Macmillan SCAN Prehabilitation Project Evaluation (v1.4)

October 2025

SCAN is a multidisciplinary NHS network which was established to improve cancer care in the South East of Scotland by facilitating communication and partnership working across the four South East Scotland Health Boards.

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Glossary of Terms

A&E	Accident and Emergency
BUPA	British United Provident Association
CEP	Clinical Exercise Physiologist
CIT	Cancer Information Team
CNS	Clinical Nurse Specialist
CPOG	Cancer Prehabilitation Oversight Group
CT	Computed Tomography
DASI	Duke Activity Status Index
EPIC	Early Prehabilitation in Lung Cancer
ERAS	Enhanced Recovery After Surgery
GP	General Practitioner
H&N	Head and Neck
HNA	Health Needs Assessment
HPB	Hepatopancreatobiliary
ICJ	Improving the Cancer Journey
ICU	Intensive Care Unit
IP	Inpatient
IV	Intravenous
LoS	Length of Stay
MDT	Multidisciplinary Team
METS	Metabolic Equivalent
MUST	Malnutrition Universal Screening Tool
NCA	Northern Cancer Alliance
NHS	National Health Service
ONS	Oral Nutritional Supplement
PEPB	Prehabilitation and ERAS Programme Board
PG-SGA	Patient Generated Subjective Global Assessment
PHQ-4	Patient Health Questionnaire - 4
PHS	Public Health Scoland
PLICS	Patient Level Information Costing Systems
PMO	Project Management Office
QPI	Quality Performance Indicator
SCAN	Southeast Scotland Cancer Network
SIMD	Scottish Index of Multiple Deprivation
SLT	Speech and Language Therapy
SLWG	Short Life Working Group
SPOC	Single Point of Contact
UK	United Kingdom
USoC	Urgent Suspicion of Cancer
WoSCAN	West of Scotland Cancer Network

Executive Summary

Introduction

Cancer prehabilitation is a person-centred approach that helps people prepare for cancer treatment by improving key aspects of their current health including their physical, nutritional and psychological well-being.

The aim of the SCAN Prehabilitation programme was to establish pathways to screen for and implement prehabilitation interventions, to map current prehabilitation resources and to scope the potential for further unfunded and funded service developments.

This paper summarises the emerging findings, outcomes and recommendations from the projects.

Background

Funding was provided by Macmillan and the Scottish Government through the Transforming Cancer Care programme, for 16 posts across 7 projects. The projects fell into three distinct areas: service pathway pilots (Head & Neck, Colorectal, Lung and Westerhaven); Board level scoping and mapping; and SCAN project support (Senior Information Analyst, Prehabilitation Project Manager).

Data was collated and analysed against the SCAN Prehabilitation Data Plan, with relevant measures used to assess each project. Prehabilitation and comparison cohorts were created for evaluation of pilot projects. Board mapping information was gathered via local stakeholder engagement and collated into a standard format to create a regional map.

Key Findings

Key findings from evaluation of projects are grouped into key themes and detailed below:

Clinical/Service Outcomes
- Reductions in Length of Stay (LoS) were noted across SCAN pilots – range 1 - 2.5 days.
- Repeat screening demonstrates improved outcomes with higher levels of patient prehab engagement.
- Reduction in Secondary care contacts in Lung pilot, particularly for inpatient admissions.
- Improved 6-month survival rates in lung prehab cohort compared to control (61.1% vs 47.7%).
- Improved weight maintenance in prehab cohorts.
- Positive patient and staff feedback across projects, highlighting the essential nature of prehabilitation in supporting and coordinating holistic patient care.

Funding and Sustainability
- Cost avoidance through LoS reduction demonstrated in Lung and H&N pilots.
- Aim to continue limited unfunded development work within Boards, in particular, improved provision and utilisation of universal prehab resources.
- No ongoing local recurrent funding identified for existing projects. Disruption to prehabilitation services occurring due to lack of consistent funding.
- Additional recurring funding essential at a national level to create and maintain sustainable pathways, and to allow full realisation of benefits from this first phase of work.

Screening
- Changes to existing pathways are required to implement effective prehabilitation screening e.g. personnel/team doing screening, use of clinic time, sending forms in advance for self-completion.
- Consideration for use of PG-SGA (short form) over MUST in the prehabilitation setting to ensure 'at risk' patients are identified.
- Screening near the point of USoC referral and in the community extends the length of time available for prehabilitation (6 weeks).
- It should be expected that 35-40% of patients diagnosed with cancer will benefit from physical activity and nutritional prehabilitation at targeted/specialist level, with 12% requiring targeted/specialist emotional wellbeing support.

Staffing Roles
- Prehabilitation specific job roles are essential to effective delivery and coordination of prehabilitation services.
- Prehabilitation Coordinators provide a central role in identifying patients, screening and providing early intervention.
- Understanding required of where existing NHS staffing roles can be used to provide prehabilitation support, and where additional specialised roles are required, e.g. remit of physios and Clinical Exercise Physiologists (CEPs).
- Staff training to be assessed and provided where necessary.

Prehabilitation Service Availability
- Mapping of SCAN services has shown current availability and gaps in service provision. This highlights limited provision of targeted and specialist support for physical activity and diet & nutrition across SCAN Boards.
- Further work required to develop pathways which support efficient use of existing services.
- Further work needed to identify and prioritise potential regional solutions to current gaps.
- Additional staff engagement and education required to increase staff awareness and understanding of prehabilitation services.
- Third sector and community partnerships are key to the delivery of cancer prehabilitation, investigation into future collaborations is under way.
- Equity of service access needs to be monitored through rural virtual offerings and further financial support for services which require patient subsidence.

Equity of Service
- Westerhaven project suggests benefit of community approach in identifying and engaging patients in more deprived areas.
- All pilots engaged with patients across deprivation categories (SIMD) at different levels and further work is required to understand deprivation profiles of control patient cohorts.
- Further Community/Primary Care engagement is key to ensuring equity in prehabilitation engagement.

Recommendations

Recommendations based on the findings of this evaluation are detailed below. These detail the work that would be required as part of a next phase of prehabilitation work in the region. Not all current resources are funded to support a second phase of work, and this poses a risk to delivery of these recommendations.

1. Additional national funding is essential to support continuation of current prehabilitation pathways, as well as future development and support of future initiatives.
2. Screening for prehabilitation should continue within existing pathways, with Boards and services to identify areas for further development, roll out and data capture.
3. Preservation of current prehabilitation staffing roles should be prioritised for funding as part of continuing prehabilitation development.
4. Boards to maintain ongoing review of available local prehabilitation services/resources in collaboration with Third Sector and community services, and to identify opportunities and challenges in the set up and maintenance of efficient referral processes.
5. SCAN Boards to identify where regional solutions could support gaps.
6. Development of Board processes for routine data collection is required to support ongoing service evaluation and development.
7. Findings and recommendations from this evaluation to be shared with regional and national stakeholders.

Introduction

The cancer prehabilitation project work was funded by Macmillan and the Scottish Government through the Transforming Cancer Care programme, to support delivery against "Ambition 3: Best Preparation for Treatment (Pre-Treatment)" of the [Scottish Government Cancer Strategy 2023-2033](#).

Cancer prehabilitation is a person-centred approach that helps people prepare for cancer treatment by improving key aspects of their current health including their physical, nutritional and psychological well-being. These three health aspects are described as the three main prehabilitation 'pillars'. Evidence suggests that by focusing on these pillars, patients experience improved preparedness for treatment, fewer complications and improvement of their long-term health. A key factor on the success of prehabilitation in outcome improvement is to begin the intervention as early in the patient journey as possible and continue into the rehabilitation period, creating a robust continuum of care. More information and guidance can be found within the [Macmillan Principles and Guidance for Prehabilitation](#) document.

How prehabilitation could best be implemented into a patients cancer journey was summarised into eight key principals and outlined in the Scottish Government publication , ["Key Principles for Implementing Cancer Prehabilitation across Scotland"](#), published in April 2022.

The aim of the SCAN Prehabilitation programme was to establish pathways to screen for and implement prehabilitation interventions, to map current prehabilitation resources and to scope the potential for further unfunded and funded service developments.

Background

Macmillan and Scottish Government advised that there was an opportunity to request non-recurring funding to the sum of approximately £250k to pilot Prehabilitation projects within SCAN. To progress this work across SCAN a Prehabilitation Steering Group was convened to discuss projects, ideas for the future and share resources. More details on the structure of Governance can be found in **Appendix A**.

SCAN liaised with Health Boards to explore what prehabilitation services were already in place across the region and discuss any potential pilot projects that would fit the funding criteria. A shortlist was agreed, and projects were submitted to Macmillan and Scottish Government under a single SCAN bid for funding.

Funding was provided for 16 posts across 7 projects. Additional funding was provided for a project within Gynaecology in NHS Lothian, however there were delays to this project starting and it is therefore not covered in this evaluation. The projects fell into three distinct areas:
- service pathway pilots (Head & Neck, Colorectal, Lung and Westerhaven);
- Board level scoping and mapping (NHS Borders);
- and SCAN project support (Senior Information Analyst, Prehabilitation Project Manager).

The SCAN Project Manager post was utilised to support additional scoping and mapping of services in NHS Fife and NHS Dumfries & Galloway.

The SCAN Prehabilitation programme ran in collaboration with the NHS Lothian Prehabilitation and Enhanced Recover After Surgery (ERAS) programme and linked with colleagues in the West of Scotland Cancer Network (WoSCAN) and the North Cancer Alliance (NCA) to share findings and best practice. SCAN work was shared with the national Cancer Prehabilitation Oversight Group (CPOG) which provided support and oversight across the three regional networks.

SCAN also supported the national prehabilitation screening project, with the Colorectal and Westerhaven projects acting as pilot areas to test a nationally agreed screening tool bundle. The project trialled use of three tools (DASI, PG-SGA (short form) and PHQ-4) to assess patient need against each of the three prehabilitation pillars (physical activity, nutrition, psychological).

NHS Lothian Service Pathway Pilot Studies

Lung

Background

The EPIC project (Early Prehabilitation in Lung Cancer), aimed to integrate early palliative/supportive care, dietetic support and rehabilitation from a physiotherapist, as soon as possible into a patient's cancer pathway. A previous phase of this work has been evaluated and published. Outcomes of that publication demonstrated reduced time spent in hospital by 76% and average length of stay was reduced from 8 days to 2.5 days[1].

Methodology

In the UK patients with suspected lung cancer are initially seen and appropriately investigated by a respiratory physician. We aimed to refer patients for the early supportive care intervention at their new patient respiratory appointment, this was often within a week of a CT scan showing radiological suspicion of lung cancer. All patients with suspected stage 3 or 4 lung cancer and were fit for further investigation were eligible. Patients who were for best supportive care or an 'in-patient' were excluded. Patients saw the respiratory physician in week 1, palliative care team in week 2 and physiotherapist and dietitian in week 3. This was a single in person intervention, with the majority of patients receiving <2 phone call follow ups.

The prehabilitation project had 2 periods of funding. July 2021-June 2023 was funded through private pharmaceutical support. Further funding from Macmillan and Scottish Government was obtained from March 2024 until February 2025. A cohort of historical controls was identified for patients diagnosed with stage 3 and 4 lung cancer from January 2019 to February 2024. These were patients following the same diagnostic pathway as prehab patients.

The backbone of the analysis was routine data from the lung cancer audit data for NHS Lothian to identify the historical cohort and provide date of diagnosis for all patients. Electronic patient records, chemotherapy, radiotherapy records and Public Health Scotland data allowed analysis of patient specific outcomes.

Findings

Screening Results: For the most recent lung cohort, screening consisted of the PG-SGA (short form), distress thermometer and pain scores. PG-SGA (short form), initial screening results indicated most patients have nutritional risk. Approximately 56% of individuals scored 4 or higher, requiring dietitian input or being in critical need however, only 4.9% falling into the critical need category (score ≥ 9). Lung prehabilitation patients had a median distress score of 6/10 and pain score of 5/10 upon initial consultation (Table 1).

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[1] Phillips I. et al. Early prehabilitation reduces admissions and time in hospital in patients with newly diagnosed lung cancer. BMJ Support Palliat Care. 2024 Dec 25;15(1):125-129. doi: 10.1136/spcare-2024-004869. PMID: 38631891.

Measure	Count	Range	Average	Median
PG-SGA (short form)	41	0 - 11	4.4	5
Distress Thermometer	40	2 – 10	5.8	6
Pain Score	41	0 - 9	4	5

Table 1. Lung Screening Results

Patient Outcomes

Cohort Information: 97 prehabilitation patients were included in this analysis, 44 of which were from the most recent 2024 intervention. Of those 97, 45 were male and 58 were female. Median age was 68. No statistically significant difference in age and sex between the Historical and Prehab cohorts was found. Further information about the cohort can be found in **Appendix B1**.

Secondary Care Interactions: Patients completing all three Prehabilitation appointments demonstrated the lowest rates of prolonged admissions per 100 patients (>5 days: 6), shortest average length of stay (LOS) per admission (2.6 days), and lowest total LOS per 100 patients (154.1 days), showing greater reductions compared to both the Historical cohort and those completing only one or two appointments, respectively (Figure 1).

When comparing only those patients who were admitted, a 95% confidence interval indicated that the Historical cohort's median LOS was significantly higher than the Prehabilitation cohort's, by an estimated 0.95 to 5.73 days. These findings suggest that while there was no overall significant difference in the tendency for any length of stay (including no stay) between the cohorts, a significant difference emerges when focusing on admitted patients. **This suggests that the Historical cohort experienced longer hospital stays for those individuals who were admitted, compared to admitted patients in the Prehabilitation cohort.**
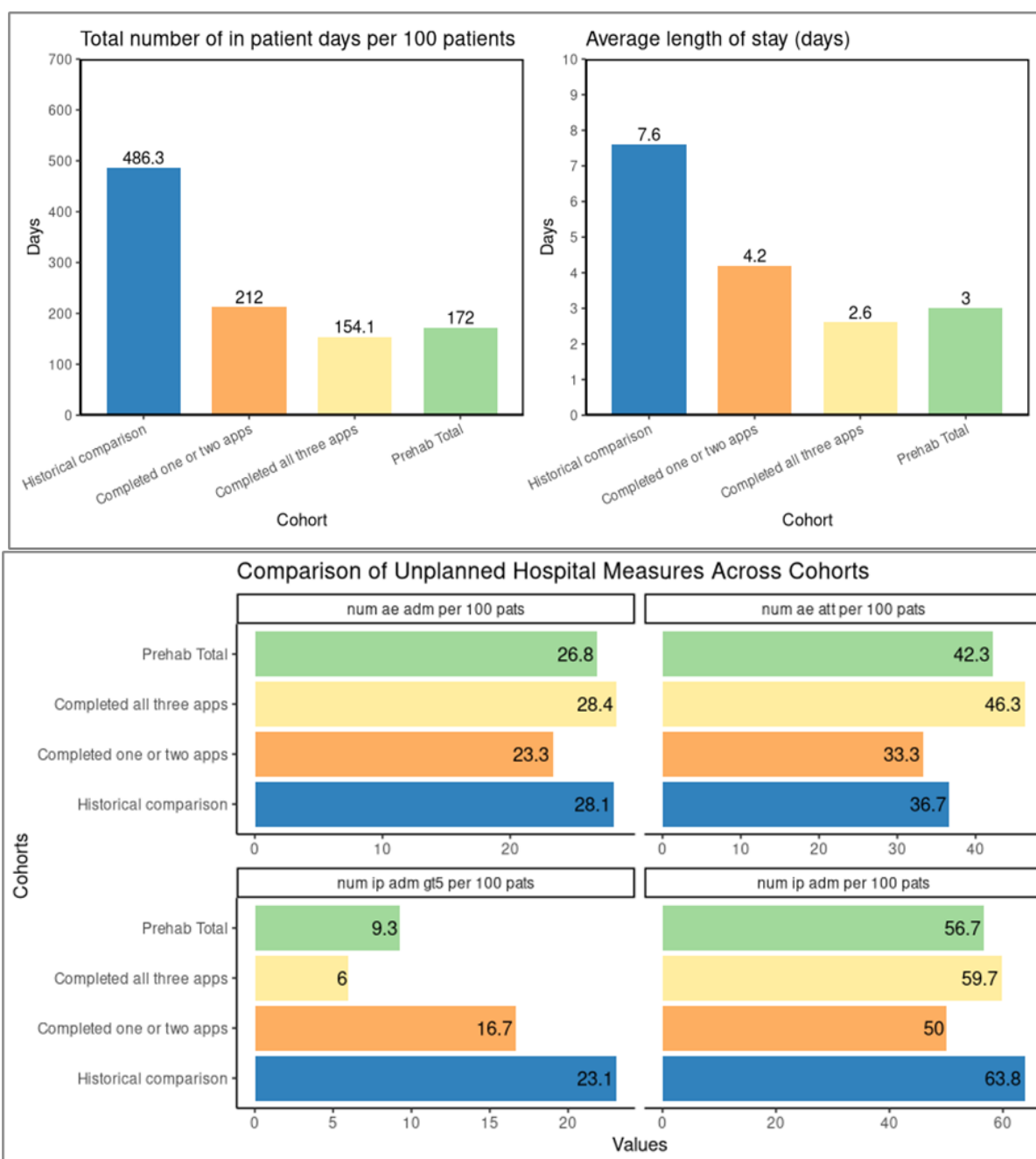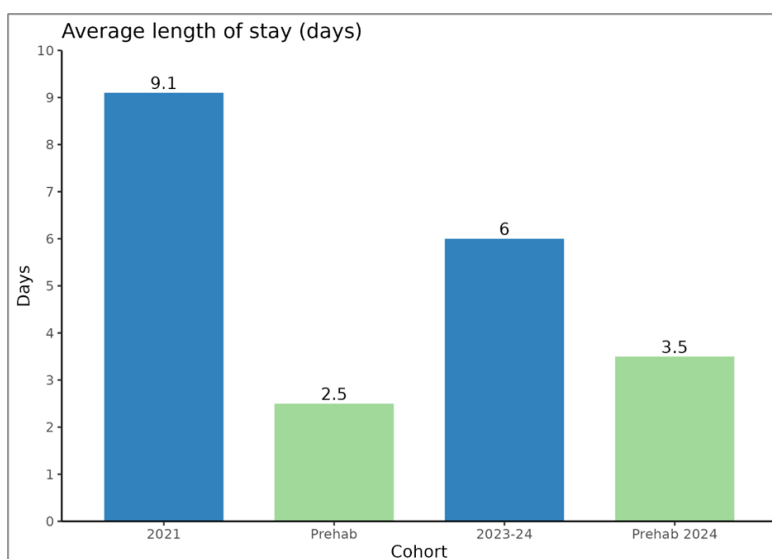
Figure 1. Figure 1.a) shows average length of stay per admission, which is shorter in patients receiving prehabilitation. Figure 1.b) shows time spent in hospital per 100 patients, which is less in patients receiving prehabilitation. Figure 1.c) A+E attendances, A+E admissions, admissions overall and number of admissions last more than 5 days. A+E attendance, A+E admissions and admissions were broadly similar. The number of admissions lasting longer than 5 days were less in the prehabilitation group than the control group (9.3 admissions vs 23.1 admission).

