

Prehabilitation evidence and insight review

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Strategic Insight

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Executive summary

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, objectives and approach

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.

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**.

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, an internally shared definition and understanding of prehabilitation .
- To understand, where possible, the role of physical activity in effective 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.

DEFINING PREHABILITATION

Existing definitions

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

Key points

A Macmillan prehabilitation definition must convey key messages including that 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 suite 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.

Suggested Definitions

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

2 Healthcare professionals

3 Commissioners and politicians

However, over-arching definitions were developed by subject-matter experts:

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

“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”

“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”

“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.”

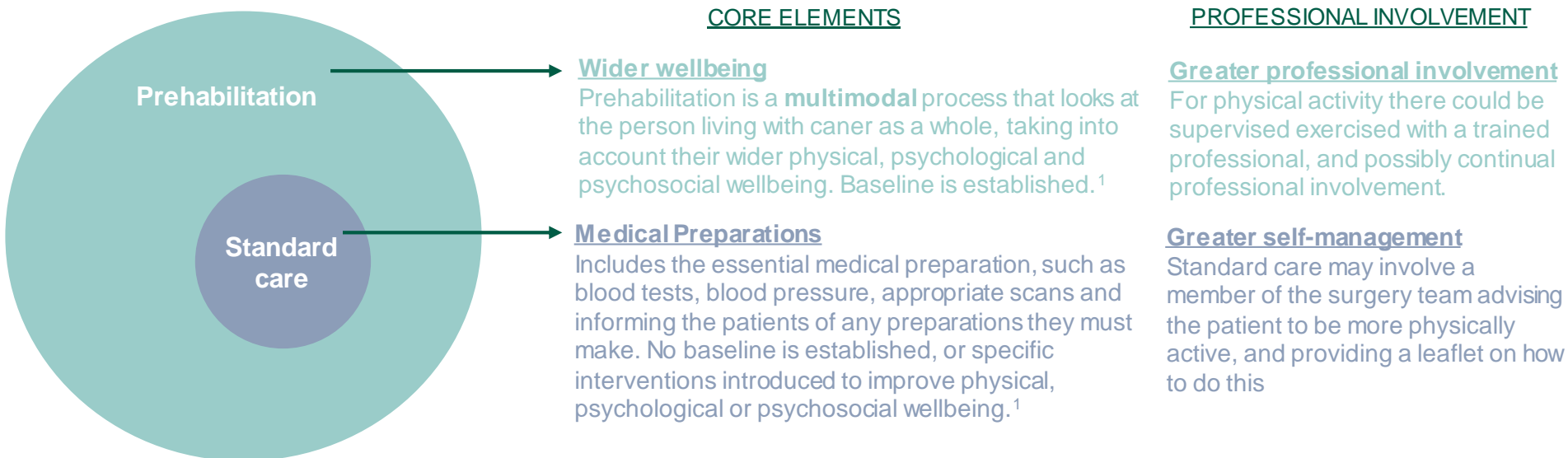
“The process around the time of cancer diagnosis and beginning treatment that includes lifestyle, physical and psychosocial health to prepare for treatment, help recovery and reduce future impairments.”

Further work needs to be done to gain a consensus on a Macmillan definition for prehabilitation and adapt it to the three different audiences.

Prehabilitation vs. standard pre-treatment care

Standard pre-treatment care is part of the wider offering of prehabilitation. Standard care involves medical preparations, whereas prehabilitation looks at the wider wellbeing of the patient is often has greater professional involvement.

Another important part of defining prehabilitation is to ensure that there is a clear distinction with standard, often preoperative, care. From the evidence, and subject-matter experts, standard care emerges as part of the wider offering of prehabilitation.



How could prehabilitation lead to improved outcomes compared to standard care?^{2,3}

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 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.

