeing events** - can occur at any point in a patients pathway and often where prehabilitation is being delivered, Health and Wellbeing events can be a vehicle for this being delivered before rather than after treatment.
- **Treatment summaries and cancer care reviews** - may contain information about the patients prehabilitation interventions. This may help with continuity of care as the patient progresses.
Existing evidence and gaps
Possible impact of prehabilitation

Prehabilitation can impact a patient’s life from the point of diagnosis onwards. Prehabilitation has the potential to affect a patient’s general wellbeing pre-, peri- and post-treatment, as well as in the long-term. Suggestions were made by subject-matter experts about the effects of prehabilitation at different points.

- **Pre**
  - Fitness
  - Patient Experience
  - Pre-pre-baseline fatigue
  - Pre-pre-baseline frailty
  - Active involvement
  - Set expectations

- **Peri**
  - Work
  - Quality of life
  - Functional capacity
  - Self management
  - Health behaviours
  - Confidence for patients
  - Better use of health resources
  - Reduced isolation
  - Sense of control
  - Tolerance of treatment
  - Increased treatment options: surgery, radiotherapy and chemotherapy rates

- **Post**
  - Reduced burden on carers
  - Reduced recovery period
  - Prevent family breakdown

- **Long-term**
  - Increased survival
  - Reduced risk of further conditions
  - Reduced cost of health and social care (ASPIRATIONAL)
  - Primed for future rehabilitation
  - Return to life roles (family, work, community)
  - Reduced impact of some late effects (e.g. fatigue, continence)
  - Increased confidence in prehabilitation from professionals and patients
  - Sustained healthy lifestyle changes
  - Reduced contact with mental health services
  - Stave off frailty and disability

- **Pre**
  - Communication and coordination of care
  - Joins up services (i.e. rehabilitation)

- **Peri**
  - Reduced complications (wound healing, infections, mobility etc.)
  - Reduced length of stay (in the High Dependency or Intensive Care Units)

- **Post**
  - Weight (over vs under nutrition)

- **Long-term**
  - Fewer readmissions
  - Reduced contact with primary care
Prehabilitation evidence overview

There is an established evidence base for outcomes of prehabilitation for non-cancer morbidities, as well as an emerging evidence base around prehabilitation for cancer.

### Non-cancer prehabilitation evidence

There is an established evidence base for non-cancer morbidities, in particular for orthopaedics, demonstrating the outcomes and efficacy of prehabilitation programmes. This suggests that prehabilitation has the potential to:

1. Increase functional capacity
2. Improve quality of life
3. Decrease depression
4. Reduce hospital length of stay
5. Increase physical fitness
6. Reduce complications

For up to 6 months post surgery

Prehabilitation and early rehabilitation is less costly per patient than standard care.

### Prehabilitation for cancer

The non-cancer morbidity evidence base may point towards similar outcomes for cancer, and some parallels can be drawn from the evidence. However, cancer specific evidence is required to build a stronger case for prehabilitation for cancer care. There is emerging evidence around the outcomes, effectiveness and impact for cancer.

#### What evidence is there for prehabilitation for cancer care?

The prehabilitation evidence base is limited, but there is emerging evidence in the following areas:

- Cancer prehabilitation studies
- Cancer prehabilitation services and pilots

There is also potential to draw upon wider cancer rehabilitation and recovery evidence (e.g. ERAS+).

It is important to note that much of the emerging evidence for prehabilitation for cancer care is for those undergoing surgery. However, this does not mean that prehabilitation is limited to just those undergoing surgery.

Although the non-cancer evidence base may point towards similar outcomes for cancer, a more established evidence base for cancer needs to be built to ensure the evidence is convincing and can gain buy-in from patients, healthcare professionals, commissioners and politicians.

References:
There is emerging evidence around the effects of cancer prehabilitation, with more evidence focused on the physical fitness outcomes and limited evidence on financial, clinical and psychological effectiveness.

There is evidence around prehabilitation for cancer of from different study types that demonstrate the effect of prehabilitation on different outcomes.

**Key**

<table>
<thead>
<tr>
<th>Outcome icons</th>
<th>Study type</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Physical fitness" /></td>
<td><strong>Small</strong> &lt;100</td>
</tr>
<tr>
<td><img src="image" alt="Financial" /></td>
<td><strong>Medium</strong> 100-200</td>
</tr>
<tr>
<td></td>
<td><strong>Large</strong> 200+</td>
</tr>
<tr>
<td><img src="image" alt="Clinical" /></td>
<td><strong>Systematic review</strong> Very large analysis of multiple studies</td>
</tr>
</tbody>
</table>