Figure 2 illustrates average LOS (days) across specific yearly cohorts. The 2021 historical cohort averaged 9.1 days, dropping to 2.5 days for the overall Prehab 2021-23 group. A similar pattern emerged comparing the 2023-24 cohort (6 days) with the concurrent Prehab 2024 group (3.5 days). This breakdown consistently demonstrates lower average LOS associated with prehabilitation, supporting the findings from the aggregated cohort comparison.

Figure 2. Comparison of average LOS per admission (days) between cohorts of prehab and historical controls.

LOS by Life Prolonging Treatment Status: Average length of stay per admission was lower for patients in the Prehabilitation cohort compared to the Historical cohort, regardless of whether treatment was life prolonging (2.7 vs. 5.8 days, respectively) or non-life prolonging (3.4 vs. 8.8 days, respectively). Non-Life Prolonging Treatment was associated with a longer average LOS per admission compared to Life Prolonging Treatment (**Appendix B2**).

Prehabilitation was associated with a decrease in total inpatient days per 100 patients for both treatment groups. The reduction was particularly pronounced for patients receiving Non-Life Prolonging Treatment (a decrease of 483.9 days per 100 patients), while a considerable reduction was also observed for those receiving Life Prolonging Treatment (a decrease of 146.5 days per 100 patients).

Weight Change: Examination of weight change between diagnosis and the 6-week review revealed a slight trend towards greater weight loss (≥ 5%) in the Historical cohort compared to the Prehab cohort. Specifically, 29.8% (n=14/47) of Historical patients lost ≥ 5% of their body weight, whereas only 24% (n=6/25) of Prehab patients experienced this level of weight loss. See (**Appendix B3**) for further detail.

Oral Nutritional Supplements (ONS): Analysis of ONS prescriptions post-diagnosis showed significantly different patterns between the Prehab and Non-Prehabilitation groups **Appendix B4**. While ONS use was minimal in the Non-Prehabilitation cohort throughout the period (ranging from 0.5% to 2.3%), the Prehab cohort experienced a marked increase. The results indicated a considerably higher level of nutritional intervention in the Prehab group (See Appendix B4 for further details on this analysis).

Survival Analysis: Comparing survival over the first 6 months (0.5 years) between the Historical and Prehabilitation cohorts is presented in Table 2. The Prehabilitation cohort demonstrating consistently higher survival probability throughout the period. At 6-months, the estimated survival probability was 61.1% for the Prehabilitation cohort, compared to 47.7% for the Historical cohort. There was also a difference in survival at 3 months and 12 months, but these were not statistically significant.

Survival Estimates at 6 Months (0.5 Years)				
Cohort	Time (Years)	N at Risk	N Events	Survival Probability	95% CI
Historical	0.50	95	104	47.7%	41.3% - 55.2%
Prehab	0.50	52	36	61.1%	51.8% - 72.0%

Table 2. Survival Curves by cohort

Admissions within 14 and 30 days of death: Inpatient (IP) admissions within 30 days of death were lower in the prehabilitation group, although this difference was not statistically significant (40.2% vs 48.2%). However, this difference reached statistical significance within the 14 days preceding death (Figure 3). The prehabilitation group had significantly lower odds of IP admission compared to the non-prehabilitation group during this shorter timeframe Accident & Emergency (A&E) attendances also showed lower rates in the prehabilitation cohort but were not significant at either 30 days or 14 days before death.
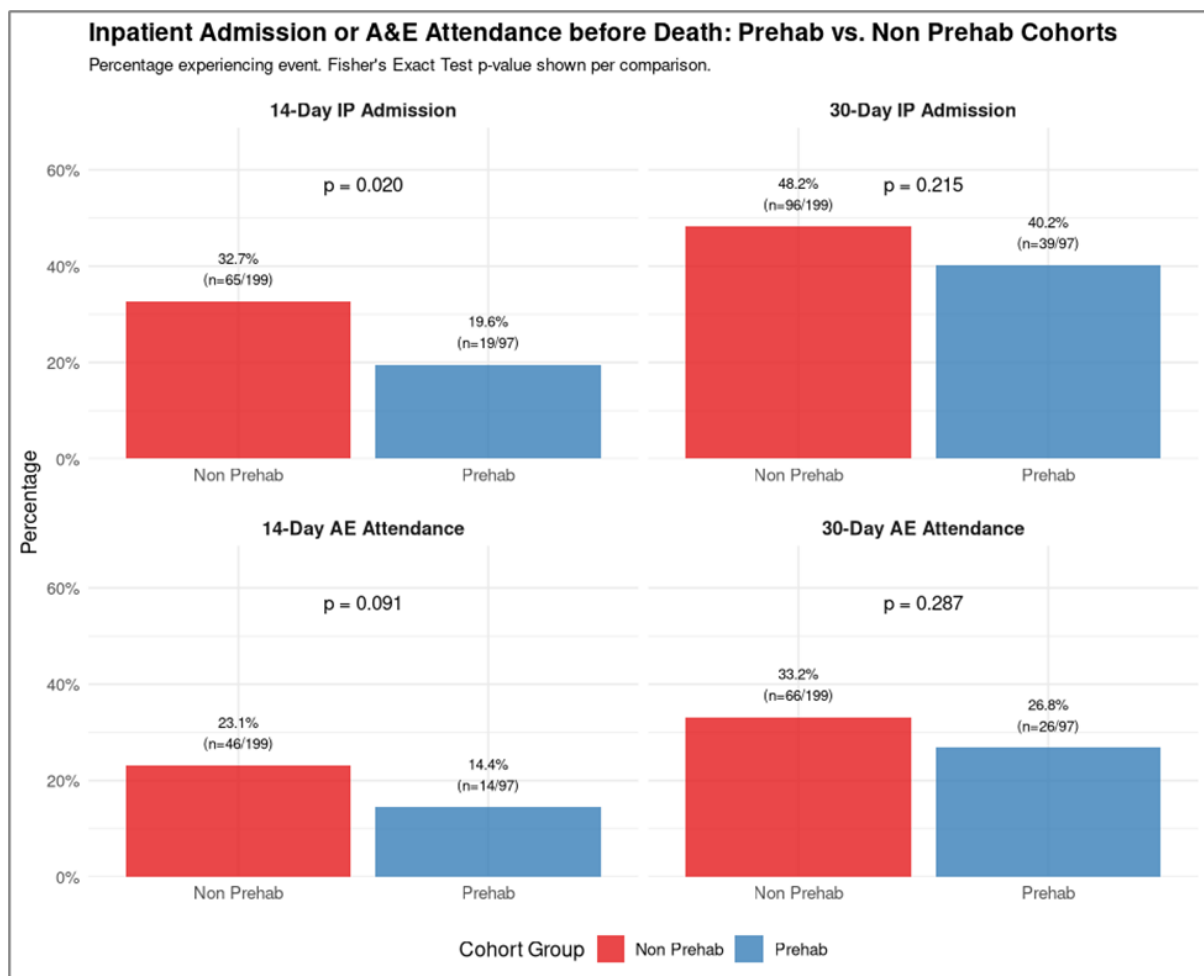
Figure 3: Inpatient admissions and A&E attendances of patients receiving prehabilitation vs historical controls. Admissions and A&E attendances were fewer in 30 days and 14 days before death. They were statistically significantly different in admissions in 14 days before death.

Time to first IP admission from diagnosis: The median time to first IP admission was substantially longer in the Prehabilitation cohort (43 days) than in the Historical cohort (34 days), suggesting that Prehabilitation patients generally experienced a longer period without an unplanned hospital stay after diagnosis.

Costings

A detailed overview (including limitations) of costing methods is available in **Appendix B5**. To determine cost for the Lung pilot project, we calculated the reduction in the LOS of unplanned inpatient admissions that occurred between 0 and 42-days post diagnosis. The ward-based costing method described in the overview was used to calculate the average cost per bed day among the lung cohort. The overall cohort average (weighted by ward use) was £416.1.

Prehabilitation was delivered at a cost of approximately £852 per patient, including staffing costs. This is based on the funding amount provided with the aim of providing prehab to 50 patients. Prehabilitation reduces time spent in hospital per 100 patients by 314 days, or 3.1 days per patient undergoing prehabilitation. (486.3 - 172 per 100 patients). This gives us the below costing information.

Costs avoided = (3.1 * £416.1) - £852= £437.90 per patient

Colorectal

Background

The ASCENT-50 exercise intervention was designed based on the latest evidence, piloted and implemented by a registered clinical exercise physiologist specialising in cancer prehabilitation. The intervention consisted of screening using validated screening tools. Patients attended appropriate exercise testing sessions at the Edinburgh Napier University, Sport and Exercise Science Laboratory. A personalised exercise prescription was designed based on patients' individual needs, surgery goals, comorbidities, medications and exercise preferences.

This was supported by a wider colorectal cancer screening programme within the service which was managed by a Prehabilitation Coordinator Nurse. This role was key in identifying, screening and motivating patients early in their treatment journey. Screening forms were sent to patients in advance of first clinic appointments for self-completion where possible. Dedicated dietetic support was also provided, with the Macmillan funded BUPA service utilised for psychological support.

Methodology

The ASCENT-50 programme comprised a home-based high intensity training exercise routine that involved aerobic exercise, strength training, pelvic floor exercises and breathing exercises performed at least 5 days per week. To ensure uptake, adherence and long-term behaviour change, the intervention was supported by weekly motivational interviewing delivered by the clinical exercise physiologist, and activity tracking using activPAL technology.

For both the colorectal and head & neck (H&N) cancer analyses, historical comparison cohorts were constructed to contrast with respective prehabilitation cohorts. An alternative cohort construction was used to calculate the colorectal Length of Stay (LoS) compared to the other analysis due to limitations in sample size and the proportion of surgical procedure types in the prehabilitation cohort. Further details are provided in **Appendix C1 & C2 (Colorectal) and Appendix D1 (H&N)**.

Findings

Screening improvements: Across all screening tools, the prehabilitation cohort demonstrated improvements across patient-reported measures: average nutritional risk scores (PG-SGA (short form)) decreased for higher-risk groups [Figure 4], functional capacity (DASI) increased across all adherence levels [Figure 5], psychological distress (PHQ-4) substantially lessened for those with BUPA referrals [Figure 6], and self-reported health status improved irrespective of baseline activity adherence [Figure 7]. In the 1-month post-surgery period, nutritional risk, psychological distress and self-reported health status continued to show average improvements for all the remaining participants.
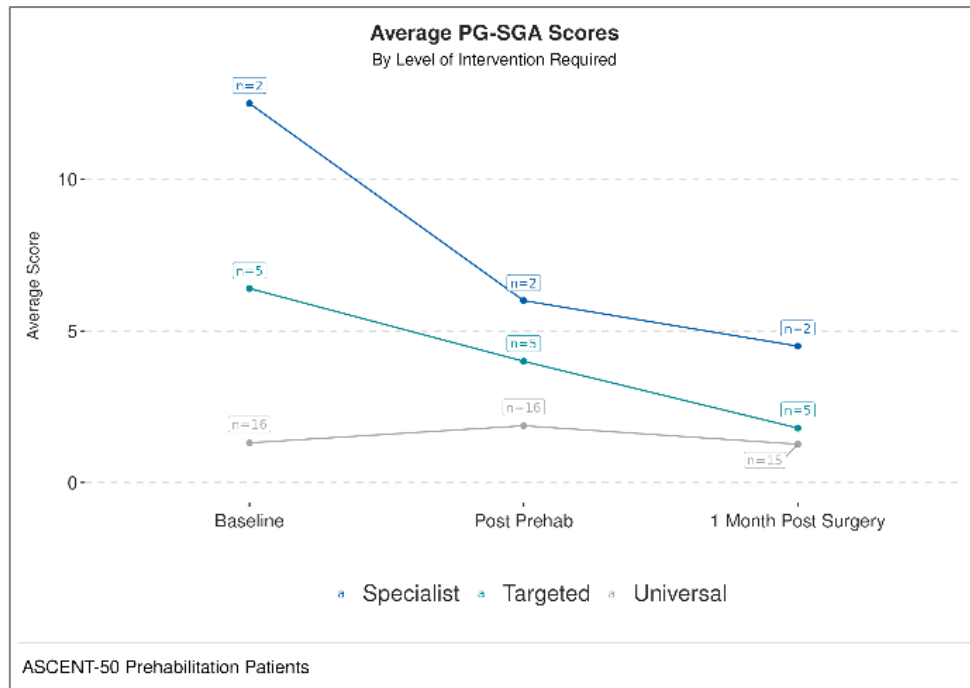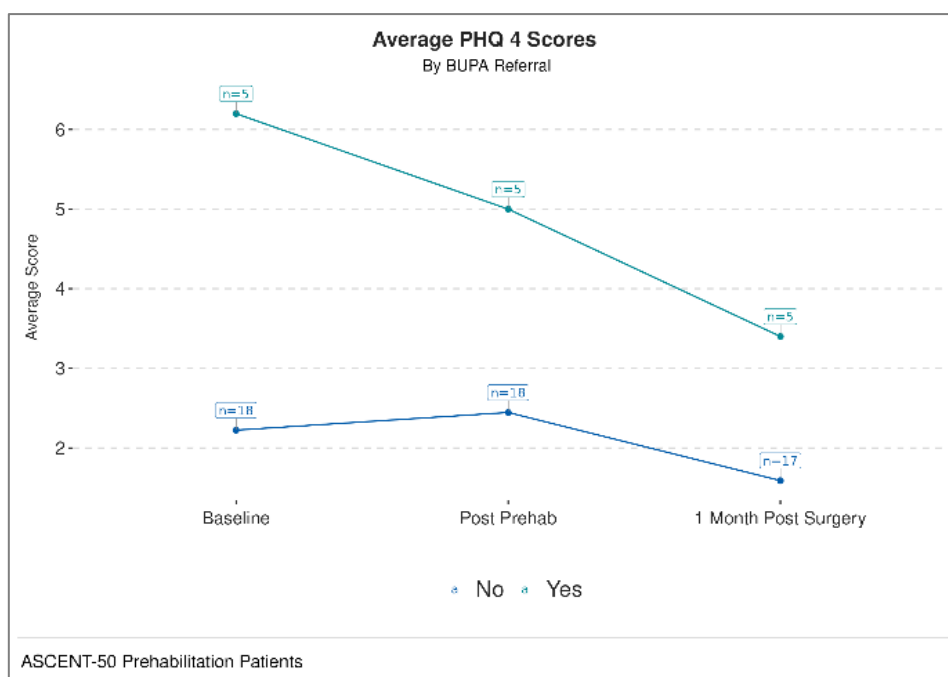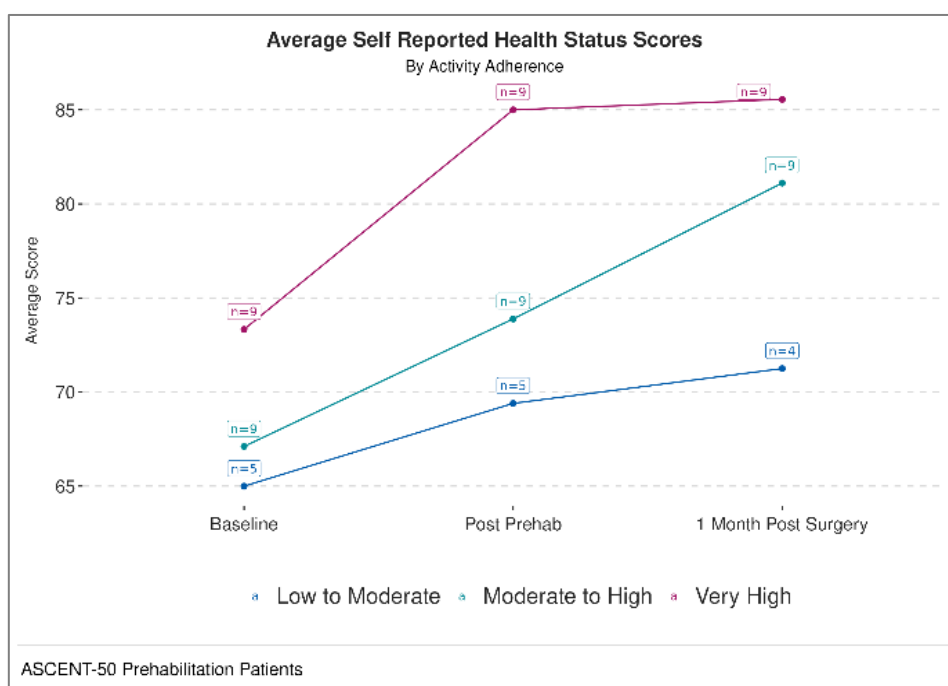
Figure 4. PG-SGA (short form) Screening Scores
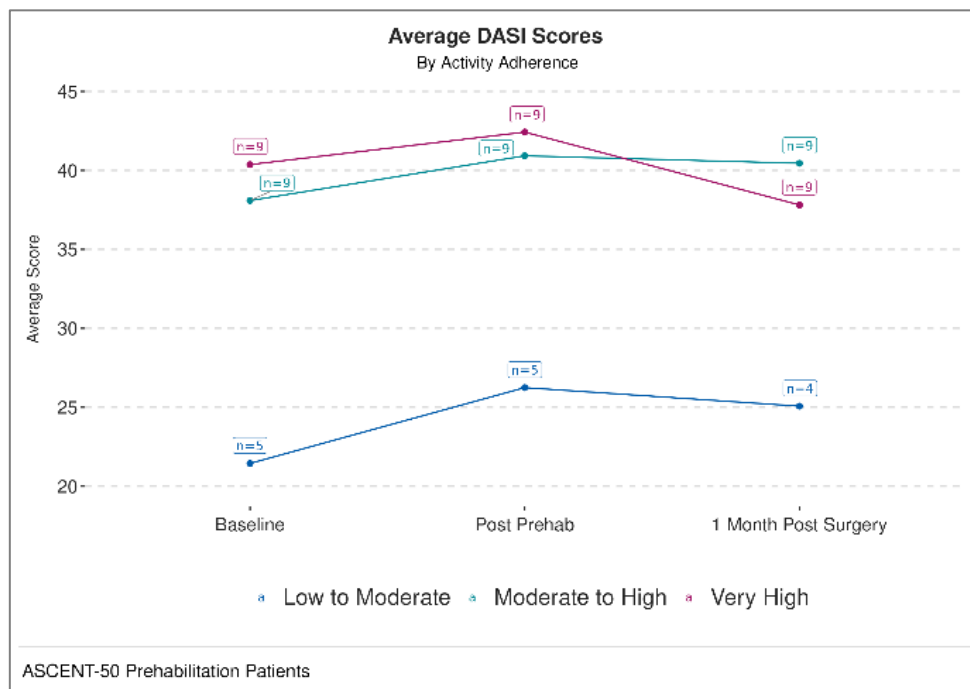
Figure 5. DASI Screening Scores