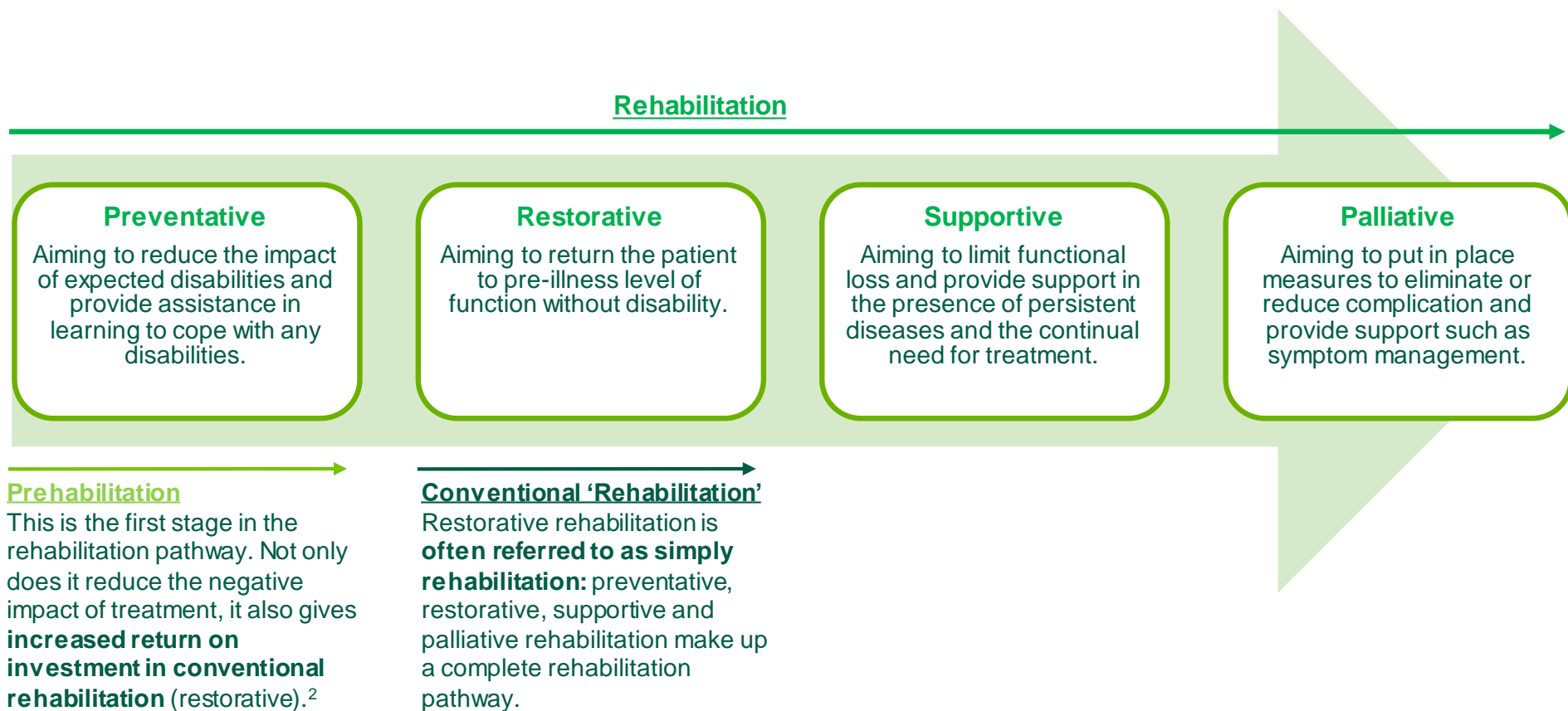
The effect of increased active involvement from patients should not be underestimated in improving outcomes

(1) Silver JK. Cancer prehabilitation and its role in improving health outcomes and reducing health care costs. *Seminars in Oncology Nursing*, 2015; 31(1): 13-30. (2) Patients' experience of exercise and cancer. *Informing 'WESFIT' Pilot Patient Involvement Report* Feedback to participants. 2017. University of Southampton and Wessex Voices. (3) Case Study - Venetia Wynter-Blyth. *Mac Voice*, the magazine for Macmillan professionals: Winter 2016. Available from: <http://www.macmillan.org.uk/aboutus/healthandsocialcareprofessionals/newsandupdates/macvoice/winter2016/case-study-venetia-wynter-blyth.aspx> [Accessed June 2017]

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:



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

PREHABILITATION STAGES

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.

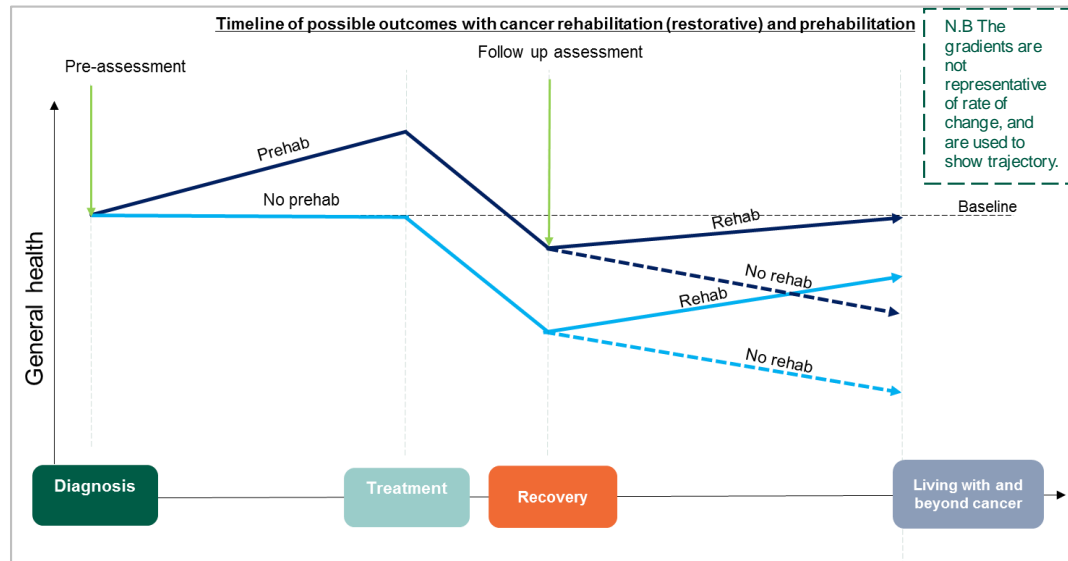
Prehabilitation diagram*

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 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.