**Study description**

<table>
<thead>
<tr>
<th>Study description</th>
<th>Outcomes studied</th>
<th>Study type</th>
<th>Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal cancer; Exercise and pulmonary physiotherapy</td>
<td><img src="image" alt="Physical fitness" /></td>
<td>Systematic review</td>
<td>Physical activity might be effective in improving physical fitness prior to major abdominal surgery, and chest physiotherapy seems effective in reducing pulmonary complications.²</td>
</tr>
<tr>
<td>All cancers; Pre-operative psychological interventions</td>
<td><img src="image" alt="Smiley" /></td>
<td>Systematic review</td>
<td>Psychological interventions prior to surgery appears to improve (psychological) outcomes and quality of life. They did not affect traditional surgery outcomes (e.g. hospital length of stay, complications, analgesia use, or mortality) but positively affected a patient’s immunological function.³</td>
</tr>
<tr>
<td>Breast cancer; Physical activity</td>
<td><img src="image" alt="Physical fitness" /></td>
<td>Large study</td>
<td>Self-reported levels of physical fitness are associated with faster recovery after breast cancer surgery. More active participants had an 85% increased chance of feeling physically recovered at 3 weeks after the operation, but no difference was seen after 6 weeks.⁴</td>
</tr>
<tr>
<td>Bladder cancer; Strength and endurance exercises</td>
<td><img src="image" alt="Physical fitness" /></td>
<td>Medium study</td>
<td>Patients adhering to prehabilitation prior to radical cystectomy showed improved mobilization and ability to perform daily activities. No difference was seen in likelihood of post-operative complications and no reductive in length of stay.¹</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study description</th>
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<th>Study type</th>
<th>Narrative</th>
</tr>
</thead>
</table>
| Colorectal cancer  | Exercise, nutrition and psychological support | Medium study | Patients had better physical fitness (measured by 6 minute walking distance) peri-operatively compared to rehabilitation alone. 

| Lung cancer        | Multimodal prehabilitation | Small study | Multimodal prehabilitation (respiratory exercises, cardiovascular exercises, smoking education and pharmacology agents) for lung cancer patients with dyspnoea requiring lung resection improves physical fitness and reduces dyspnoea. This may reduce postoperative complications. 

| Prostate cancer    | Resistance and aerobic exercise | Small study | Muscle strength and physical fitness was significantly improved with specific exercises, and the benefits were maintained 6 weeks post-surgery. 

| Colorectal cancer  | Exercise, nutrition and psychological | Small study | A study showed that high intensity exercise programme prior to liver resection can delivery improvements in physical fitness. 

| Rectal cancer      | Aerobic exercise | Small study | Patients with rectal cancer undergoing neoadjuvant chemotherapy (NACRT) showed that a structured exercise intervention is feasible post-NACRT and returns fitness to baseline within 6 weeks. 

| All cancer         | Prehabilitation  | Editorial study | Patients with rectal cancer undergoing neoadjuvant chemotherapy (NACRT) showed that a structured exercise intervention is feasible post-NACRT and returns fitness to baseline within 6 weeks. 


Prehabilitation is applicable for any treatment option including surgery, radiotherapy and chemotherapy, however, the vast majority of the evidence base is for those undergoing surgery. In University of Leicester, OT Helen Fieldson runs Enhanced Recovery group session prior to radiotherapy, and there is potential for more involved rehabilitation interventions in this area.
There are many gaps in the cancer prehabilitation evidence, with those around outcomes and effectiveness and cost effectiveness being particularly important to build upon to make a stronger case for wide spread prehabilitation.

There are some key questions which are not fully answered by the current available evidence base on prehabilitation:

**Best practice and models**
- What does best practice in prehabilitation look like?
- What is the Macmillan model for prehabilitation?

**Funding**
- Who funds prehabilitation?
- Who should fund prehabilitation?

**Outcomes and effectiveness**
- Do we have evidence of the outcomes for each intervention (not just physical activity)?
- Can we prove it’s effectiveness?

**Workforce**
- Who is best placed to provide prehabilitation?
- Who can realistically provide prehabilitation?

**Cost effectiveness**
- What are the potential cost saving that can be made?

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**Which are particularly important to ‘make a case’ for prehabilitation?**

Having convincing evidence on the outcomes and effectiveness is the key to establishing prehabilitation in the cancer continuum. Concrete evidence is important in enabling the patient to understand why they are undergoing a potentially tough regime (therefore important for adherence), for healthcare workers to buy into the concept and for buy-in from commissioners and politicians. There is currently a lack of large randomised trials.

Prehabilitation requires additional funding, which can be justified to commissioners by explaining the potential cost savings that can be made. However, there is a lack of data in this area, making it more difficult to make a strong case for prehabilitation.

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Silver JK. Cancer Prehabilitation: Important Lessons From Best Practices Model. 2015. TON.
Appendix A: Other interventions

Other possible interventions:¹

- Balance/gait
- Joint range of motion
- Therapeutic exercise
- Pain
- Swallowing
- Speech
- Sleep
- Fatigue
- Cognitive function
- Pulmonary function
- Skin protection
- Urinary incontinence
- Bowel/ostomy care
- Activities of daily living
- Instrumental activities of daily living
- Assistive devices
- Durable medical equipment
- Home safety
- Workplace accommodations
- Psychosocial support
- Supportive oncology symptom management
- Integrative oncology interventions
- Anaesthetic review

Other psychological interventions suggested by subject-matter experts:

- Hydrotherapy
- Body image
- Mindfulness
- Tai Chi/Qi Gong
- Motivation interviewing
- Art and music therapy
- Social coping
- Behaviour change development
- Sleep hygiene
- Healthy conversation

Please note, these lists are not exhaustive.