Figure 6. PHQ-4 Screening Scores

Figure 7. Self-Reported Health Status Scores

Patient Outcomes

> **Important note:** *LOS measurement using the original matched cohort provided a LOS reduction of 3.5 days for prehabilitation patients. However, this utilised matched patients back to 2021 and so did not account for advancements in surgical technique, namely robotic surgery. An alternative procedure-matched cohort was therefore formed with patients from 2023/2024, to control for differences in procedural case mix and patient outliers. This is the cohort that has been used for the analysis in this report and details of both methods are detailed in Appendix C.*
>
> *Whilst this provides a more representative figure of LOS, it has highlighted some issues in procedure recording in the original dataset and subsequent bed costing. Further analysis is therefore being progressed with the colorectal team which will be reported in due course. The figures presented for LOS and Cost Avoidance are therefore the best representation that can be made based on the available data at the time of writing this report.*

Post-operative LOS: Table 3 and 4 present a comparison of procedure standardised post-operative length of stay (LOS) between a prehabilitation cohort and a historical comparison cohort. The prehabilitation group exhibited a lower procedure standardised LOS (8.8 days) compared to the comparison group (9.8 days). **The comparison of procedure standardised LOS suggests prehabilitation patients spent 1 day less in hospital post operation.**

Procedure Name	Prehab Count	Percent of Procedures	Prehab Mean LOS	Prehab Median LOS	Comparison Count	Comparison Mean LOS	Comparison Median LOS
AP Resection	1	5%	46.0	46.0	5	7.8	7.0
Hartmann's Procedure	1	5%	6.0	6.0	12	10.1	9.5
High Anterior Resection	4	20%	14.3	11.0	222	8.2	5.0
Right Hemicolectomy	11	55%	6.2	4.0	68	18.5	13.0
Small Bowel Resection	1	5%	3.0	3.0	19	8.6	7.0
Subtotal Colectomy and Ileo-rectal Anastomosis	2	10%	16.5	16.5	25	6.7	5.0

Table 3. Post-Operative Length of Stay by Procedure Type.

Cohort	Procedure Standardised LOS (per patient)
Prehab	8.8
Comparison	9.8

Table 4. Procedure Standardised Length of Stay.

Reasons for low / moderate adherence: Patients with moderate to high levels of prehabilitation adherence demonstrated improved LOS compared to those with lower adherence. Low to moderate adherence to the prehabilitation program was attributed to a variety of factors. Prominent barriers included significant pre-existing physical deconditioning, often coupled with no prior exercise history, and a high burden of symptoms. These issues were frequently compounded by existing comorbidities,

demanding medical schedules, employment time constraints, and increased caregiving responsibilities.

Perioperative outcomes: The analysis of theatre time metrics revealed differences between the prehabilitation and comparison cohorts. Specifically, the prehabilitation group demonstrated shorter theatre times, with a mean of 240 minutes compared to 348 minutes for the comparison group, and a median of 225 minutes versus 336 minutes, respectively. A similar trend was observed for anaesthesia duration, where the prehabilitation group recorded a mean of 274 minutes and a median of 259 minutes, both lower than the comparison group's mean of 379 minutes and median of 372 minutes. **These findings suggest a possible correlation between prehabilitation and reduced theatre and anaesthesia times.**

30-Day readmissions: Assessment of 30-Day readmissions showed no difference between the cohorts. Both the comparison group and the prehabilitation group recorded a 30-day readmission rate of 5%.

Unplanned ICU Admissions: The rate of unplanned Intensive Care Unit (ICU) admissions was assessed for the cohorts. The comparison group experienced an unplanned ICU admission rate of 7.5%. In contrast, the prehabilitation group exhibited a slightly higher rate, with 10% of patients requiring unplanned ICU admission.

Post-Operative Morbidity and IV Volume: Data suggest that patients undergoing prehabilitation experienced lower post-operative morbidity, as measured by the POMS score. **Further findings also indicate that patients in the prehabilitation cohort received a lower volume of IV fluids compared to the comparison group. See Appendix C3.**

Costings

To determine costs, the difference in procedure-standardised post-operative length of stay between the groups was multiplied by the average ward cost per day, which was derived using the ward-based costing method described in the overview. The overall cohort average (weighted by ward use) was £853. See **Appendix C4** average breakdown.

Prehabilitation has been delivered at a cost of approximately £1,189 per patient, including staffing costs. This is based on the funding amount provided with the aim of providing prehabilitation to 50 patients. Prehabilitation reduced time spent in hospital post operation by 1 day and unplanned 30-day readmissions by 0.3 days per patient. This gives us the below costing information.

Costs avoided (Bed Days Only) = (1.3 * £851.50) - £1,189 = £-82 per patient

<u>Patient Experience</u>

Experience of exercise programme: Overall patients rated their experience of the exercise programme as 4.91 out of 5. Patients felt motivated and empowered and found the structure to be comprehensive and catered to suit their needs. As a result, patients felt fitter, more confident, educated and involved in their care. Some feedback suggested that instructional videos could be helpful to aid home learning.

Experience of surgery guidance and treatment journey: Overall, patients rated their journey and surgery guidance as 4.39 out of 5. There was a lot of positive feedback for the empathy and explanations provided by staff, which helped patients to feel respected and valued. Some patients noted that they appeared and felt more active than other patients on the ward post-surgery. It was suggested that the prehabilitation programme should be made available to more patients and that engagement should start whilst patients are on the waiting list to maximise time and impact.

Head & Neck

Background

This pilot employed a dietitian to provide pre-treatment dietetic assessment for patients with H&N cancer on a surgical pathway. The dietitian linked with the CNS, Speech and Language team and MDT to ensure continuity of care. The main aim of the pilot was to nutritionally optimise patients prior to surgery to minimise weight loss and improve surgical outcomes.

Methodology

Some adjustments to the patient pathway were accommodated to allow earlier completion of the PG-SGA (short form) screening tool at the point of diagnosis. This was completed by the Clinical Nurse Specialist (CNS). The pilot initially recruited major surgery patients only, but this was expanded to some minor surgeries and chemoradiotherapy groups.

Comparison cohorts were constructed to contrast with respective prehabilitation cohorts. Further details on these data sources are provided in **Appendix D1**.

Findings

Screening sensitivity: Comparison of nutritional screening tools within the cohort (n=58) highlights the greater sensitivity of the PG-SGA (short form) in identifying patients requiring nutritional attention (Figure 9). While the MUST screening indicated potential nutritional risk in 34.5% (n=20) of patients, the PG-SGA (short form) provided a more nuanced assessment. The PG-SGA (short form) identified 44.8% (n=26) as testing positive and further delineated 27.6% (n=16) as having a critical need for dietetic review. Cumulatively, the PG-SGA (short form) flagged 72.4% (n=42) of the cohort as either positive or having a critical need, a considerably higher proportion than identified by MUST alone.
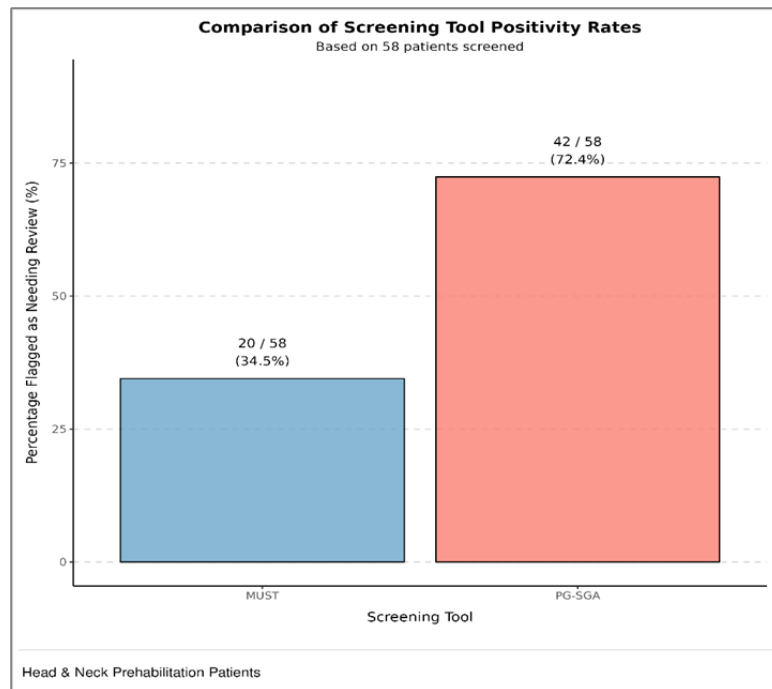
Figure 9. Comparison of screening tool sensitivity.

Patient Volume & Prehab Window: Figure 10. Plot A demonstrates a positive trend of increasing monthly patient volume, this suggests successful referral pathway development and enhanced screening efforts effectively identifying more individuals requiring care. Concurrently, Plot B shows that the average time elapsed between a patient's first contact and treatment is also exhibiting an increasing trend. This lengthening interval supports the aim of establishing a longer prehabilitation window, allowing more time for pre-treatment optimisation.
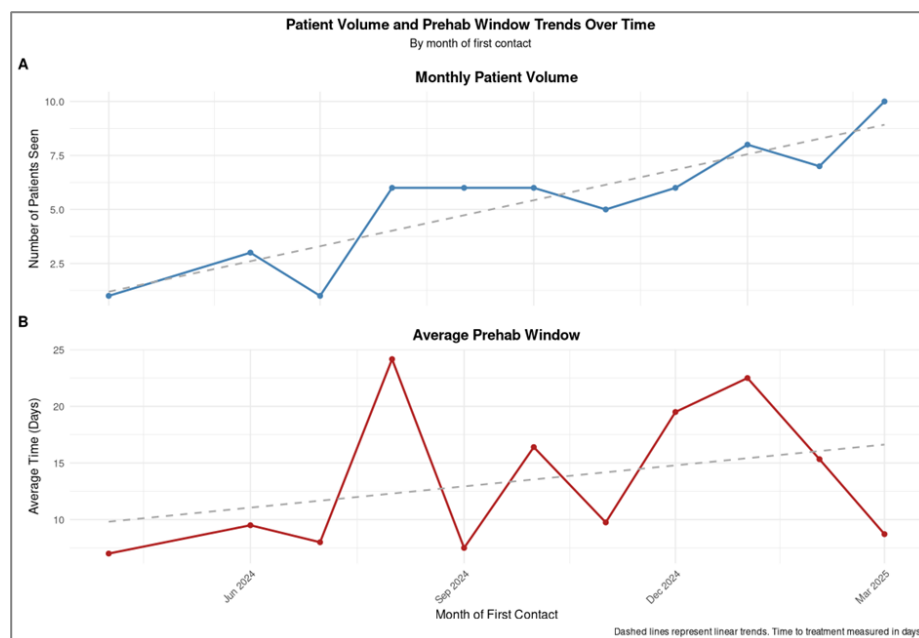
Figure 10. Patient Volume and Prehab Window Trends Over Time

<u>Patient Outcomes</u>

Weight Change: The comparison group experienced a substantially larger average decrease in mean weight (**Appendix D2**). Both groups exhibited overall weight loss, but with differing trajectories (Figure 11). The comparison group displayed a pronounced initial drop, followed by a reduced further change resulting in a total loss of 3.2 kg. Conversely, the prehabilitation group showed a less severe initial decline followed by a continued steady loss resulting in a total mean loss of 1.6 kg.
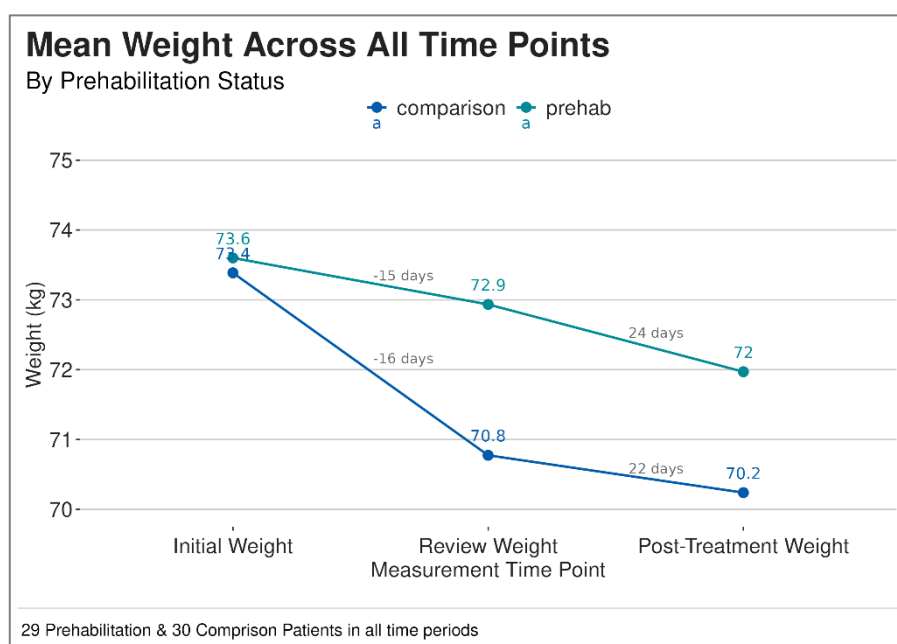
Figure 11. Mean across all time points

Significant weight loss (≥ 5%) from initial to post-treatment measurement was observed more frequently in the comparison group than in the prehabilitation group. **This suggests that fewer patients in the prehab group encountered substantial weight loss across the treatment pathway.**

Post-operative LOS: An analysis model was developed to calculate a standardised average LOS for the comparison group in relation to the prehabilitation group. **When calculated, the comparison cohort exhibited a mean LOS of 15.8 days, while the prehab cohort showed a slightly lower mean LOS of 14.5 days.**

Costings

To determine costs, the difference in procedure-standardised post-operative length of stay between the groups was multiplied by the average ward cost per day, which was derived using the ward-based costing method described in the overview. See **Appendix D3** for breakdown. The overall cohort average (weighted by ward use) was £913.3.