(1) Shun SC, et al. Cancer Prehabilitation for Patients Starting from Active Treatment to Surveillance. Asia Pac J Nurs. 2016; 3(1): 37-40.

*Diagram adapted from: Figure 4: Silver JK. Cancer prehabilitation and its role in improving health outcomes and reducing health care 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.

See Appendix B for suggested methods of measuring progress.

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

CNS involvement in informing patients

Oncology nurses generally educate patients only one day before treatment about post-chemotherapy self-care and symptom management after chemotherapy. This may be too late for patients to take action (physical and psychological) to prevent expected impairment, thus it is suggested that it is beneficial to discuss this during the pre-assessment.¹

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 overview

There are consistent elements across prehabilitation services. Physical Activity is always present, while other elements vary in frequency.

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

Prehabilitation interventions	Always	Often	Sometimes
Physical Activity*			
Dietary Support*			
Psychological Wellbeing*			
Anaemia Management			
Smoking Cessation and Alcohol Reduction			
Respiratory Exercises			
Lymphoedema Management			
Medication and Comorbidities Review			
Other (See Appendix A)			

N.B Frequency is based on a limited evidence base, and may not be representative of all evidence that is not currently publicly available. Those under *sometimes* may be seen in the evidence or mentioned as important interventions by subject-matter experts.

* 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 can be broadly categorised into cardiovascular fitness and muscular strengthening. Within these categories the exercises may vary depending on the specific service and the cancer type.

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.⁵
- 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 helpful¹.

“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

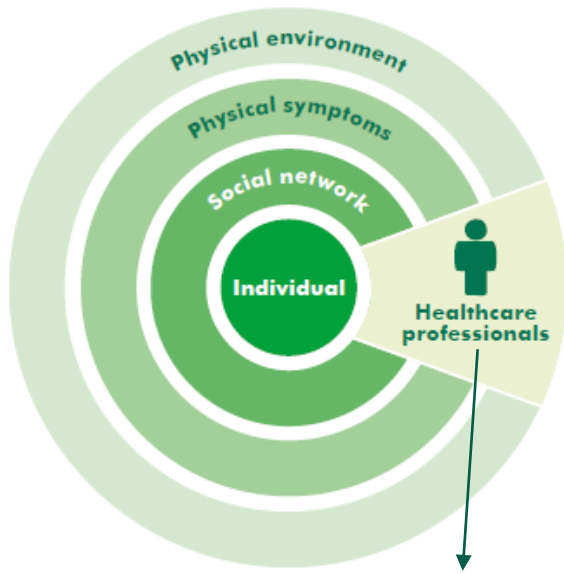
- The type of strength exercises required **varies by cancer type**, as specific muscle groups are **targeted** depending on the patient's needs.
- Prehabilitation provides the opportunity to give the patient advice and **check that they are doing the exercises correctly** and thus strengthening the 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.³

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.

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.



Healthcare professionals

Healthcare professionals can have a strong influence on physical activity behaviour. Many people living with cancer and their family members are sceptical about the evidence of the benefits of physical activity for people living with and beyond cancer: they want to hear these messages from trusted healthcare professionals, gaining permission to be active, to know that it is safe and right for them and their condition.

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.