Methods mentioned in literature and by subject-matter experts:

- Cardio Pulmonary Exercise Testing (CPET)
- 6 Minute Walking Distance (6MWD)
- EQ-5D (generic health measurements)
- Patient Activation Measurement (PAM)
- Canadian Occupational Performance Measure (COPM)
- Functional Assessment of Chronic Illness Therapy (FACIT)
- Hand grip
- Incremental shuffle test
- Hospital Anxiety and Depression Scale (HADS)
- Warwick-Edinburgh Mental Well-being Scale
- Patient experience
- Blood tests
- Heart monitors
- SF-36® mental health score
- Internal Consultation on Incontinence Questionnaire (ICIQ)
- Patient diaries
- Scans
- PSS: International Prostate Symptom Score and Quality of Life (I-PSS)

*Please note, this list is not exhaustive.*
Appendix C: Subject-matter experts

Key external and internal stakeholders were involved in discussion, interviews and a workshop held in July 2017. They are referred to as subject-matter experts.

Interviewees

Arny Cain  Macmillan Physical Activity Manager, Wales
Jo Foster  Macmillan Physical Activity Programme Lead
Kerryn Chamberlin  Macmillan Physical Activity Manager
Mike Grocott  Professor of Anaesthesia and Critical Care Medicine, University of Southampton
Rosie Lof tus  Joint Chief Medical Officer
Sandy Jack  Wesfil Research Lead & Consultant Clinical Scientist, University of Southampton
Sarah Worbery  Physical Activity Integration Manager

Workshop attendees or otherwise

Anna Tee  Clinical Lead/Consultant Occupational & Macmillan Professional
Anne Johnson  Senior Lecturer/Consultant Occupational Therapist UWE
Cait Allen  Chief Executive, Wessex Cancer Trust
Catherine Neck  Macmillan Cancer Rehabilitation Recovery Package Project Lead
Charlie Ewer-Smith  Macmillan Lead Occupational Therapist
Dany Bell  Macmillan Treatment & Recovery Specialist Advisor
Debbie Provan  Regional TCAT Lead (WoSCAN) & National Macmillan AHP Lead for Cancer Rehabilitation
Deepa Doshi  Macmillan Partnership Quality Lead South East
Elizabeth Wright  Macmillan Interim Strategic Partnership Manager Central, South West England
Emer Sheehy  Macmillan Assistant Policy Analyst
Fran Williams  NHS England
Fiona Taylor  Macmillan Partnership Manager
Gary Howell  Macmillan AHP Cancer Lead for Cardiff and Vale UHB
Greg Pycroft  Macmillan Policy and Public Affairs Manager, Wales
Hannah Edward-Jones  Project Support Officer, Wales Cancer Network
Helen Petley  Macmillan Partnership Quality Lead South West
John Moore  NHS National Innovation Accelerator Fellow ERAS+, Consultant in Anaesthetics and Intensive Care Medicine
Julian Backhouse  Macmillan Partnership Manager
June Davis  Macmillan National Cancer Rehabilitation Lead
Karen Roberts  Macmillan Chief Nursing Officer
Kathryn Cooke  Macmillan Learning and Development Manager, South West Coast
Kim Bowles  Macmillan Partnership Manager
Lorraine Eades  Head of Dietetics and Care, Closer to Home Centre Manager
Lowri Griffiths  Former Macmillan Policy and Public Affairs Manager, Wales
Maggie Crowe  Macmillan Partnership Manager
Paula Kealey  Macmillan Strategic Partnership Manager
Rachael Barlow  Cardiff and Vale UHB, Cardiff University
Sandy Jack  Wesfil Research Lead & Consultant Clinical Scientist, University of Southampton
Sara Mathewson  Macmillan Partnership Manager, Gloucestershire & Swindon
Sibbhan Doyle  Macmillan Mass Planning Manager
Sinead Clarke  UK GPA For Treatment & Recovery
Sophia Nicola  Macmillan Prevention and Diagnosis Project Manager
Sue Lewis  Macmillan Partnership Quality
Susan Morris  Head of Macmillan Services for Wales
Sue Williams  Macmillan Programme Manager
Thomas Cave  Macmillan AHP Cancer Rehabilitation Project Lead
Trisha Hatt  Macmillan Strategic Partnership Manager
Wendy Wilkinson  Macmillan AHP Lead Wales Cancer Network
Yvonne Beadle  Macmillan Partnership Manager London (link with PREPARE programme)
MACMILLAN CANCER SUPPORT

We’re here to help everyone with cancer live life as fully as they can.

For information, support or just someone to talk to, call 0808 808 00 00 or visit macmillan.org.uk