Prehabilitation was delivered at a cost of approximately £486.6 per patient, including staffing costs. This is based on the funding amount provided with the aim of providing prehab to 50 patients. **Prehabilitation reduced time spent in hospital post operation by 1.3 days. This gives us the below costing information**.

Costs avoided = (1.3 * £913.3) - £486 .6 = £700.70 per patient

Staff Experience

The H&N project team undertook surveys to gather feedback from staff on the impact of the pilot work. Staff were asked:
1. Do you feel dietetic input as part of prehabilitation has benefitted your patients?
2. What impact will it have to remove dietetics from the prehabilitation/pre-treatment pathway?
3. Any other comments?

Staff agreed that dietetic input had been highly beneficial for patients and the care team. They highlighted that dietetic input had improved patient preparedness for treatment whilst empowering patients to better understand and manage their own nutrition. Staff members noted stronger MDT collaboration, particularly with Speech and Language Therapy (SLT) and Clinical Nurse Specialist (CNS), as well as reduced burden on General Practitioners (GPs) for the external prescription of nutritional supplements.

Staff identified that removal of the service could lead to poorer patient outcomes, with increased complications, infections and recovery times likely. There would also likely be greater reliance on non-oral feeding. This would risk disempowering patients and lead to lower patient satisfaction as well as increased workload for staff.

Overall staff were very positive about the dietetic input, with the CNS team commenting that it enables them to "feel(s) like we are delivering a gold standard service". Another colleague commented that "the dietetic service is an essential component of the holistic approach needed to deliver safe and effective care for head and neck cancer patients". It was suggested that it would be of benefit to extend this service to oncology patients who are not surgical candidates.

Westerhaven

Background

The Westerhaven and Wester Hailes Medical Practice pilot aimed to support patients in the local community with prehabilitation interventions in advance of cancer treatment. Patients were identified at the point of diagnosis and/or Urgent Suspicion of Cancer (USoC) referral. Patients were screened and provided with exercise classes, emotional support, nutritional advice and other supportive therapy e.g. massage. The aim of this work was to support patients with cancer in a more deprived area of the city who would otherwise experience additional barriers to engaging with prehabilitation and cancer treatment more generally. It was also hoped that earlier identification and engagement with patients in the community would extend the prehabilitation window.

Methodology

Initial data collected by the Health Agency was linked to information from various sources for analysis. These included electronic patient records, surgical details, chemotherapy administration records, radiotherapy treatment data and GP-derived comorbidity information. This enabled the analysis of patient pathways and demographic information. Due to the large variation in cancer types, treatment regimens and patient interaction in the Westerhaven patient cohort a suitable matching cohort could not be created to compare outcomes against.

Findings

Screening Results: For the PG-SGA (short form), initial screening results indicated significant nutritional risk. Approximately 78% of individuals scored 4 or higher, requiring dietitian input or being in critical need, with a substantial 67% falling into the critical need category, highlighting a strong demand for nutritional intervention. For the PHQ-4, patient responses revealed high levels of psychological distress. 54% of individuals experienced moderate or severe levels of psychological distress (scores ≥6), while 77% reported mild or greater levels of distress (scores ≥3). See Table 5.

| Measure	Count	Range	Average	Median
PG-SGA (short form)	9	0 - 23	10.8	11
DASI (METS)	10	3.6 – 9.2	6.3	6.1
PHQ-4	13	0 - 12	5.5	6

Table 5. Westerhaven Screening Results

Patient Pathways: This analysis of patient pathways (n=17-19 with complete data for specific intervals, from a cohort of 31 patients) shows that individuals experienced a quick transition from referral to their initial appointment, with a median time of 5 days

(average 8 days). Subsequently, the median duration from this initial appointment to the commencement of definitive treatment was 34 days (average 48 days). **These findings suggest that a community-based prehabilitation setting can facilitate prompt patient contact, creating a substantial window for the delivery of prehabilitation.**

Patient Outcomes

Appointment Types: Attendance at Westerhaven Prehabilitation services reveals supportive and well-being services such as 'Massage' and regular 'Check in calls' demonstrate the highest uptake, with 67% each. '1 to 1 support' also shows robust engagement at 54%. Specialised interventions, including 'Nutrition,' 'Counselling,' and 'Cancer Exercise Specialist,' each had participation from 46% of patients, indicating a demand for these focused supports. Patients participated in a median of 4 (average 5.4) activities during prehabilitation, with the majority continuing to engage with these activities after its completion. Figure 12 shows the variety of utilised resources.
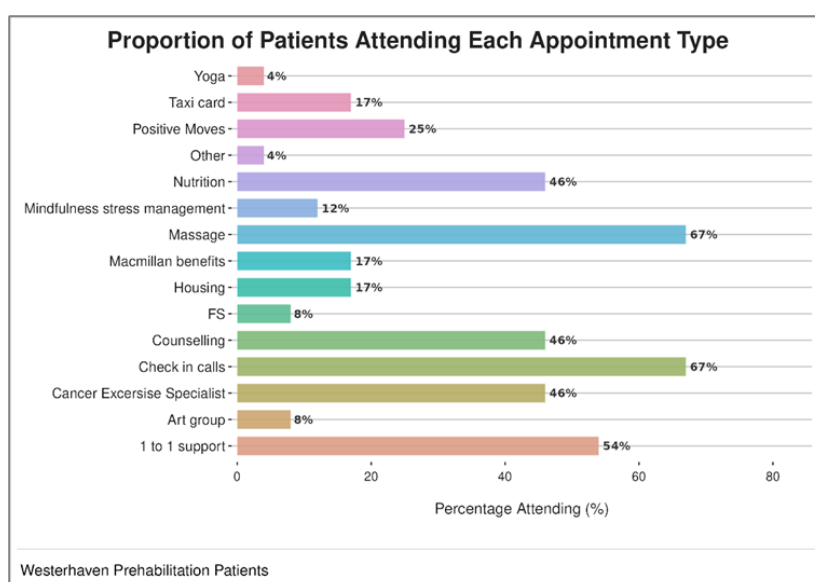
Figure 12. Westerhaven Appointment Types

Tumour Types: The distribution highlighted a concentration of common cancers (Breast, Lung, Colorectal) alongside a diverse range of less frequent malignancies within this prehabilitation program.

GP Comorbidities: Analysis of GP diagnosis records, using high-level categories, reveals a substantial and varied comorbidity burden within the Westerhaven patient cohort. This mix of multiple, varied health problems, especially the significant mental health burden alongside serious physical conditions, creates unique challenges for the Westerhaven prehabilitation program. Consequently, the program needed to be highly personalised, to effectively meet diverse patient needs.

<u>Patient Experience</u>

Support: Figure 13 presents a summary of feedback from twelve participants (N=12) regarding key support metrics following involvement in the Westerhaven prehabilitation program. Overall, these results indicate a highly positive reception to the support offered through the Westerhaven program.
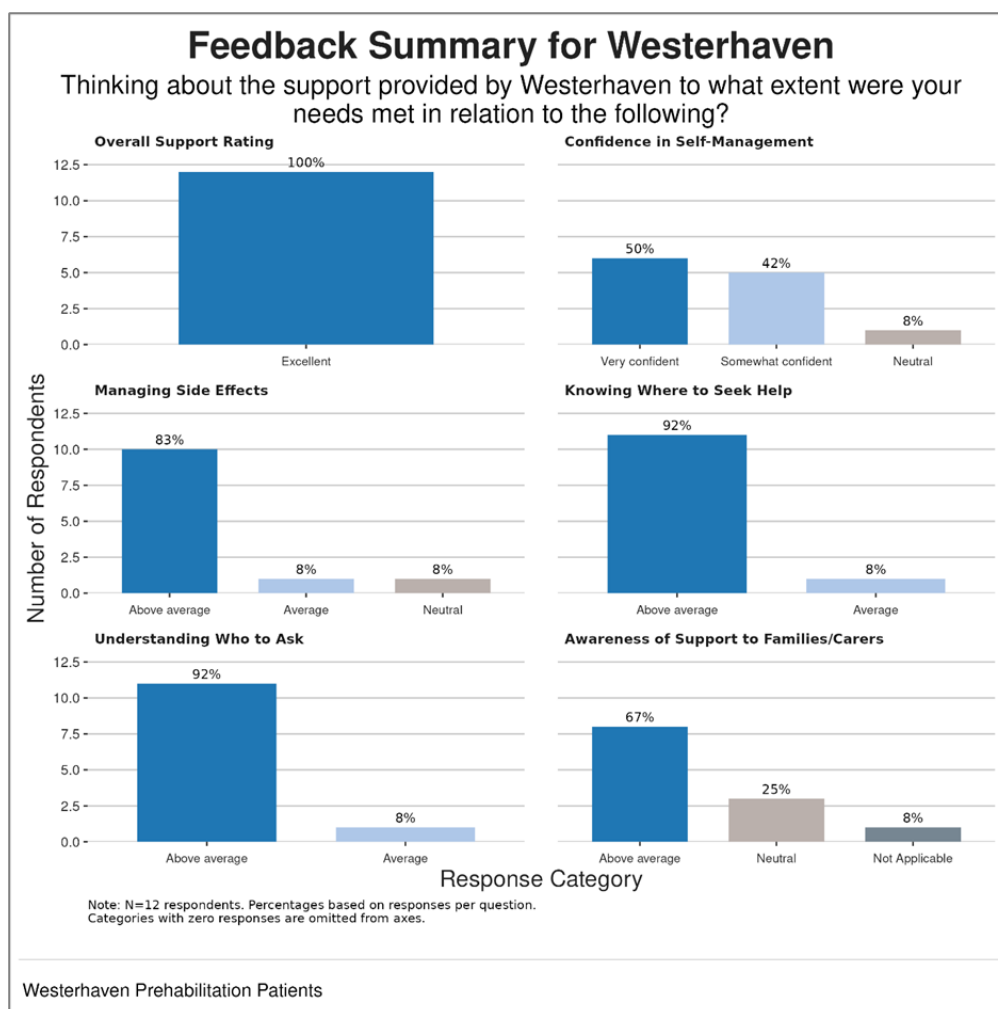
Figure 13. Westerhaven Evaluation Form (Support)

The evaluation of the Westerhaven prehabilitation program revealed overwhelmingly positive feedback across several dimensions. Participants unanimously felt involved in decisions about their care, with 83% also agreeing that the program effectively coordinated support and facilitated communication. Confidence in managing concerns post-program was highest for emotional issues (92%), followed by family/relationship issues (67%), physical condition (58%), and practical concerns (58%), while financial and lifestyle concerns showed room for improvement.

Free-text responses emphasised the value of personalised support, particularly counselling and mindfulness sessions, with staff praised for their availability and empathy. Suggestions for improvement focused on increasing staffing and promoting the service more proactively, though most participants expressed high satisfaction. Among the 16 non-respondents, reasons included lack of initial engagement, existing

support systems, minimal service use, poor health, or incapacity, with only one case due to death (see **Appendix E2 and E3** for further survey analysis).

<u>Patient Case Studies</u>

To highlight the benefit of the community Westerhaven project and the impact the services had on individual patients, the team collaborated with patients to write four case studies which can be viewed in full in **Appendix E4**.

The Westerhaven project provided holistic, community-based support to cancer patients facing complex challenges, including emotional distress, financial hardship, and social isolation. Through personalised care plans developed from Holistic Needs Assessments and prehabilitation (prehab) assessments, patients like Miles, Ivan, Tomasz, and Sarah received tailored interventions such as counselling, nutritional guidance, exercise classes, massage therapy, and financial aid. These interventions led to significant improvements in emotional and physical wellbeing, as reflected in reduced PHQ-4 scores, for example, Miles's score dropped from 6 to 2 and Ivan's from 10 to 4. Patients reported feeling more resilient, supported, and empowered to manage their diagnoses and recovery. The project's embedded, flexible approach ensured timely, compassionate care that adapted to each patient's evolving needs, often reaching individuals who might not have accessed traditional services like these, meeting the objectives of providing equity for all patients.

Selected Quotes Highlighting Patient Sentiments

1. **Miles**:
   "I didn't think counselling was going to be helpful, but it has surprised me and allowed me to put things into perspective. I didn't want to burden my friends, and this support has given me a space to be honest about my feelings."
2. **Ivan**:
   "I appreciate the constant support, help, and attitude. The unlimited help and the desire to provide as much support, assistance, resources, and advice as possible."
3. **Tomasz**:
   "I did not know all these supports existed or that someone would be able to make referrals on my behalf. It has taken the pressure off me when I was going through a difficult time."
4. **Sarah**:
   "I have been offered the best support and help imaginable."

NHS Board Level Scoping and Mapping Projects

<u>Background</u>

The number of cancer diagnoses in each SCAN board is shown in Table 6.

Table 6. Cancer Diagnoses across the SCAN NHS Boards for 2022.

SCAN board	Cancer Incidence 2022	Total Population (2022)
NHS Lothian	5373	905,800
NHS Borders	861	116,820
NHS Dumfries and Galloway	1121	145,770
NHS Fife	2447	371,390

Source for Cancer Incidence: PHS - Annual Cancer Incidence - Datasets - Scottish Health and Social Care Open Data

Source for Population : National Records of Scotland - Population Estimates - Datasets - Scottish Health and Social Care Open Data

The aim of the SCAN Board Prehabilitation mapping (NHS Borders, NHS Fife, NHS Dumfries & Galloway), was to scope current prehabilitation service availability across the region, identify gaps and produce recommendations for service improvement which would allow early access to prehabilitation interventions. Prehabilitation service scoping information from the Lothian Prehabilitation and ERAS Programme and Lothian pilot studies was used for the overall SCAN map.

Funding was provided to NHS Borders for GP Lead and project support resources, with the funded SCAN Prehabilitation Project Manager role providing support to each Board. Each board project progressed differently depending on funding arrangements and local governance structures. This is described in brief below.

NHS Borders

The project was progressed in three key stages:
1. Scoping - fully scope existing "prehabilitation" in NHS Borders and identify any gaps.
2. Options Appraisal – development of options for service developments to be considered by the Project Board and wider Cancer Services.
3. Production of recommendations for a prehabilitation service, delivered within current resources.

A project team was established to engage with stakeholders, outline objectives and deliver the desired outcomes and recommendations for improvement in existing services. Connection with the Macmillan SCAN Project Manager ensured communication and shared learning from other SCAN NHS board projects.

The project reported through the NHS Borders Cancer Services Group and Cancer Strategy Board for oversight and approval.

The project commenced from March 2024 which allowed early progress with scoping and implementation of recommendations by June 2025. This included the additional aim to implement prehabilitation screening into existing pathways.

NHS Fife

To ensure stakeholder involvement, a dedicated 'Short Life Working Group' (SLWG) was established and chaired by the Fife Lead Cancer Nurse. This group included key cancer service stakeholders representing the three main prehabilitation modalities and representatives of third sector parties. The aim of third sector inclusion was to identify key areas of collaboration with the NHS.

This SLWG met monthly and worked through the following steps:
1) Establish objectives
2) Provide input on existing prehabilitation service
3) Conduct patient and staff surveys to gather baseline data on prehabilitation awareness and understanding
4) Outline the objectives of 'Test of change' in Head and Neck Cancer pathway
5) Review data and develop the final recommendations with outcome measures
6) Report recommendations through local governance groups for approval

Outputs from the SLWG were reported through the NHS Fife Acute Cancer Service Delivery Board, Cancer Senior Leadership Team and Cancer Governance and Strategy Team.

NHS Dumfries and Galloway (D&G)

NHS D&G engaged a large stakeholder workshop led by the Cancer Service Manager. Additional project support was provided by the local Project Management Office (PMO). After the initial stakeholders meeting, a smaller working group was established, with prehabilitation modality leads identified. This group met monthly and worked through the following objectives:

1) Scoping - fully scope existing "prehabilitation" services in NHS D&G and identify gaps.
2) Options Appraisal – development of options for service developments to be considered by the Short Life Working group.
3) Production of recommendations for a prehabilitation service, delivered within current resources

The project group reports through the D&G Cancer Operations Group and Cancer Steering Group.

Methodology

Although the SLWGs were similar, each NHS board took a different approach to who was included in those groups and their communication plan. **Appendix F1** gives an overview of the groups and the benefits of the approach taken.

Stakeholder engagement methods included workshops, interviews, surveys and shared spreadsheets. A breakdown of their use across the different NHS boards can be seen in **Appendix F2**.

Services were defined by the three main pillars of prehabilitation, plus alcohol and smoking cessation, often considered as part of the prehabilitation interventions. Mapping information was collated into a standard format from Board outputs. Further consultation and interviews were conducted to ensure accurate representation of findings.