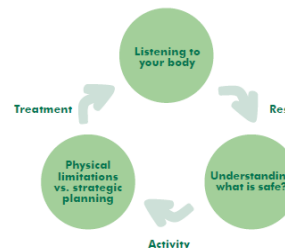
Social network

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



Physical symptoms

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



Physical environment

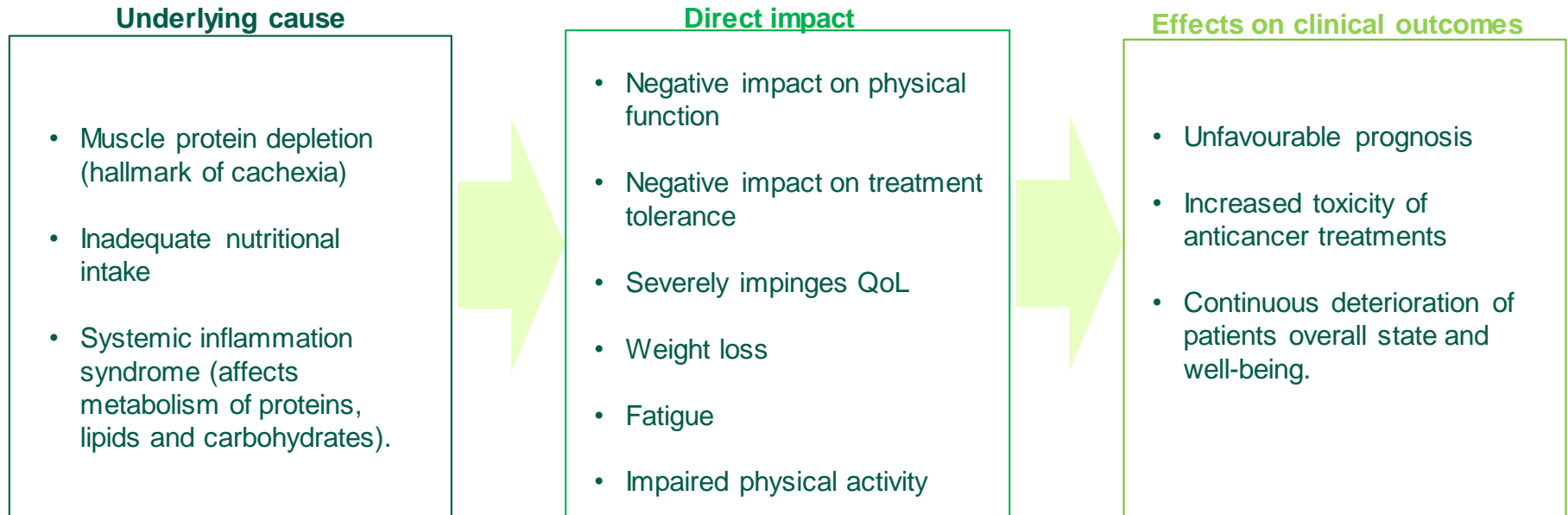
The physical environment and the proximity of facilities can both widen (if they are available) or narrow possibilities (if they are lacking).



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

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.



ESPEN guidelines¹ outline the importance of initiating interventions early, and lists interventions which can broadly be categorised into ‘Eat well’ and ‘Nutritional interventions’.

ESPEN 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:

~80%

‘Eat well’

This was suggested as the approximate split by subject-matter experts.

~20%

‘Nutritional intervention’

Intervention

Nutrition counselling

Dedicated and repeated professional process with the ultimate aim to maintain or increase energy and protein intake with normal food.

Oral nutritional supplements

Most often recommended to supplement volitional food intake.

Artificial nutrition

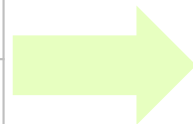
Application of nutrients via enteral tubes (enteral or parental).

Physical therapy

Nutritional care should always be accompanied by physical activity- see slide 19.

Drug therapy

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 hyper-catabolism (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).



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.

NICE guidelines for *Improving supportive and palliative care for adults with cancer* outline the professionals, assessments and interventions required for psychological support based on stratified risk. These broadly match other evidence in the literature and from subject-matter experts.

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 strategies².

Professional support

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

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

NICE guidelines

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

Increasing depth of support

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 the subject-matter experts.

Level 1-2

These are cases where the distress experienced by patients can be managed and resolved with minimal training by non-specialist workforce. This point was emphasised by subject matter experts, who stressed that anyone who interacts with the patient should be able to assess basic psychological wellbeing and given low level psychological support,

Level 3-4

In these cases the psychological distress experienced by cancer patients is severe and persistent enough to require specialist support by mental health professionals, such as psychologists and psychiatrists.

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.

(1) NICE guidelines: Improving supportive and palliative care for adults with cancer. (2) Tsimopoulou I, et al. Psychological Prehabilitation Before Cancer Surgery: A Systematic Review. Ann Surg Oncol. 2015; 22: 4117-4123.

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 problems¹.

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

(1) PREPARE programme. Imperial College Healthcare. 2016. Available from <https://www.imperial.nhs.uk/our-services/cancer-services/oesophago-gastric-cancer/prepare-programme> [Accessed June 2017]. (2) Management of anaemia in the pre-operative period. Draft guidelines and protocols. 2005. Available from: <http://www.transfusionguidelines.org/document-library/documents/management-of-anaemia-in-the-pre-operative-period-draft-guidelines-and-protocols-2005> [Accessed July 2017]. (3) Anaemia- iron deficiency. Scenario Management. NICE. Available from: <https://cks.nice.org.uk/anaemia-iron-deficiency> [Accessed July 2017]. (4) PREPARE programme. Imperial College Healthcare. 2016. Available from <https://www.imperial.nhs.uk/our-services/cancer-services/oesophago-gastric-cancer/prepare-programme> [Accessed June 2017].

Lymphoedema Management¹

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.²



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.⁴

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.³ 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.



Case study: PREPARE programme

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 engagement¹.

It has won both the **Royal College of Nursing Nurse of the Year and Innovation Awards**².



P

PHYSICAL
ACTIVITY



R

RESPIRATORY
EXERCISES



E

EAT
WELL



P

PSYCHOLOGICAL
WELLBEING



A

ASK ABOUT
MEDICATIONS



R

REMOVE
BAD HABITS



E

ENHANCED
RECOVERY

Outcomes⁴



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)

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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

Exercise physiologist

Occupational therapist

CNS

With appropriate training
Can signpost



Unregistered Professionals

Volunteer/buddy

- In health centres and information centres
- In leisure centres
- Provide support to increase activity

Rehab/therapy assistant

Support Worker

Provide support to increase activity

Fitness instructor/ personal trainer

Level 4



- 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.

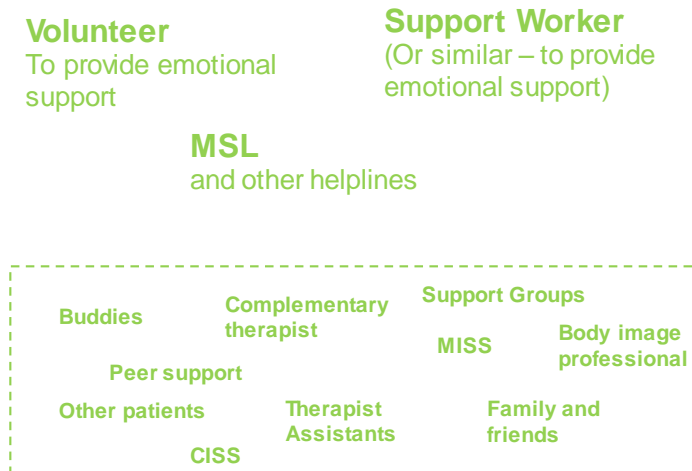
Workforce: Psychological Wellbeing

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.

Registered Professionals



Unregistered Professionals



- 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.

Workforce: Dietary 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.

Registered Professionals



CORE ROLES

NON-CORE ROLES

Unregistered Professionals



CORE ROLES

NON-CORE ROLES

- 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).

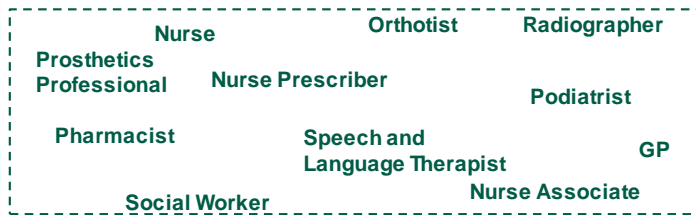
Workforce: Other

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

Registered Professionals

Occupational therapist

CORE ROLES



NON-CORE ROLES

Unregistered Professionals



NON-CORE ROLES

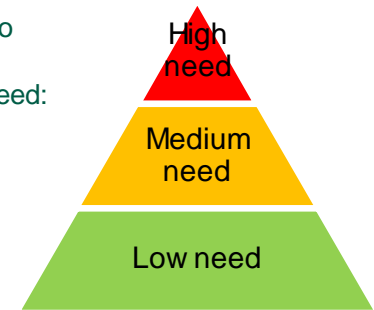
- Many of the suggested roles could be categorised as Allied Health Professionals (e.g. Occupational Therapists, Prosthetists, Speech and Language Therapists, Podiatrists, Orthotists)
- Several of the professionals would be able to undertake medication and comorbidity review roles (e.g. Nurse, GP, Pharmacist, 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 delivery a prehabilitation service. However, it is important to clarify what a prehabilitation programme consists of before it is decided *who* should deliver it.

Workforce: Key points

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



Stratified risk triangle based on complexity of patients' needs.

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.

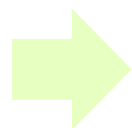
Workforce: Talking about prehabilitation

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.

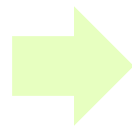
Need

Ability to talk about prehabilitation



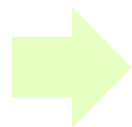
Take time to define cancer prehabilitation for the entire team. Many health professionals believe that they are already offering prehabilitation when in fact they are offering standard preoperative preparations, or standard care with education.

Make a case for timing



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.

Make a case for cost



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.

Why?

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.

A large, irregular green watercolor splash serves as the background for the text. The green is a vibrant, medium-toned hue with some darker and lighter variations, giving it a textured, artistic appearance. The text is centered within this splash.

POLICY ENVIRONMENT

External policy across the four nations

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:

NORTHERN IRELAND

- No policy levers in place
- Most recent cancer policy literature dates back to 2011

Potential levers

- AHP workforce professional workforce report in progress

SCOTLAND

Possible Levers

- Post-Treatment support
- Healthy Lifestyles

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.

WALES

Strong Levers

- Prehabilitation
- Healthy Lifestyles
- Person-centred care

Possible Levers

- Prevention
- Self-management



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.

The following slides will explore these levers in more detail.

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.

External policy: England

The key cancer and health policies in England present some strong levers for prehabilitation.