Service mapping information was collected in the following ways:

1) Information gathered by surveys local board stakeholder workshops
2) Direct input from Board stakeholders
3) Stakeholder review at workshops and working group meetings
4) Stakeholder interviews to complete gaps in service detail

The service scoping and mapping template outlined the different modalities at the different intervention tier level and was separated into NHS services, third sector services and those services provided outside the board, as in regional or centralised, either by NHS or third sector/other.

A summarised version of these services across all SCAN NHS Boards can be seen in Table 5. A recommendation for how future phases of mapping can be taken forward is outlined in Table 7.

Findings from the SCAN Board Service Scoping and Mapping

Table 7. This table shows a high-level summary of the detail from the scoping and mapping exercise performed across the SCAN region.

Intervention/Tier	Board	Universal			Targeted			Specialist		
		NHS	Third Sector	Outside Board	NHS	Third Sector	Outside Board	NHS	Third Sector	Outside Board
Emotional and Well-being	Lothian	* (blue)	(green)	(grey)	(blue)	(green)	(grey)	(blue)	(green)	(grey)
	Borders	* (green)	(green)	(grey)	(blue)	(red)	(green)	(red)	(red)	(blue)
	Fife	* (blue)	(green)	(grey)	(blue)	(green)	(grey)	(blue)	(green)	(grey)
	D and G	* (blue)	(green)	(grey)	(yellow)	(green)	(grey)	(blue)	(red)	(grey)
Physical Activity	Lothian	* (blue)	(green)	(grey)	(purple)	(green)	(grey)	(red)	(red)	(grey)
	Borders	* (blue)	At patient cost (yellow)	(green)	(red)	At patient cost (yellow)	Limited cancer types (purple)	(red)	(red)	(grey)
	Fife	* (blue)	(green)	(grey)	(red)	At patient cost (yellow)	(grey)	(red)	(red)	(grey)
	D and G	* (blue)	(green)	(grey)	Limited cancer types (yellow)	(grey)	(grey)	Limited cancer types (yellow)	(red)	(grey)
Diet and Nutrition	Lothian	* (blue)	(green)	(grey)	Limited cancer types (yellow)	(red)	(grey)	(blue)	(red)	(grey)
	Borders	* (blue)	(green)	(green)	(blue)	(red)	(grey)	(blue)	(red)	(grey)
	Fife	* (blue)	(green)	(grey)	Limited cancer types (blue)	(red)	(grey)	Limited cancer types (blue)	(red)	(grey)
	D and G	* (blue)	(red)	(grey)	Limited cancer types (blue)	(red)	(grey)	Limited cancer types (blue)	(red)	(grey)
Smoking and alcohol cessation	Lothian	* (blue)	(green)	(grey)	(black)	(black)	(black)	(black)	(black)	(black)
	Borders	* (blue)	? (red)	(grey)	(black)	(black)	(black)	(black)	(black)	(black)
	Fife	* (blue)	? (red)	(grey)	(black)	(black)	(black)	(black)	(black)	(black)
	D and G	* (blue)	(green)	(grey)	(black)	(black)	(black)	(black)	(black)	(black)

Key	Description
Green	Service available and currently capturing prehabilitation patients, has extra capacity, and some improvements can still be made to referral routes
Yellow	As above but only available for some tumour sites or at cost to patient
Red	Service not available at intervention tier
Blue	Service available but not accessible to prehabilitation patients and/or process improvements needed, included to referral routes
Purple	Service available and currently capturing prehabilitation patients but will end soon due to funding
Grey	Not applicable

* Services provided by the NHS at the 'Universal' tier level include prehabilitation discussions and advice given by cancer nurse specialists, consultants and other healthcare professionals. Stakeholder engagements methods highlighted the gaps in awareness and education amongst staff and inconsistency in prehabilitation advice offered. Staff awareness and education has been highlighted as a key area for improvement and has been included in the recommendations. For this reason, these services are blue. The national prehabilitation website offers universal prehabilitation advice to all patients but requires consistent signposting. https://www.prehab.nhs.scot/

Key Findings:
- Many prehabilitation services across all modalities/pillars are provided by third sector and not NHS
- Targeted and specialist services are limited in all service pillars/modalities across all boards
- Some cancer tumour sites have more need than others for targeted and specialist services and where intervention considered 'essential' these are included in patient pathway by NHS
- Even when NHS services are present, referral routes and processes could be improved to increase uptake and access
- Differences in definitions of service level tier requires further national guidance

Overview of Outcomes and Recommendations from NHS Board Prehabilitation Projects

As each board approached the prehabilitation project in different ways the outcomes of each board project differ in the format of recommendations and actions as well as the sustainability plan and next steps. See Table 8 below.

Table 8. Summary of Board recommendations and next steps/sustainability plans.

Board	Recommendations	Next Steps/Sustainability
NHS Fife	1. Strengthen referral pathways to Maggie's universal prehab workshop 2. Create a Central Directory of Prehabilitation Services in Fife 3. Expand Screening Implementation Based on H&N test of change 4. Assess demand and resource needs for targeted and specialist NHS Wellbeing Services (diet, nutrition, and physical activity) 5. Develop a staffing proposal for prehabilitation service expansion 6. Establish evaluation and data collection mechanisms 7. Enhance staff and patient knowledge on prehabilitation through education	1. Escalating recommendations through local governance groups. 2. Continue SLWG to progress actions. 3. Development of local test pilots. 4. Further collaboration with 3rd sector partners.
NHS Borders	1. Informing all patients referred with suspected cancer about prehabilitation. 2. Continuing existing ad hoc support. 3. Adding the national prehab website to the SPOC leaflet. 4. Including prehab information in the SPOC cover letter. 5. Implementing screening via the national tool, with onward referrals as needed. 6. Develop referral processes with SPOC, Wellbeing Service and LIVE Borders.	1. Awareness sessions using existing resources from Macmillan and other sources, 2. Two-part training on the national screening tool. 3. Collation of screening and pathway data to inform a business case for service expansion. 4. Establish SPOC prehab screening with ICJ follow up (HNA) where required. **See Appendix G for SBAR and evaluation.**
NHS Dumfries & Galloway	Currently in development.	1. Continue SLWG to gather further data to inform a revised options appraisal process (further 6 months). 2. Undertake options appraisal with local stakeholder group. 3. Develop and progress local recommendations.

Future Mapping Phases

The completed mapping work has provided baseline information to develop initial recommendations for each board. Ongoing input is required to ensure ongoing accuracy and to add further 'layers' of detail onto the map. Further proposed phases of mapping are described in Table 9.

Table 9: Proposed phases for ongoing mapping.

Mapping layer	Methods	Details gained	Limitations	Status
1	• Workshops with stakeholders, • Stakeholder working group formed • Staff Surveys • 1:1 interview with service providers • Modality/pillar leads identified to include service details • Estimates of future service needs based on board diagnoses numbers	• NHS, Third sector, outside board services • Limited usage and capacity data • Basic level details of referral routes • Recommendations for referral route improvement • Recommendations for improvement within existing resources	• Referral routes difficult to map and missing timings • Alignment with frameworks missing • Historic services not considered prehab missed • Reliant on engagement with correct people • Limited detail due to diffuse nature of current services • Definitions of the intervention level can differ between boards	Complete
2	• Interviews with individual cancer tumour site clinical teams • Detailed mapping of referral routes of all services • Quantify prehab workforce • Current wait times reviewed and documented • Plan and costing of 'tests of change' • Establish data monitoring processes for ongoing evaluation	• Differences between tumour site pathways • Identification of service gaps with guidelines • Detailed referral route and identification of service evaluation measures • Costs of 'Test of change' projects designed to answer operational questions	• Informal referral routes hard to identify and detail due to inconsistencies • Training level of workforce and alignment with frameworks will need further effort	In progress for NHS Borders
3	• Using information from test of change, estimate detailed workforce and funding requirements per board • Mapping of current staff training across modality/pillar workforce and frameworks • Incorporation of digital tools to support delivery (e.g. Trak screening tool)	• Detailed outline of service gaps • Workforce training requirements • Business case for expanded SCAN prehabilitation services • Ongoing data monitoring and evaluation established	• Details of implementation of services may not be clear and will require full engagement of all tumour site clinical teams	Not started

Key considerations include assessing data from screening implementation to determine service area need, as well as staff training requirements for expanding

existing services beyond Universal levels. Staff training requirements will be guided by key frameworks including 'Nutrition Framework for People Affected by Cancer' and 'Psychological therapies and support framework for people affected by cancer', as well as the Macmillan 'Principles and guidance for prehabilitation within the management and support of people with cancer document'.

Prehabilitation Screening - National Pilot and Local Education

SCAN prehabilitation projects provided screening data into the national prehabilitation screening pilot. Using national screening pilot data and 2022 diagnosis figures, estimates of patients needing targeted or specialist support have been calculated for the SCAN region (see Table 10). However, these estimates should be interpreted with caution, as the pilot study focused on specific cancer types, and patient needs can vary considerably across different cancers—potentially leading to inflated percentages. Nonetheless, these figures provide a useful indication of the potential upper limit of service demand. More accurate figures will be generated in each NHS Board once screening has been implemented and these figures will be collected and regularly reviewed to inform clinical demand.

Extrapolated Annual potential numbers of patients for each pillar intervention tier in SCAN region				
Board Cancer Incidence 2022	Intervention Level	Emotional Wellbeing	Physical Activity	Diet and nutrition
NHS Lothian **5373**	Universal	**4728** (88%)	**3224** (60%)	**3492** (65%)
	Targeted	**376** (7%)	**1881** (35%)	**1075** (20%)
	Specialised	**269** (5%)	**269** (5%)	**806** (15%)
NHS Borders **861**	Universal	**758** (88%)	**517** (60%)	**560** (65%)
	Targeted	**60** (7%)	**301** (35%)	**172** (20%)
	Specialised	**43** (5%)	**43** (5%)	**129** (15%)
NHS Fife **2447**	Universal	**2153** (88%)	**1468** (60%)	**1591** (65%)
	Targeted	**171**(7%)	**856** (35%)	**489** (20%)
	Specialised	**122** (5%)	**122** (5%)	**367** (15%)
NHS D&G **1121**	Universal	**986** (88%)	**673** (60%)	**729** (65%)
	Targeted	**78** (7%)	**392** (35%)	**224** (20%)
	Specialised	**56** (5%)	**56** (5%)	**168** (15%)

Table 10. Annual predicted numbers of patients for each pillar intervention tier in SCAN region

A key barrier to implementing prehabilitation services across NHS boards was limited understanding of prehabilitation screening and its role in identifying clinical need. To address this, the SCAN project team and national colleagues developed targeted training, including a virtual session.

In NHS Borders, training was delivered in two parts: Part 1 explained the rationale for screening and shared examples from other boards; Part 2 focused on how to use and interpret the screening tools. After Part 1, the percentage of staff confident in explaining screening rose from 14% to 42%.

Interactive questions helped maintain engagement and gather feedback on local implementation plans, with staff expressing optimism about adopting screening (see **Appendix F3 and F4** for results).

Discussion

<u>Clinical/Service Outcomes</u>

Key findings:

- **Reductions in Length of Stay (LoS) were noted across SCAN pilots – range 1 - 2.5 days.**
- **Repeat screening demonstrates improved outcomes with higher levels of patient prehab engagement.**
- **Reduction in Secondary care contacts in Lung pilot, particularly for inpatient admissions.**
- **Improved 6-month survival rates in lung prehab cohort compared to control (61.1% vs 47.7%).**
- **Improved weight maintenance in prehab cohorts.**
- **Positive patient and staff feedback across projects, highlighting the essential nature of prehabilitation in supporting and coordinating holistic patient care.**

Outcomes from patient reported measures showed improvements across all modalities of prehabilitation in the Colorectal pilot. Patients with higher levels of adherence tended to demonstrate better outcomes in repeated screening throughout treatment.

While screening scores tend to drop after treatment across all groups, those in prehabilitation cohorts, and with higher levels of adherence, were starting from a higher baseline and maintained higher scores post treatment. Nutritional screening in the Head and Neck and Lung pilots showed improved weight maintenance for patients in prehab cohorts.

Reductions in LOS were noted across the NHS Lothian pilots. In colorectal, an improved post-operative LOS was noted for patients with higher adherence to prehabilitation.

There were significant benefits in average LOS per admission noted within the Lung pilot (reduction of 2.5 days in 2024/25 prehab cohort compared to 2023/24 comparison). Like Colorectal, greater reductions in LOS were observed for patients who completed all prehabilitation appointments. Reductions in secondary care admissions were noted, particularly for inpatient admissions. Improved 6-month survival rates were also demonstrated for the prehabilitation cohort (61.1% vs 47.7%).

Feedback from across the projects shows that prehabilitation interventions empowered and enabled patients to feel involved in their care. Prehabilitation provision aided care coordination between MDT professionals and allowed patients to communicate needs effectively. The service benefit extended beyond acute teams and into primary care with there being a reduced requirement for GPs to prescribe nutritional supplements through the H&N and Lung pilots.

Powerful Westerhaven patient stories showed that patients greatly valued the variety of offerings through the Westerhaven programme and came to rely on that service through their care journey. This highlights the importance of engaging with Third Sector and other non-NHS services to provide holistic prehabilitation that is adaptable to the changing care needs of patients, regardless of where they are.

Patients and staff both highlighted the requirement to secure existing prehabilitation resources to ensure the continuation of services, as well as the need to grow these offerings to reach more patients.

Funding and Sustainability

Key findings:

- **Cost avoidance through LoS reduction demonstrated in Lung and H&N pilots.**
- **Aim to continue limited unfunded development work within Boards, in particular, improved provision and utilisation of universal prehab resources.**
- **No ongoing local recurrent funding identified for existing projects. Disruption to prehabilitation services occurring due to lack of consistent funding.**
- **Additional recurring funding essential at a national level to create and maintain sustainable pathways, and to allow full realisation of benefits from this first phase of work.**

The focus of the prehabilitation work was on delivering positive patient outcomes and not necessarily to demonstrate cost savings through prehabilitation delivery. However, and understanding of cost implications is necessary to develop efficient models of service delivery. Cost savings have been calculated across the pilot projects where it has been possible to apply PLICS data to treatment pathways. The Lung and H&N pathways demonstrated cost avoidance through reductions in LoS (range £437.90 – £700.70). The Colorectal pilot was close to being cost neutral, despite being a comprehensive and comparatively expensive delivery model. It is anticipated that growth and maturity of prehabilitation services would also lead to increases in operational and financial efficiency over time. Additionally, it is anticipated that further cost avoidance can be found in theatre and ICU time, but further data is required to confirm this.

No recurrent funding has been identified for these pilots. Non-recurring funding is being used to recommence the Lung and H&N pathways, with the Colorectal pathway now terminated until further funding can be identified. Despite a lack of further funding, the Westerhaven team will continue to offer prehabilitation support, albeit without the exercise classes and a slight reduction in capacity.

Work within the Boards will be continued by local working groups to enhance the initial service mapping. Existing work has been based on cost neutrality due to strains on local funding, however Boards will look to identify where additional funding could support expansion of existing resource. These can be advanced through local governance structure to request funding as well as exploring external funding opportunities both locally and nationally.

These findings alongside the positive patient outcomes demonstrate that effective prehabilitation can be delivered in a sustainable way. This provides reassurance that further investment in prehabilitation pathways will yield positive returns for service areas, if set up and supported appropriately. This also provides incentive to expand services where possible to offer prehabilitation to a wider cohort of patients.

<u>Screening</u>

Key findings:

- **Changes to existing pathways are required to implement effective prehabilitation screening e.g. personnel/team doing screening, use of clinic time, sending forms in advance for self-completion.**
- **Consideration for use of PG-SGA (short form) over MUST in the prehabilitation setting to ensure 'at risk' patients are identified.**
- **Screening near the point of USoC referral and in the community provides significant gains in the length of time available for prehabilitation (6 weeks).**
- **It should be expected that 35-40% of patients diagnosed with cancer will benefit from physical activity and nutritional prehabilitation at targeted/specialist level, with 12% requiring targeted/specialist emotional wellbeing support.**

Screening pathways were put in place across the pilots to ensure that patient requirements for prehabilitation were assessed accurately and at an early stage of the pathway, to maximise the time and impact of prehabilitation delivery. The Colorectal and Westerhaven pilots utilised the national screening tools (DASI, PG-SGA (short form), PHQ-4).

The Colorectal project screened patients for inclusion in the ASCENT 50 pilot, but this was part of a wider screening pathway that was put in place. The service sent out self-assessment screening forms and asked to bring them completed to their clinic appointment. This allowed early assessment for the level of intervention required (universal, targeted, specialist).

The Head and Neck project also made adjustments to patient pathways in order to improve the length of prehab window. Screening was carried out by the CNS during their first clinic contact with patients, which increased the time for prehab from 10 to 17 days on average, with some patients benefitting from up to 4 weeks of input prior to treatment.