England

Policy area	Policy document	Key points	Leverage
Self-Management	<ul style="list-style-type: none"> NHS 5-Year¹ 	Strongly emphasised, one of the first priorities raised	Possible lever. Case for Prehab can be linked to Self-Management
Innovation	<ul style="list-style-type: none"> NHS 5-Year¹ 	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.	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
Reducing Demand	<ul style="list-style-type: none"> NHS 5-Year¹ NHS Next Steps² 	Emphasised, to tackle issues of sustainability of NHS	Very tenuous link. Evidence would be needed of how Prehab reduces demand for services.
Long-Term Conditions	<ul style="list-style-type: none"> NHS 5-Year¹ 	Emphasised, noted that LTCs account for 70% of NHS budget	Tenuous link. A more obvious lever exists through emphasis on cancer care
Cancer Care	<ul style="list-style-type: none"> NHS 5-Year¹ NHS Next Steps² 	Strongly emphasised, explicitly mentioned in '5-Year Forward View' and 'Next Steps' docs	Strong lever. Case for Prehab can be linked to emphasis on cancer care
Prevention	<ul style="list-style-type: none"> NHS 5-Year¹ NHS Next Steps² 	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	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.
Cancer Prevention	<ul style="list-style-type: none"> NHS 5-Year¹ 	Some explicit mention, but not necessarily a key priority	Possible lever. Case for Prehab can be linked to Cancer Prevention, but Cancer Prevention itself is not a top priority
Urgent and Emergency Care	<ul style="list-style-type: none"> NHS Next Steps² 	Emphasised. Aims include removing bed-blocking in hospitals while waits occur for community health and social care	Very tenuous links. Prehab could help achieve this, but indirectly, would be difficult to evidence.
Integrating Care Locally	<ul style="list-style-type: none"> NHS Next Steps² 	Strongly emphasised, initiatives include freeing up 2,000 to 3,000 beds, obtaining best value from medicines and pharmacy	Very tenuous links. Prehab could help achieve these initiatives, but indirectly, would be difficult to evidence.
Obesity and Lifestyle	<ul style="list-style-type: none"> Cancer Outcomes³ 	Strongly emphasised, albeit as preventative rather than rehabilitative (i.e. pre-treatment) Physical activity emphasised as a post-treatment measure	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.
Surgery	<ul style="list-style-type: none"> Cancer Outcomes³ 	Emphasis on surgery as treatment.	Possible lever. Would be a short step to add case for Prehab to case for value of surgery.
Preventative Rehab	<ul style="list-style-type: none"> Cancer Outcomes³ 	Emphasis on preventative rehabilitation, delivered before and during cancer treatment, including Recommendation re review of cancer rehabilitation workforce.	Strong lever. Explicit mention of value of 'preventative rehabilitation, and its benefits. Strong opportunity to capitalise on this.

(1) NHS. *Five Year Forward View*. 2014. (2) NHS. *Next Steps on Five Year Forward View*. 2017. (3) NHS England. *Achieving World Class Cancer Outcomes*. 2016.

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.

Wales

Only explicit mention of prehabilitation



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

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.

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.

Scotland

Policy area	Policy document	Key points	Leverage
Post-Treatment Support	<ul style="list-style-type: none">• Beating Cancer¹	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.	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.
Healthy Lifestyles	<ul style="list-style-type: none">• Beating Cancer¹	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.	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.

Northern Ireland

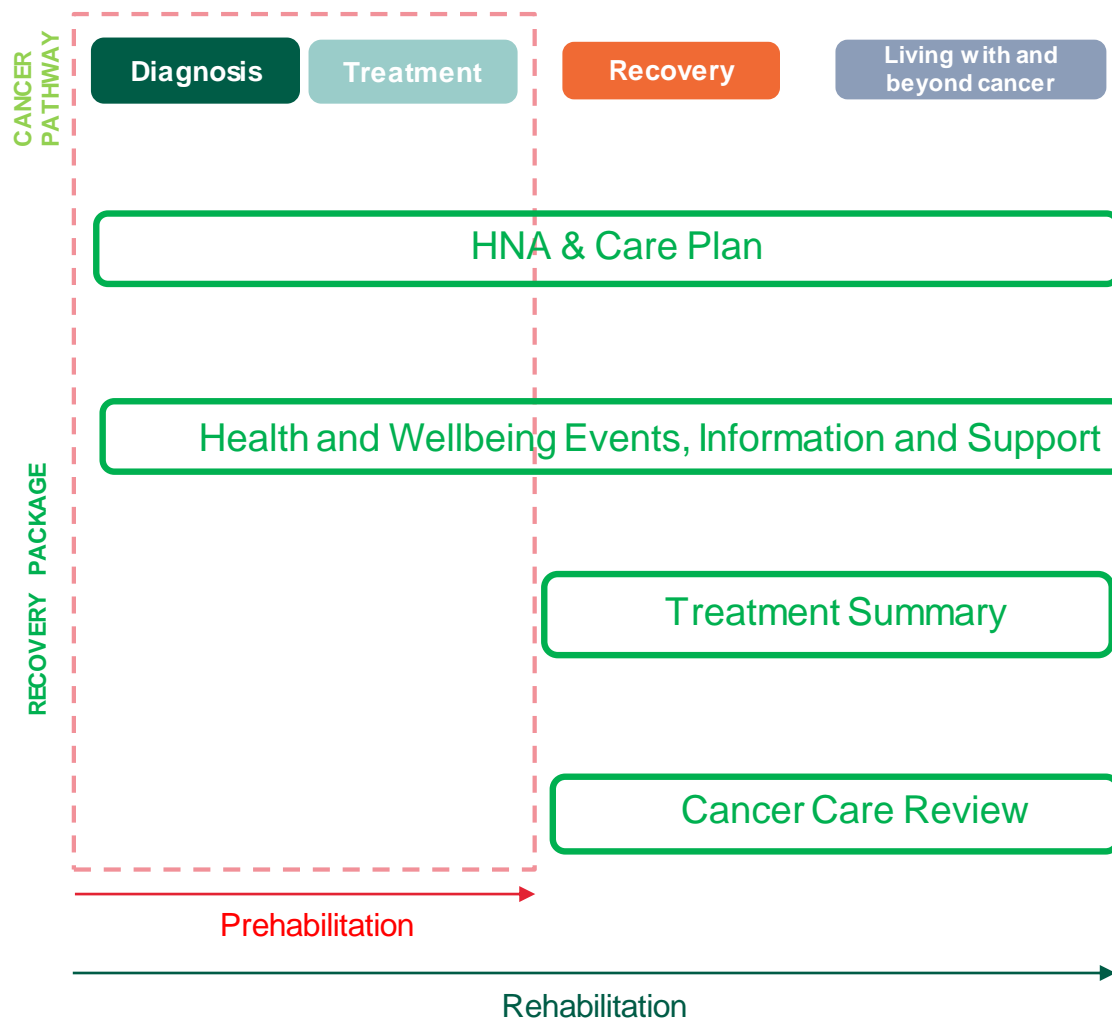
Most recent policy document is from 2011 (with no explicit mentions of prehabilitation, although some potential levers around healthy lifestyles, e.g. physical activity, healthy eating, alcohol).

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.

POTENTIAL OVERLAP

STRONG OVERLAP

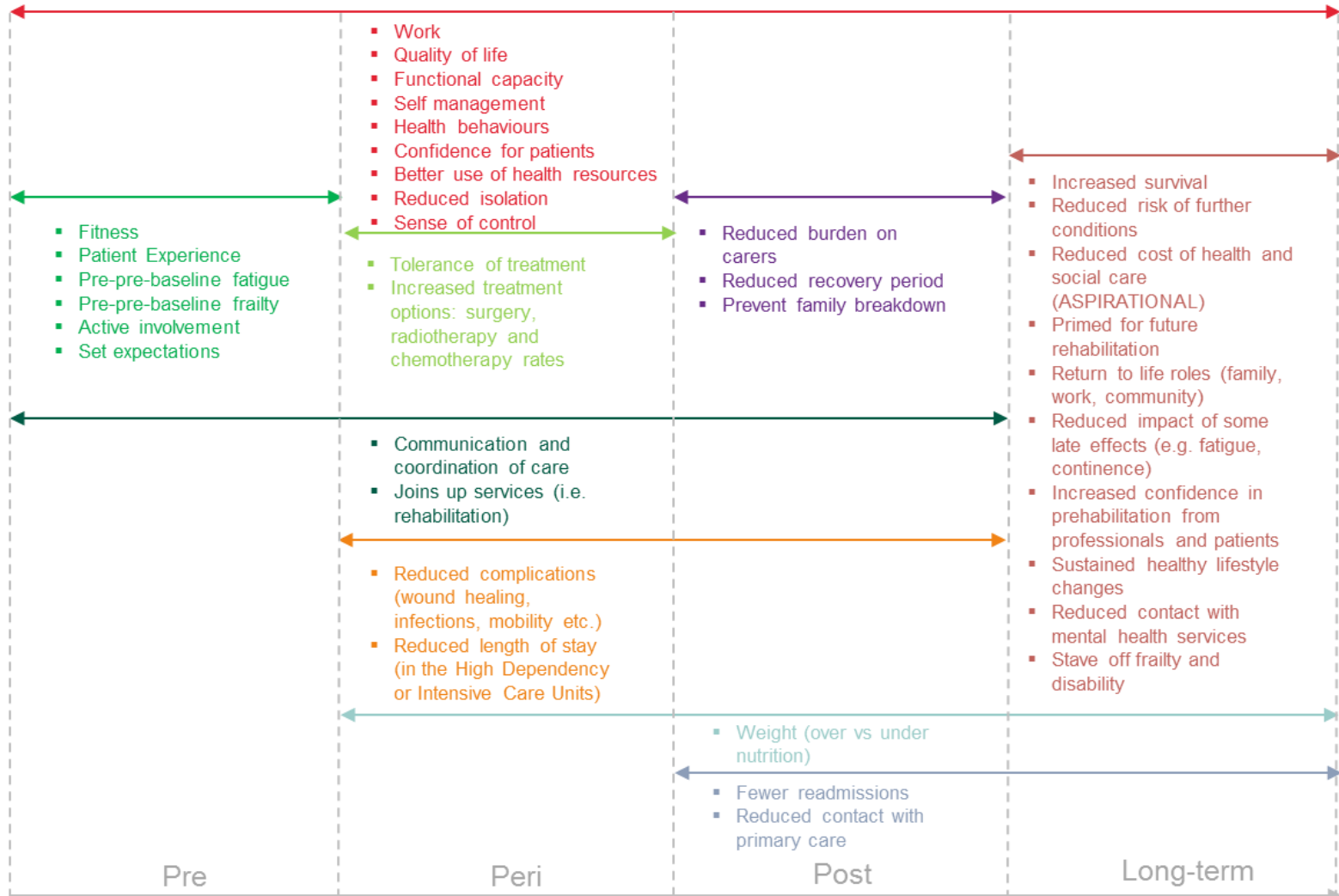
UNLIKELY OVERLAP

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



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

Improve quality of life

For up to 6 months post surgery

Decrease depression

Reduce hospital length of stay

Increase physical fitness

Reduce complications

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.