Use of the PG-SGA (short form) tool in the Head and Neck pilot demonstrated a higher sensitivity for identifying patients requiring dietetic input, particularly those in critical need, compared to the conventional MUST tool. The MUST tool is widely used as the primary tool for nutritional screening and is built into national guidelines and QPIs. Therefore, there remains a requirement to continue using the MUST tool and any use of PG-SGA (short form) would be alongside and not instead of MUST, which creates duplication of workload. This raises the consideration of whether the PG-SGA (short form) should be made the screening tool of choice within these settings, and if so, what steps would be required locally and nationally to make this common practice.

Being embedded within the local community, the Westerhaven team were able to screen patients at initial appointment an average of 48 days (6 weeks) prior to treatment. This was significantly longer than the other, acute based pilots.

Data from the national screening pilot has provided a baseline expectation for targeted and specialist prehabilitation demand. This suggests that the targeted/specialist requirements are 12% for emotional wellbeing, 40% for physical activity and 35% for diet and nutrition.

Staffing Roles

Key findings:

- **Prehabilitation specific job roles are essential to effective delivery and coordination of prehab services.**
- **Prehab Coordinators provide a central role in identifying patients, screening and providing early intervention.**
- **Understanding required of where existing NHS staffing roles can be used to provide prehabilitation support, and where additional specialised roles are required, e.g. remit of physios and CEPs.**
- **Staff training to be assessed and provided where necessary.**

The pilots utilised a range of different staffing roles to deliver prehabilitation interventions. In addition to existing job roles, new prehabilitation specific roles were created to support service delivery. This included the Prehabilitation Coordinator role within the Colorectal project. This role identified, screened and directed patients to appropriate services from an earlier point in the pathway. This role was essential to providing earlier intervention to provide optimisation for treatment. Without this role, screening of all new patients cannot be met for moderate/large volume services.

The Clinical Exercise Physiologist role was a new role within NHS Lothian. A collaborative partnership with Napier University was established to provide CEP resource to the Colorectal project. An NHS Lothian job description has been developed to create a sustainable route to future recruitment of CEP posts, with the first such Agenda for Change (AfC) post starting within the Gynaecology service in March 2025.

Whilst services may look to use existing staffing resource like physiotherapists and dietitians to develop prehabilitation service pathways, the remit and limitations of roles should be built into service planning requirements. For instance, the CEP role is highly specialised and professionals are trained to engage in motivational interviewing with patients. Services should therefore ensure that appropriate roles are being used to staff prehabilitation pathways, and that training needs are being assessed and met.

Prehabilitation Service Availability

Key findings:

- **Mapping of SCAN services has shown current availability and gaps in service provision. This highlights limited provision of targeted and specialist support for physical activity and diet & nutrition across SCAN Boards.**
- **Further work required to develop pathways which support efficient use of existing services.**
- **Further work to identify and prioritise potential regional solutions to current gaps.**
- **Additional staff engagement and education required to increase staff awareness and understanding of prehabilitation services.**
- **Third sector and community partnerships are key to the delivery of cancer prehabilitation, investigation into future collaborations is under way.**
- **Equity of service access needs to be monitored through rural virtual offerings and further financial support for services which require patient subsidence.**

In general, prehabilitation service availability for universal intervention in each prehabilitation pillar was available in all four SCAN boards, largely though the Third Sector. Maggie's centres provide a session dedicated to prehabilitation and often runs below capacity. Travel to Maggie's centres in Edinburgh and Kirkcaldy can be a barrier for patients in accessing support. The delivery of a remote virtual session is being scoped to support patients in rural communities.

Where NHS services do exist, unclear referral routes and long wait times often prevent timely access within the prehabilitation window. More detailed mapping is needed to refine pathways and expand capacity for targeted and specialist care. Currently, only emotional and well-being support is consistently available at higher tiers, primarily through Maggie's. In Borders, this requires travel to Edinburgh, which can be a barrier.

As part of the mapping work, a list of the prehabilitation third sector providers was compiled. The value of the contribution of third sector to prehabilitation services cannot be understated, as they currently supplement NHS services at all intervention tiers across all pillars. Many of the targeted physical activity offerings such as 'Fife Sports and Leisure Trust Active Move programme' are heavily subsidised, but still require a cost of £4.20 per session for 12 sessions, which creates a barrier for some patient groups. Further funding for these services could ensure further equity of services.

Collaborations and partnerships with third sector organisations can be used to support specific cancer site groups, as seen in other regions outside of SCAN. In Dundee, Prostate Scotland collaborated with the urology department and Maggie's to deliver a Prostate cancer specific prehabilitation workshop. Initiatives like this can be used to increase numbers of patients with specific cancer types and can hopefully be delivered without the need for much extra resource from the NHS. In order to investigate future collaborations, a Third Sector survey was designed and distributed by the Scottish Cancer Coalition who have 31 cancer related Third sector organisation members. At this time, only two members replied to the survey, but this route to collaboration will be expanded in the future work.

Equity of Service

Key findings:

- **Westerhaven project suggests benefit to community approach in identifying and engaging patients in more deprived areas, with greater representation of deprived areas in Westerhaven cohort compared to other acute pilots.**
- **All pilots engaged with patients across deprivation categories but to different levels of distribution across tumour types.**
- **Further work required to understand deprivation profiles of control patient cohorts.**
- **Further Community/Primary Care engagement key to ensuring equality in prehabilitation engagement.**

SIMD data (Figure 14) shows that patients across all deprivation categories attended prehabilitation services. The Westerhaven project served more patients from deprived areas that the other pilot projects. There are many factors that can be impacting these findings including the co-location of Westerhaven within deprived communities. Future analysis of prehabilitation and control cohorts is necessary to assess if improvements in service access equality are required for certain tumour groupings.
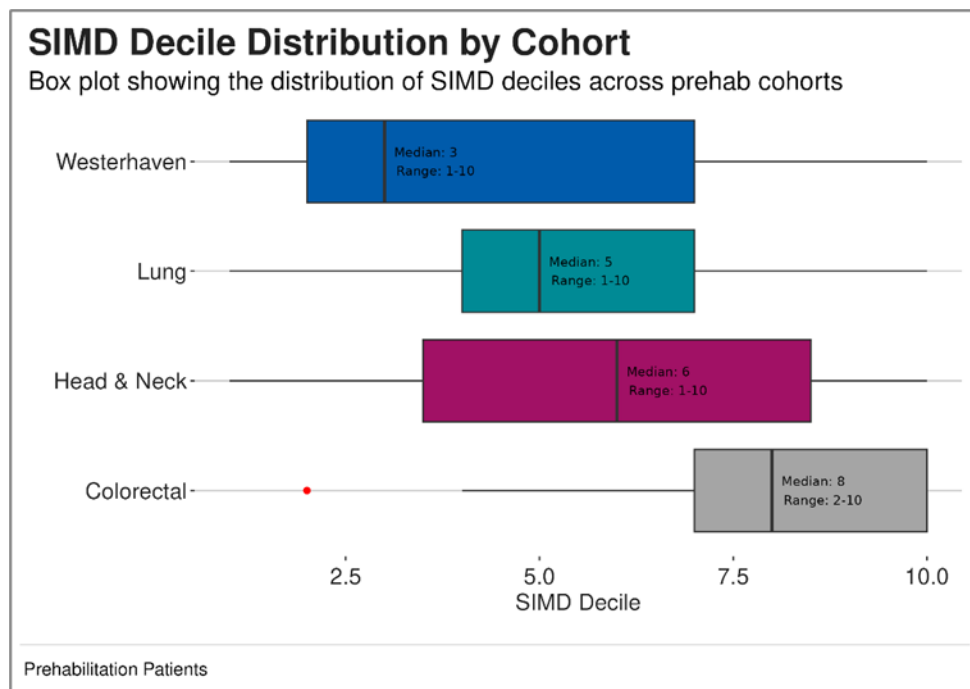
Figure 14: SIMD distribution across each SCAN Prehabilitation pilot study.

The Westerhaven case studies highlight the challenges and benefits of community prehabilitation engagement for deprived communities. This demonstrates the requirement for targeted community support alongside acute prehabilitation service provision. In turn this suggests the requirement for clear service and communication pathways between acute and community settings, to ensure continuity for patients.

Additionally, mapping work performed in NHS Fife with Maggie's, the tumour type diagnosis of patients attending their centres. Patients with prostate, HPB and skin cancer had the highest representation at the Maggie's prehabilitation classes. Patients with breast and lung cancer had the lowest attendance. This can be used to focus on which pathways for future development.

Planned Next Steps

1. SCAN Boards are **progressing locally developed actions and recommendations**, with escalation for discussion and approval through local governance routes.
2. SCAN Board **prehabilitation working groups will continue** in order to support and deliver local development work.
3. The **SCAN Prehabilitation Steering Group will be refreshed/restructured** to support ongoing cancer prehabilitation work across SCAN.
4. **Ongoing funding will continue to be sought** to extend existing work and fund future project work.
5. Planning and **requirements for future phases of SCAN prehabilitation work** to be drafted, incorporating the recommendations from this report.

Macmillan SCAN Prehabilitation Project Evaluation

Conclusion & Recommendations

The SCAN Prehabilitation programme set out to establish pathways to screen for and implement prehabilitation interventions, to map current prehabilitation resources and to scope the potential for further unfunded and funded service developments.

SCAN prehabilitation project teams have demonstrated effective set up and delivery of prehabilitation interventions and pathways, including screening to quantify levels of demand. The mapping of services across the SCAN region has highlighted where there is existing support for patients and cancer services, as well as gaps for further development. Engagement within Boards has also demonstrated further need for training and education for staff to raise awareness of prehabilitation services.

Despite the successful outcomes demonstrated within this report, funding for maintenance of ongoing work remains a challenge. It is also clear that further work is required to continue to build on current progress. The recommendations below suggest further steps to be taken forward by the SCAN Boards and Regional Network.

1. **Additional national funding essential to support continuation of current prehabilitation pathways, as well as future development and support of future initiatives.**

   Boards should provide detailed funding requirements to support delivery of local and regional priorities and should identify funding through local governance structures to support current and future work where possible. Further funding from national sources would be required to further develop services beyond current small-scale changes. Current interventions have been shown to be cost effective but funding for initial investment is generally lacking in current Board budgets. Details of remaining funding requirements will be escalated through national routes to explore potential solutions.

2. **Screening for prehabilitation should continue within existing pathways, with Boards and services to identify areas for further development, roll out and data capture.**

   Boards and services should aim to build on the screening pathways established through the pilots and other services, to deliver the approved national screening toolkit where possible and appropriate to do so. Ongoing support from the national prehab screening project is essential to aid teams in identifying how to set up and implement effective screening pathways. Boards/teams must ensure that data is being captured in a robust way to support effective referrals and ongoing evaluation.

3. **Preservation of current prehabilitation staffing roles should be prioritised for funding as part of continuing prehabilitation development.**

   To limit further service disruption and to allow the benefits of existing work to be fully realised, existing pilots should be extended until longer term funding can be identified to support services. Longer term investment planning locally and nationally is required to develop fully embedded services. Boards should look to utilise existing staff and

provide training where required, as well as identifying where prehabilitation specific roles like CEPs are required to ensure effective and specialised delivery.

4. **Boards to maintain ongoing review of available local prehab services/resources in collaboration with 3rd sector and community services, and to identify opportunities and challenges in the set up and maintenance of efficient referral processes.**

Boards should continue to expand and develop the Board/regional service mapping based on the recommended steps set out in this paper. Collaboration and integration with local and national 3rd sector, community and primary care services is essential to ensure that services can be delivered equitably. Provision of pathways to universal services should be prioritised by Boards in the first instance. Further education and training for staff is required to develop and broader understanding and awareness of prehabilitation and available services.

5. **SCAN Boards to identify where regional solutions could support gaps in map of prehabilitation services.**

Based on common gaps within Board mapping, SCAN will support Boards and other services to identify where regional solutions can be developed. This includes for areas of service provision, education, training and referral routes for patients.

6. **Development of Board processes for routine data collection required to support ongoing service evaluation and development.**

Boards and services should look to embed robust mechanisms for data collection around screening and prehabilitation delivery to inform ongoing evaluation and service development. This should be aligned to the proposed national core dataset as well as the SCAN prehabilitation data plan. Data collection should aim to limit input requirements on frontline teams and should utilise electronic/digital resources where possible.

7. **Findings and recommendations from this evaluation to be shared with regional and national stakeholders.**

Findings to be shared with colleagues and stakeholders in SCAN and other regional networks to share learning and examples of best practice. Findings and recommendations to be escalated to national colleagues at CPOG, Macmillan and Scottish Government to highlight concerns around lack of recurrent funding and impact of discontinued services.

Appendices

Appendix A. Overarching Clinical Governance

A SCAN Prehabilitation Steering Group was established to provide oversight to the pilot projects and Board mapping projects. The purpose of this group was to bring strategic focus and vision to the successful integrated delivery of cancer prehabilitation across SCAN. The group brought together key contacts and leads for each project, regional service representation, NHS Lothian and national prehab programme representation and Macmillan. The group met 6-8 weekly and fed into the SCAN Regional Cancer Planning Group and SCAN Regional Cancer Advisory Group governance structure.
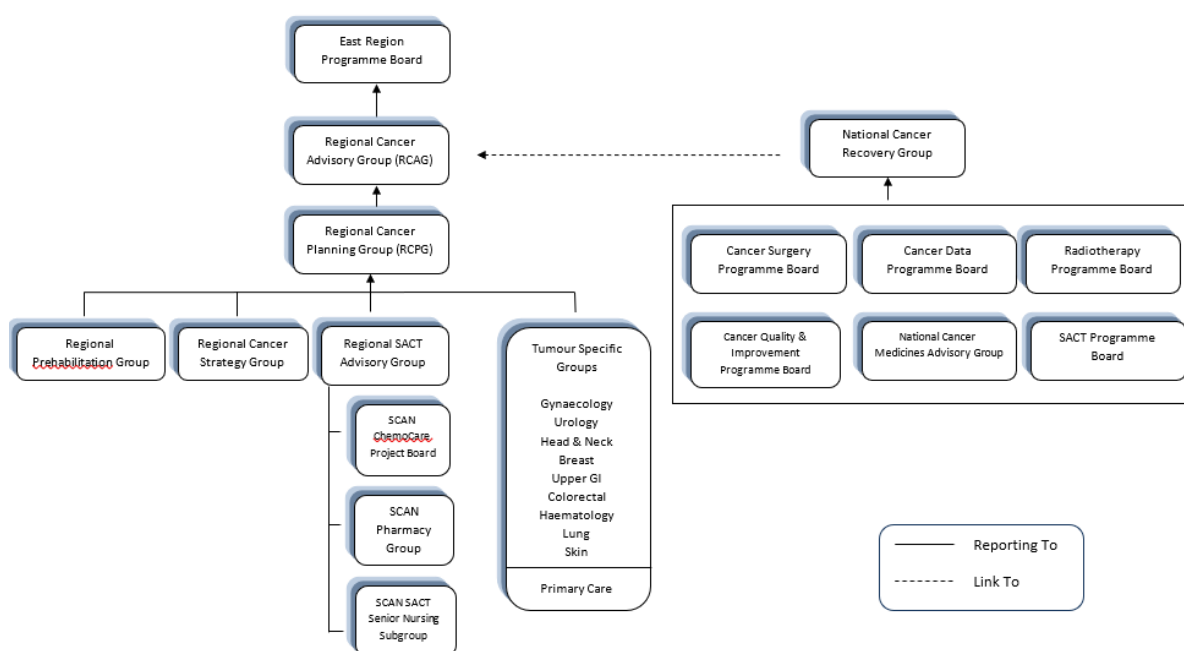
The SCAN Prehabilitation Steering Group provided reports and updates on progress to the NHS Lothian Prehabilitation and ERAS Programme Board (PEPB) and the national Cancer Prehabilitation Oversight Group (CPOG).

A Project Management and Evaluation subgroup was set up to develop a data and evaluation plan that would span all projects, in order to deliver a final evaluation. This was made up of SCAN and NHS Lothian project managers as well as Cancer Information Team (CIT) senior information analyst and programme manager. The governance for individual board projects is outlined in the projects section.

Appendix B. Lothian Pilot study-Lung
B1: Cohort Overview Tables

		Historical	**Prehab**	**Total**
Number of pts		199	97	296
Age (median, range)		70 (34-91)	68 (38-89)	70 (34-91)
Gender	% male	50.8% (101)	43.3% (42)	48.3% (143)
	% female	49.2% (98)	56.7% (55)	51.7% (153)

		Historical (%)	Prehabilitation (%)
Number of pts		199	97
Age (median, range)		70 (34-91)	68 (38-89)
Gender	% male	101 (50.8%)	42 (43.3%)
	% female	98 (49.2%)	55 (56.7%)
Diagnosis			
	Radiological dx	25 (12.6%)	7 (7.2%)
	Small cell lung cancer	48 (24.1%)	17 (17.5%)
	NSCLC	126 (63.3%)	72 (74.2%)
	Mesothelioma	0 (0%)	1 (1%)
	No. patients with stage 3 disease	72 (36%)	30 (31%)
	No. of patients with stage 4 disease	127 (64%)	67 (69%)
Inflammatory markers, SIPS	% Bloods available for SIPS	145 (73%)	83 (86%)
	% SIPS 0	55 (37.9%)	31 (37.3%)
	% SIPS 1	51 (35.2%)	33 (39.8%)

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	% SIPS 2	39 (26.9%)	19 (22.9%)
	% bloods available for mGPS	110 (55%)	68 (70%)
	% mGPS 0	21 (19.1%)	24 (35.3%)
	% mGPS1	30 (27.3%)	11 (16.2%)
	% mGPS 2	59 (53.6%)	33 (48.5%)
Treatment	% stage 3 received SACT	31 (15.6%)	16 (16.5%)
	% stage 4 received SACT	51 (25.6%)	41 (42.3%)
	% stage 3 receiving radical RT (55-60Gy in 20-30 doses)	15 (7.5%	1 (1%)
	% stage 3 & 4 receiving high dose palliative radiotherapy (36-39Gy in 12-13 doses)	7 (3.5%)	2 (2.1%)
	% stage 3 & 4 receiving palliative radiotherapy (8-20Gy in 1-5 doses)	2 (1.0%)	9 (9.3%)
	% stage 3 & 4 BSC	90 (45.2%)	27 (27.8%)
	% stage 3 patients getting life prolonging treatment	52 (26.1%)	18 (18.6%)
	% stage 4 patients getting life prolonging treatment	55 (27.6%)	43 (44.3%)

Table B.1, patient and treatment characteristics by cohort . SACT: Systemic Anti-Cancer drug treatment, RT: radiotherapy, BSC: Best Supportive Care. Life prolonging treatment defined as SACT, radical radiotherapy or high dose palliative radiotherapy (i.e. all treatment groups except low dose palliative radiotherapy and BSC). SIPS: Scottish Inflammatory Prognostic Score. GPS: Glasgow Prognostic Score.

B2: Impact of prehabilitation for patients sub-divided into those who received life prolonging treatment (SACT, radical RT and high dose palliative RT) and those who didn't
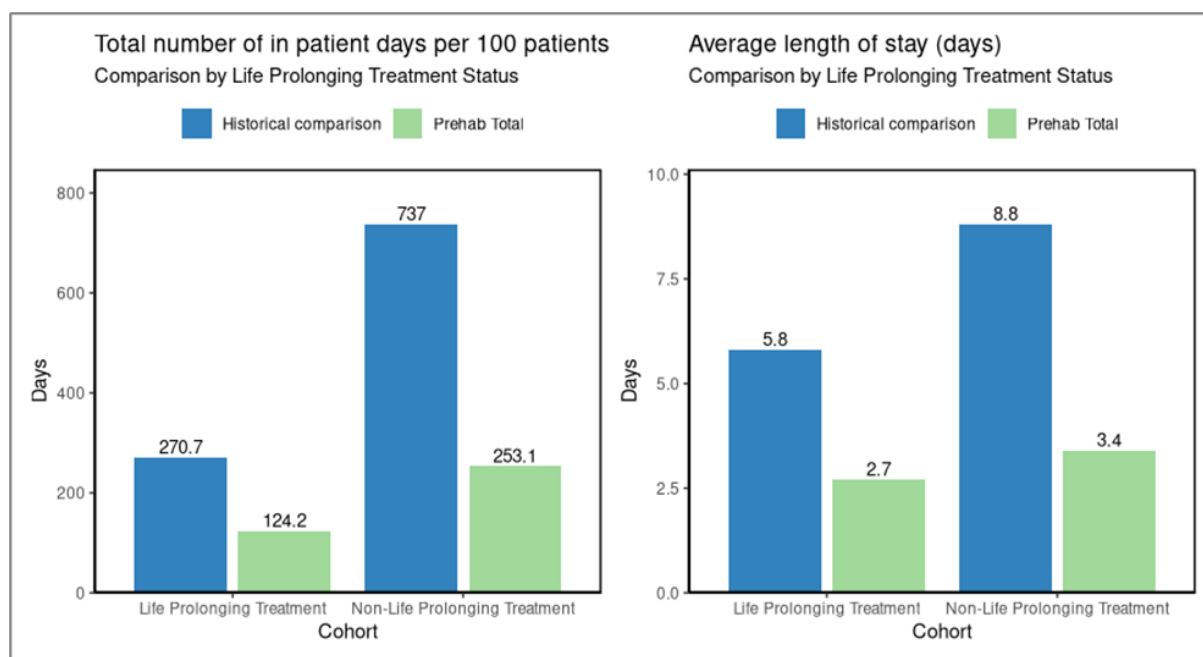
Figure

B2. Impact of prehabilitation for patients sub-divided into those who received life prolonging treatment (SACT, radical RT and high dose palliative RT) and those who didn't. Prehabilitation appears to reduce time spent in hospital, irrespective of whether patients went on to receive life prolonging treatment.

B3: Weight change in Lung prehab patients

Patient weight data was extracted from electronic health records (Trakcare, ChemoCare) and primary care (GP) data where available. The 'initial weight' was defined as the measurement recorded closest to the date of diagnosis, provided it occurred within a 14-day window (inclusive) surrounding diagnosis. The 'review weight' was defined as the measurement recorded closest to 42 days (6 weeks) post-diagnosis, within a specified window of 5 to 8 weeks (35-56 days) post-diagnosis. For instances with multiple weight measurements within a defined window, the value closest in time to the target date (diagnosis date or 42 days post-diagnosis, respectively) was selected. Patients lacking valid weight measurements recorded during both periods were excluded from this analysis.

Figure B3. *Weight change in Lung prehab patients*

B4: Oral Nutritional Supplement Further data

The monthly proportion of patients prescribed Oral Nutritional Supplements (ONS) post-diagnosis was assessed using data linked from the Prescribing Information System (PIS).

Oral Nutritional Supplements: The monthly proportion of patients prescribed Oral Nutritional Supplements (ONS) post-diagnosis was assessed using data linked from the Prescribing Information System (PIS). An ONS prescription was identified for a patient if their PIS record contained dispensing information for specific ONS brands, detected using the keywords "ensure", "fortisip", "fresubin", or "aymes". The monthly proportion was calculated as the number of eligible patients with an identified ONS prescription within a specific calendar month, divided by the total number of patients eligible during that same month. Eligibility for inclusion in the denominator for any given month required the patient to be alive during that month and for the month to fall within the study's observation period (data available up to January 2025). Patients were excluded from the calculation for any month following their date of death or occurring after the data cutoff date.
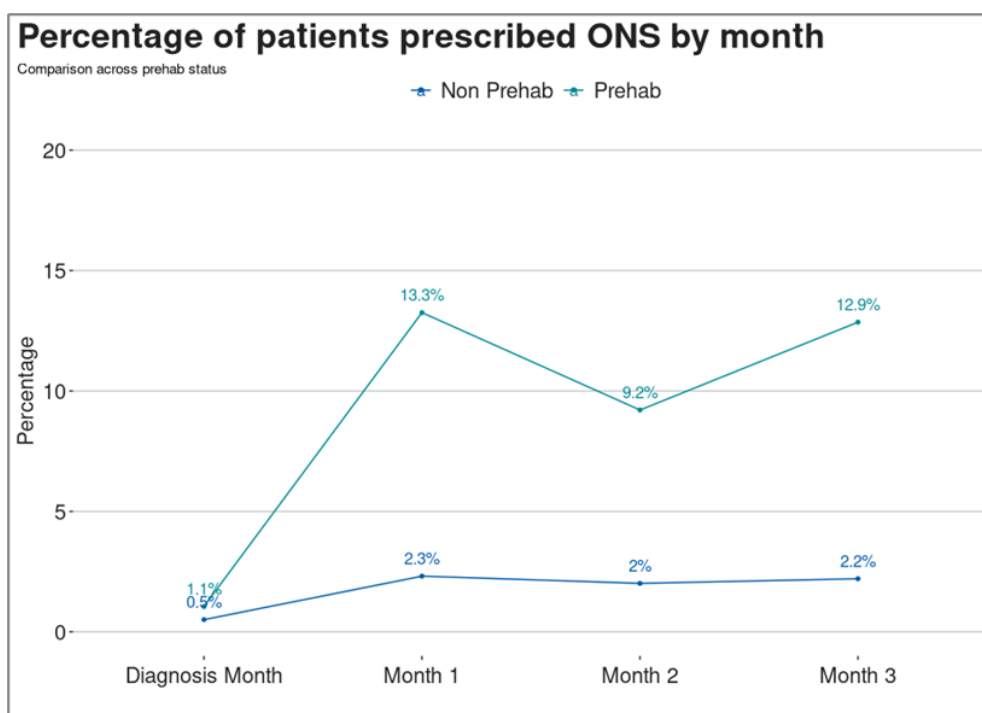
Percentage of patients prescribed ONS by month

Comparison across prehab status

⬥ Non Prehab ⬥ Prehab

Analysis of ONS prescriptions post-diagnosis showed significantly different patterns between the Prehab and Non-Prehab groups. While ONS use was minimal in the Non-Prehab cohort throughout the period (ranging from 0.5% to 2.3%), the Prehab cohort experienced a marked increase. Following an initial rate of 1.1% in the diagnosis month, the proportion of Prehab patients prescribed ONS peaked at 13.3% in Month 1 and remained substantially elevated in Month 2 (9.2%) and Month 3 (12.9%), indicating a considerably higher level of nutritional intervention in this group.

B5: Costing Overview and limitations

Overview: To determine costs, we first identified the specific wards and/or theatres each patient used and the duration of this use. We then aggregated these durations for each ward and/or theatre across the entire cohort. Using Patient-Level Information and Costing System (PLICS) data, wards and theatres were subsequently matched with their unit cost (e.g., per day or per hour). The total cost for each specific ward or theatre was calculated by multiplying its total usage time by its unit cost. Summing these individual costs gave us the total cohort expenditure. From this, the average cost per unit of time for the cohort was derived by dividing the total cohort expenditure by the total aggregated usage time. Unit costs were obtained for the majority of wards relevant to patient care across the cancer types and periods. In instances where a specific ward's unit cost could not be ascertained, the associated patient stay in that ward was excluded from the calculation of the average cost per day. This gives us a unique cost per day for each cancer type, that reflects the underlying costs of the wards the patients stay in. The costs of delivering prehab per patient was calculated based on the Macmillan funding provided to the programme and the number of patients this funding was allocated to treat during the programme or the expected number if the programme is still running.

Limitations: Several limitations should be acknowledged. Firstly, sample sizes are small across the cancer types, consequently, the presence of a few outlier patients with exceptionally long

or short stays could disproportionately influence the length of stay and therefore, the derived costs. Secondly, the current analysis calculates costs based on PLICS data, it does not incorporate the costs of concurrent or subsequent treatments such as chemotherapy or radiotherapy. These costs are likely to be higher in the prehab cohorts (as shown in lung with a higher proportion getting life prolonging treatment). These differences could therefore increase the overall costs of delivering prehab. Thirdly, the per-patient prehab cost, based on Macmillan funding, is an estimate that may not capture the true operational costs of the prehab. Additionally for colorectal, procedures where matched on a higher-level procedural grouping so the exact procedures may differ slightly between cohorts. Lastly, the use of historical data for the comparison group means that changing procedural techniques, advancements in care, and shifts in best practice likely also contribute to these variations.

Average cost per bed day among the lung cohort

Ward	% Ward Days	Cost per day (£)
SJH21	32.1	334.1
SJH25	8.3	349.5
SJH MAU	7.4	615.2
SJH09	5.7	341.1
SJH08	5.6	315.1
WGH11	5.5	408.4
Tippethill - Baillie Wing	5.2	375.2
WGH03	3.3	762.2
SJH Stroke Unit	2.8	360.6
WGH15	2.5	397.1
WGH04	2.3	397.1
WGH06	2.0	616.0
WGH54	1.9	401.2
SJH Observation Ward	1.8	729.0
RIE106	1.7	327.9
SJH18	1.6	379.4
WGHCAU	1.5	796.5
H@H REACT	1.3	301.6
WGH23	1.0	332.9
RIE114	0.8	399.0
RIE204	0.7	390.7
RIE105	0.6	344.0
RIE103	0.5	399.0
WGH71	0.5	366.0
SJH12	0.5	1296.0
WGH06D	0.4	616.0
WGH MAUB1	0.4	891.4
RIE109	0.3	349.1
SJH14	0.3	315.3
RIE D230	0.3	532.6
SJH19A	0.2	369.8

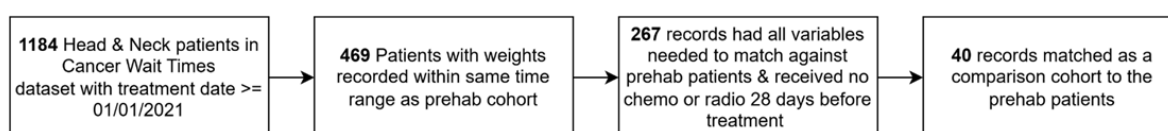|		
WGH72	0.2	426.6
WGH52 SHD	0.2	1054.9
SJH High Dependency Unit	0.2	810.8
SJHDSC	0.1	621.2
RIE102	0.1	342.2
RIECAA2	0.1	547.8
RIE107	0.1	341.7
WGH57	0.1	467.4
RIE112	0.1	1069.3
RIECAA7	0.1	547.8
SJH Discharge Ward	<0.1	4965.0
WGH Discharge	<0.1	2958.8
RIE Discharge Ward	<0.1	3587.6
Overall Cohort Average (Weighted by Ward Use)	**100.0**	**416.1**

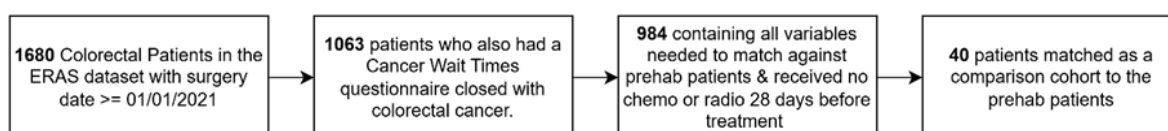### *Appendix C. Lothian Pilot study-Colorectal*
C1: Data Sources

A historical comparison cohort was constructed to contrast with the prehab cohort. Initial patient identification utilised Enhanced Recovery After Surgery (ERAS) and Cancer Wait Time (CWT) records. Comprehensive data for analysis was then integrated from multiple sources: surgical details from Trak theatre/operation records, chemotherapy administration from ChemoCare, and radiotherapy treatments from the Radiotherapy Data System (RTDS). Demographic information and ICD-10 codes (for comorbidity assessment) were sourced from SMR01 extracts. Comorbidities were quantified using the Charlson Comorbidity Index, derived from SMR01 ICD-10 codes excluding those specific to the primary colorectal cancer. Patients receiving chemotherapy or radiotherapy within 28 days prior to their primary treatment were excluded to minimise confounding.

Matching Process Flow

Head & Neck matching process flow

| **1184** Head & Neck patients in Cancer Wait Times dataset with treatment date >= 01/01/2021 | → | **469** Patients with weights recorded within same time range as prehab cohort | → | **267** records had all variables needed to match against prehab patients & received no chemo or radio 28 days before treatment | → | **40** records matched as a comparison cohort to the prehab patients |

Colorectal matching process flow

| **1680** Colorectal Patients in the ERAS dataset with surgery date >= 01/01/2021 | → | **1063** patients who also had a Cancer Wait Times questionnaire closed with colorectal cancer. | → | **984** containing all variables needed to match against prehab patients & received no chemo or radio 28 days before treatment | → | **40** patients matched as a comparison cohort to the prehab patients |

Procedure Grouping

To facilitate matching across different types of colorectal surgeries, the procedure codes were categorised into broader groups. This grouping was based on the anatomical location (e.g., right colon, left/sigmoid colon, rectum) and the extent of surgery (e.g., Hemicolectomy, proctocolectomy), and specific operative strategies (e.g., Hartmann's procedures). This approach allows for groups that reflect major differences in surgical complexity and anatomical region while maintaining adequate numbers within each group.

Procedure Group	Included Procedures	Grouping
Right Hemicolectomy	• Right hemicolectomy • Ext. Right Hemicolectomy	Targets right colon: standard and extended versions share core principles.
Left/Sigmoid/Transverse/High AR	• Transverse colectomy • Left hemicolectomy • Sigmoid colectomy • High anterior resection	Targets left/sigmoid colon/upper; distinct from deep pelvic surgery.
Low Rectal Resection/APR	• Low anterior resection (below peritoneal reflection) • AP Resection	Targets low rectum requiring deep pelvic dissection.
Hartmann's Procedure/Reversal	• Hartmann's Procedure • Reversal of Hartmann's • Ultra-low Hartmann's Resection	Represents a specific surgical strategy; includes initial surgery and reversal.
Total/Subtotal Colectomy	• Subtotal colectomy and ileo-rectal anastomosis • Total Colectomy	Defined by the large extent of colonic resection.
Panproctocolectomy/Pouch/Proctectomy	• Panproctocolectomy & Ileo-Anal Pouch • Completion proctectomy • Restorative proctectomy • Panproctocolectomy	Defined by removal of the entire colon / rectum.
Small Bowel/Ileocaecal	• Ileo-Caecal resection • Small bowel resection	Primary target is the small intestine or the junction between small and large bowel.
Pelvic Exenteration	• Pelvic Exenteration	Major operation that takes out some or all of the organs inside the pelvis.