Prehabilitation evidence summary

There is emerging evidence around the effects of cancer prehabilitation, with more evidence focussed 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.

It is difficult to compare current evidence as **studies vary** by:


- Cancer type
- Regime composition
- Measurement methods
- Setting
- Regularity
- Level of supervision
- Treatment type

Key


Outcome icons




Physical fitness



Clinical
e.g. complications, recovery



Financial
e.g. cost saving










Psychological

Study type







Editorial publication <small>Opinion piece by expert</small>	Small <small><100</small>	Medium <small>100-200</small>	Large <small>200+</small>	Systematic review <small>Very large analysis of multiple studies</small>
		<small>(participants)</small>		

However, the **emerging evidence base** is beginning to demonstrate the effect of prehabilitation, **particularly on physical fitness**:

Study description	Outcomes studied	Study type	Narrative
<ul style="list-style-type: none"> • Abdominal cancer • Exercise and pulmonary physiotherapy 	 	Systematic review	Physical activity might be effective in improving physical fitness prior to major abdominal surgery, and chest physiotherapy seems effective in reducing pulmonary complications. ²
<ul style="list-style-type: none"> • All cancers • Pre-operative psychological interventions 		Systematic review	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 patients immunological function. ³
<ul style="list-style-type: none"> • Breast cancer • Physical activity 	 	Large study	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
<ul style="list-style-type: none"> • Bladder cancer • Strength and endurance exercises 	 	Medium study	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

(1) Jensen BT, et al. Efficacy of a multiprofessional rehabilitation programme in radical cystectomy pathways: A prospective randomized controlled trial. *Scand J Urol*. 2014; 49(2): 133-141.(2) Pouwels S, et al. Preoperative exercise therapy for elective major abdominal surgery: A systematic review. *International Journal of Surgery*. 2014; 12: 134-140.(3) Tsimopoubu I, et al. Psychological Prehabilitation Before Cancer Surgery: A Systematic Review. *Ann Surg Oncol*. 2015; 22: 4117-4123. (4) Nilsson H, et al. Is preoperative physical activity related to post-surgery recovery? A cohort study of patients with breast cancer (2015).

Prehabilitation evidence summary *continued*

Study description	Outcomes studied	Study type	Narrative
<ul style="list-style-type: none"> 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. ²
<ul style="list-style-type: none"> 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. ⁵
<ul style="list-style-type: none"> 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. ⁴
<ul style="list-style-type: none"> 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. ¹
<ul style="list-style-type: none"> 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. ³
<ul style="list-style-type: none"> 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. ⁶

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.

(1) Dunne DJF, et al. Randomized clinical trial of prehabilitation before planned liver resection. *BSJ*. 2016; 103: 504512.(2) Minnella EM, et al. Multimodal prehabilitation improves functional capacity before and after colorectal surgery for cancer: a five-year research experience. *Acta Oncologica*. 2017; 56(2): 295-300.(3) West MA, et al. Effect of prehabilitation on objectively measured physical fitness after neoadjuvant treatment in preoperative rectal cancer patients: a blinded interventional pilot study. *Br J Anaesth*. 2014; 114(2): 244251.(4) Singh F, et al. Feasibility of Presurgical Exercise in Men With Prostate Cancer Undergoing Prostatectomy. *Integr Cancer Ther*. 2016 (5) Chesterfield-Thomas G, et al. Impact of preoperative pulmonary rehabilitation on the Thoracoscore of patients undergoing lung resection. *Interactive CardioVascular and Thoracic Surgery*. 2016; 23: 729-732 (6) Silver JK. Cancer prehabilitation and its role in improving health outcomes and reducing health care costs. *Seminars in Oncology Nursing*, 2015; 31(1): 13-30.

Gaps in the evidence

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?



Which are particularly important to 'make a case' for prehabilitation?¹

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.

There is currently a lack of large, randomised trials on prehabilitation, but of more importance is building up strong evidence base around the outcomes and effectiveness and cost effectiveness.

APPENDICES

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.

Appendix B: Methods for measuring progress

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

Arry Cain	Macmillan Physical Activity Manger, 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 Loftus	Joint Chief Medical Officer
Sandy Jack	Wesfit 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	Wesfit Research Lead & Consultant Clinical Scientist, University of Southampton
Sara Mathewson	Macmillan Partnership Manager, Gloucestershire & Swindon
Siobhan 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)

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