Propensity Score Matching

To address baseline confounding between the prehab and historical cohorts, we employed propensity score matching (PSM). Propensity scores, representing the probability of being in the prehab cohort, were estimated using logistic regression based on: Age at Operation, Sex, Procedure Group, Charlson Comorbidities, Smoking status, Drinking status, and BMI. We performed optimal matching (method = "optimal") to construct matched sets, aiming to achieve the best overall covariate balance. This method was implemented with a fixed ratio of two control participants (comparison cohort) for each treated participant (prehab cohort), and matching was performed without replacement. Exact matching was enforced for the Procedure Group variable, ensuring that individuals within each matched set shared the identical procedure group. Covariate balance was assessed post-matching using Standardised Mean Differences (SMDs) and visual inspection of covariate distributions. This procedure returned the final matched cohorts for comparative analysis.

Covariate Balance Assessment

Figure C5 illustrates the effect of the propensity score matching procedure in balancing observed baseline covariates between the comparison groups. The x-axis represents the Standardized Mean Difference (SMD), with zero indicating perfect balance. The y-axis lists the covariates included in the matching model. Red points depict the SMDs before matching ('Unadjusted'), while blue points show the SMDs after matching ('Adjusted'). The vertical dashed lines mark the commonly accepted threshold for good balance (SMD < |0.1|).
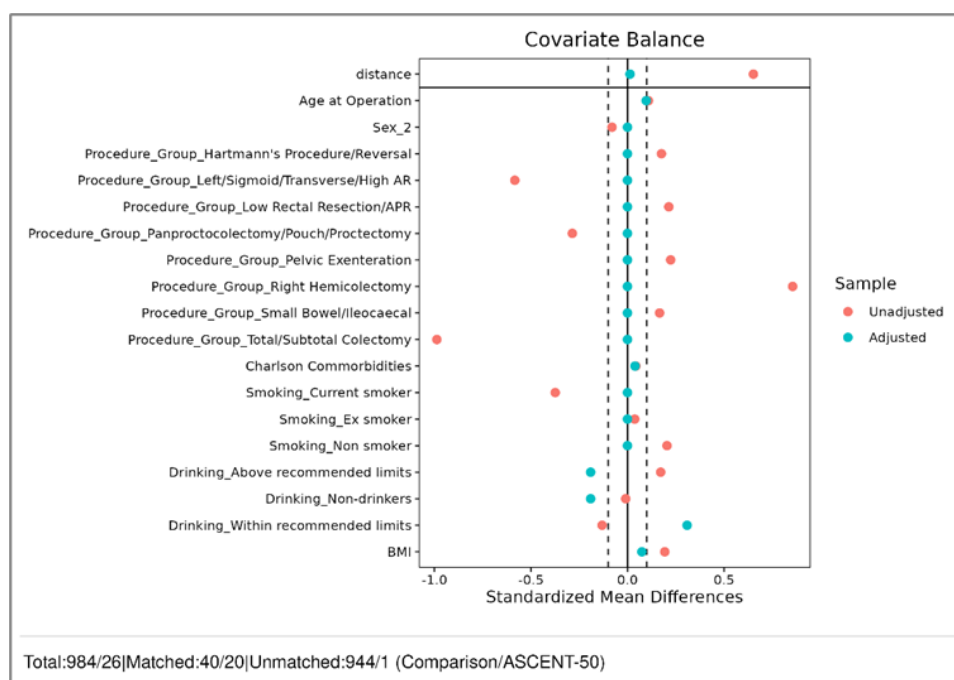

Figure C5. Love plot of SMD before and after matching

Table C5 demonstrates the success of the matching procedure in creating a balanced comparison cohort based on observed covariates. While considerable imbalances were present before matching (evidenced by large unadjusted SMDs), these were substantially mitigated post-matching. The adjusted SMDs were generally close to zero, with most falling below the common threshold of |0.1|. Furthermore, statistical tests comparing the groups after matching returned non-significant p-values for all assessed covariates. This lack of statistical significance, combined with the low adjusted SMDs, indicates that the matching produced cohorts that are comparable with respect to measured baseline characteristics like age, sex, comorbidities, smoking, BMI, and procedure group. Drinking status is not significantly different between the groups (p = 0.549), however the SMDs shows residual imbalance remains between categories. Therefore, the potential confounding effect of drinking status should be considered when interpreting subsequent results. We can see what this distribution looks like before and after matching in Figure C5.

	Standardized Mean Difference			
Covariate Balance Before and After Matching				
Covariate	**SMD (Unadjusted)**	**SMD (Adjusted)**	**Test Type**	**P-value (Adjusted)**
distance	0.91	0.02	—	—
Age at Operation	0.12	0.11	t-test	0.698
Sex	-0.08	-0.00	Chi-squared Test	>0.999
Procedure Group Hartmann's Procedure/Reversal	0.23	-0.00	Fisher's Exact Test	>0.999
Procedure Group Left/Sigmoid/Transverse/High AR	-0.51	-0.00	Fisher's Exact Test	>0.999
Procedure Group Low Rectal Resection/APR	0.30	-0.00	Fisher's Exact Test	>0.999
Procedure Group Panproctocolectomy/Pouch/Proctectomy	-0.40	-0.00	Fisher's Exact Test	>0.999
Procedure Group Pelvic Exenteration	0.32	-0.00	Fisher's Exact Test	>0.999
Procedure Group Right Hemicolectomy	1.04	-0.00	Fisher's Exact Test	>0.999
Procedure Group Small Bowel/Ileocaecal	0.21	-0.00	Fisher's Exact Test	>0.999
Procedure Group Total/Subtotal Colectomy	-0.72	-0.00	Fisher's Exact Test	>0.999
Charlson Commorbidities	0.03	0.03	t-test	0.865
Smoking Current smoker	-0.52	-0.00	Chi-squared Test	>0.999
Smoking Ex smoker	0.04	-0.00	Chi-squared Test	>0.999
Smoking Non smoker	0.21	-0.00	Chi-squared Test	>0.999
Drinking Above recommended limits	0.19	-0.21	Chi-squared Test	0.549
Drinking Non-drinkers	-0.01	-0.19	Chi-squared Test	0.549
Drinking Within recommended limits	-0.13	0.32	Chi-squared Test	0.549
BMI	0.19	0.07	t-test	0.797

Note:
SMD: Standardized Mean Difference. Values between -0.1 and 0.1 generally indicate good balance.
Adjusted values refer to the sample after matching.
Categorical variable p-value applies to the overall test for that variable.

Table C5. Covariate Balance Before and After Matching
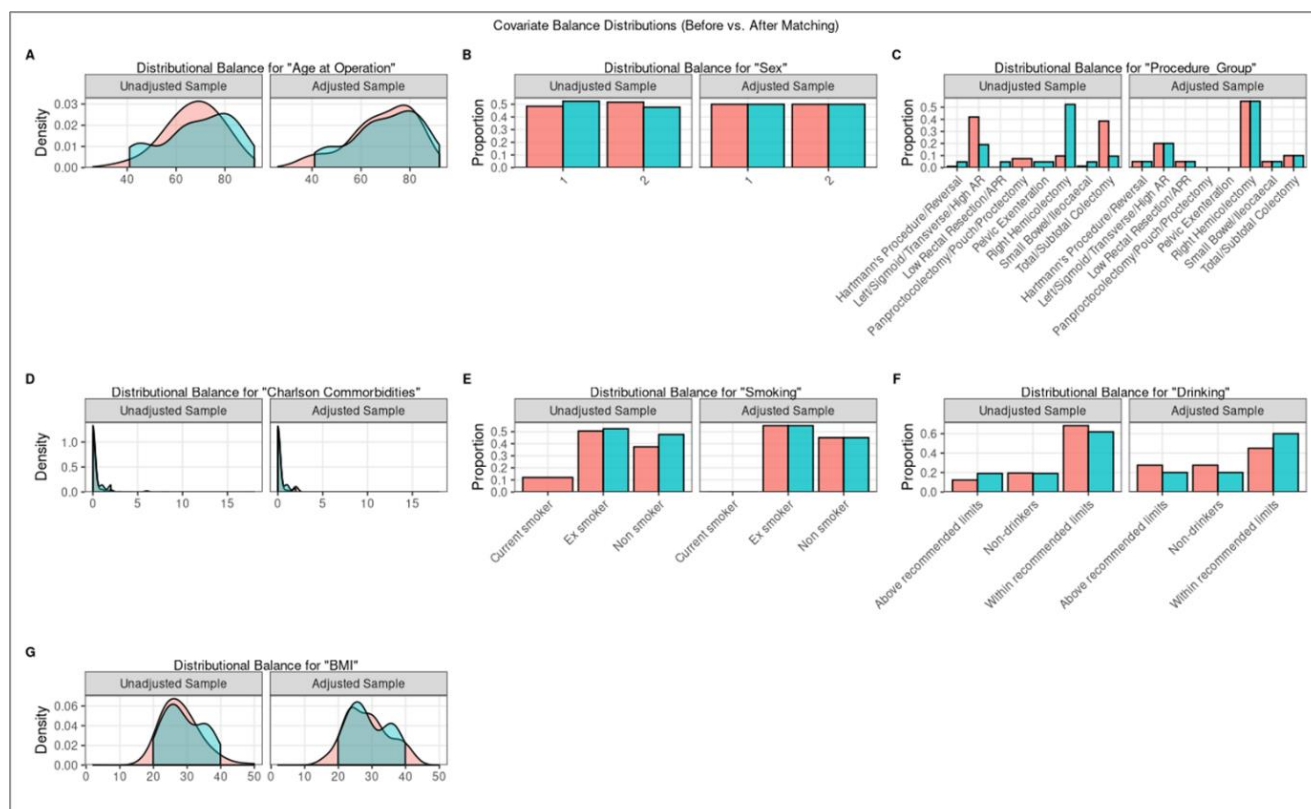
Figure C5: Covariate balance distribution (Before vs. After Matching)

C2: Procedure Standardised Length of Stay
Method
We aimed to produce a comparable LOS between the prehab and ERAS comparison cohorts by creating a procedure standardised LOS per patient that controls for differences in procedural case mix and patient outliers. This allowed for the inclusion of all ERAS patients who underwent the same procedures between 2023 and 2024, rather than only a matched subset.
Step 1: Define the Case Mix
The exact number and type of procedures performed in the 20-patient prehab cohort was used as the standard case mix for both cohorts. For example, the prehab cohort had 55% (11) right hemicolectomies, so we use that as the case mix for the comparison cohort.
Step 2: Calculate Procedure Specific Median LOS
For each procedure, the median LOS was calculated for the prehab and comparison cohort. The median was chosen over the mean to reduce the impact of outliers.
Step 3: Calculate Standardised LOS

- Prehab Standardised LOS was calculated by applying the prehab cohort's median LOS values (from step 2) to the standard case mix (from step 1). This figure represents the prehab group's expected LOS per patient.

- Comparison Standardised LOS was calculated by applying the comparison cohort's median LOS values to the same standard case mix. This figure represents what the comparison group's expected LOS per patient, would be under an identical procedural workload as the prehab cohort.

Limitations & Assumptions
- **Selection Bias:** The inclusion criteria for the prehab patients would likely result in this cohort having less comorbidities and frailty pre-op than the standard ERAS population.
- **Covariables:** This assumes the mix of procedures is the primary difference for LOS, other factors are not accounted for.
- **Procedure Coding:** The prehab group's procedures were from a manually verified list, while the comparison group's procedures were derived from dataset codes. For this analysis, it is assumed that the codes for the comparison group are sufficiently accurate to allow for a meaningful comparison after procedural standardisation.

The prehab cohort showed a reduction in procedure standardised LOS by one day per patient. This LOS reduction was primarily driven by the difference in post operative LOS times for right hemicolectomy's, especially with the high prevalence of right hemicolectomies in the prehab cohort.

C3: Post Operative Morbidity
Post-Operative Morbidity: Assessment of Post-Operative Morbidity Survey (POMS) scores at 72 hours post-surgery indicated differences between the prehabilitation (prehab) and comparison cohorts. The mean POMS score was marginally lower in the prehab group (1.9) compared to the comparison group (2.0). A more pronounced difference was observed in the median POMS scores (1 and 2 respectively). This suggest that patients undergoing prehabilitation experienced lower post-operative morbidity, as measured by the POMS score.
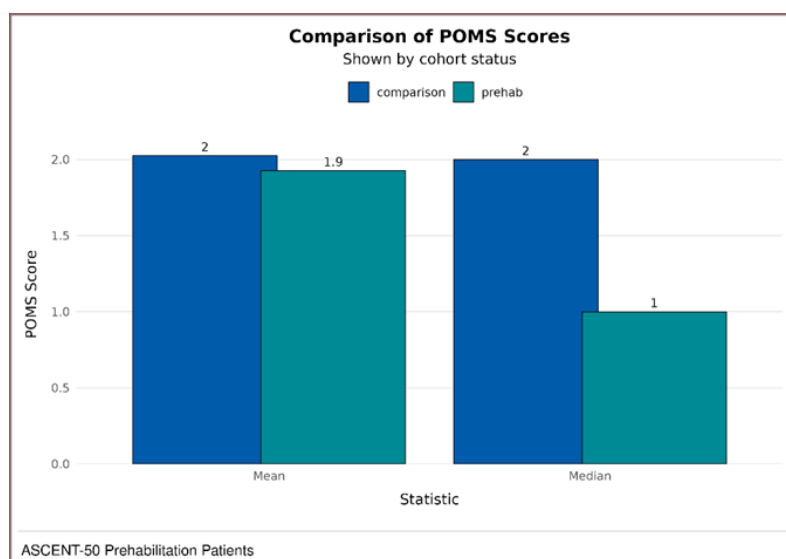
Figure C9: Comparison of POMS scores

C4: Colorectal Ward Costs

Ward costs and readmissions for the 20 prehab patients and 351 ERAS patients who had the same procedures in 2023 – 2024.

Readmissions are unplanned readmissions that occurred within 30 days of the date of operation

Colorectal Ward Costs

Ward	% Ward Days	Cost per day (£)
WGH24	37.0	341.3
WGH23	36.0	332.9
WGH52 Intensive Care	16.1	2802.1
WGHT58	7.4	1054.9
WGH20	2.6	2802.1
WGH56	0.2	403.5
WGH57	0.2	467.4
RIE107	0.2	341.7
WGH75	0.1	531.6
WGH53	0.1	591.5
WGH26	0.1	354.3
WGH72	0.1	426.6
SJHDSC	<0.1	621.2
WGHCAU	<0.1	796.5
RIE116	<0.1	711.3
WGH Discharge	<0.1	2958.8
WGH42	<0.1	427.8
RIEDSU	<0.1	493.1
WGH43	<0.1	427.8
Overall Cohort Average	**100**	**851.5**

Macmillan SCAN Prehabilitation Project Evaluation

Colorectal Unplanned Readmissions (30 days)

Cohort	Unplanned Readmissions	Cohort Size	Total LOS (Days)	LOS per Person (Days)
comparison	32	351	193.6	0.6
prehab	1	20	5.7	0.3

### Appendix D. Lothian Pilot study-Head and Neck
D1: Data Sources

A historical comparison cohort was constructed to contrast with the prehab cohort. Initial patient identification utilised Cancer Wait Time (CWT) records. Comprehensive data for analysis was then integrated from multiple sources: surgical details from Trak theatre/operation records, chemotherapy administration from ChemoCare, and radiotherapy treatments from the Radiotherapy Data System (RTDS). Demographic information and ICD-10 codes (for comorbidity assessment) were sourced from SMR01 extracts. Weight measurements were compiled from clinical (prehab, Trak, ChemoCare) and primary care (DataLoch GP) systems, using a prioritisation rule favouring clinical records for a single daily value per patient. Smoking and alcohol status were similarly collated from DataLoch and Trak. Comorbidities were quantified using the Charlson Comorbidity Index, derived from SMR01 ICD-10 codes excluding those specific to the primary H&N cancer. Patients receiving chemotherapy or radiotherapy within 28 days prior to their primary treatment were excluded to minimise confounding.

Propensity Score Matching Parameters

To further address baseline confounding between the prehab and historical cohorts, we employed propensity score matching (PSM). Propensity scores, representing the probability of being in the prehab cohort, were estimated using logistic regression based on: Age at Treatment, Sex, Charlson Comorbidity Index, Smoking status, Drinking status, and Mode of Treatment. We performed 1:1 nearest neighbour matching without replacement, applying a calliper of 0.2 standard deviations of the logit of the propensity score. Exact matching was enforced for the Mode of Treatment variable, ensuring pairs shared the identical treatment modality. This process provided the final matched cohorts for comparative analysis.

Covariate Balance Assessment

Figure D3 illustrates the effect of the propensity score matching procedure in balancing observed baseline covariates between the comparison groups. The x-axis represents the Standardised Mean Difference (SMD), with zero indicating perfect balance. The y-axis lists the covariates included in the matching model. Red points depict the SMDs before matching ('Unadjusted'), while blue points show the SMDs after matching ('Adjusted'). The vertical dashed lines mark the commonly accepted threshold for good balance (SMD < |0.1|).
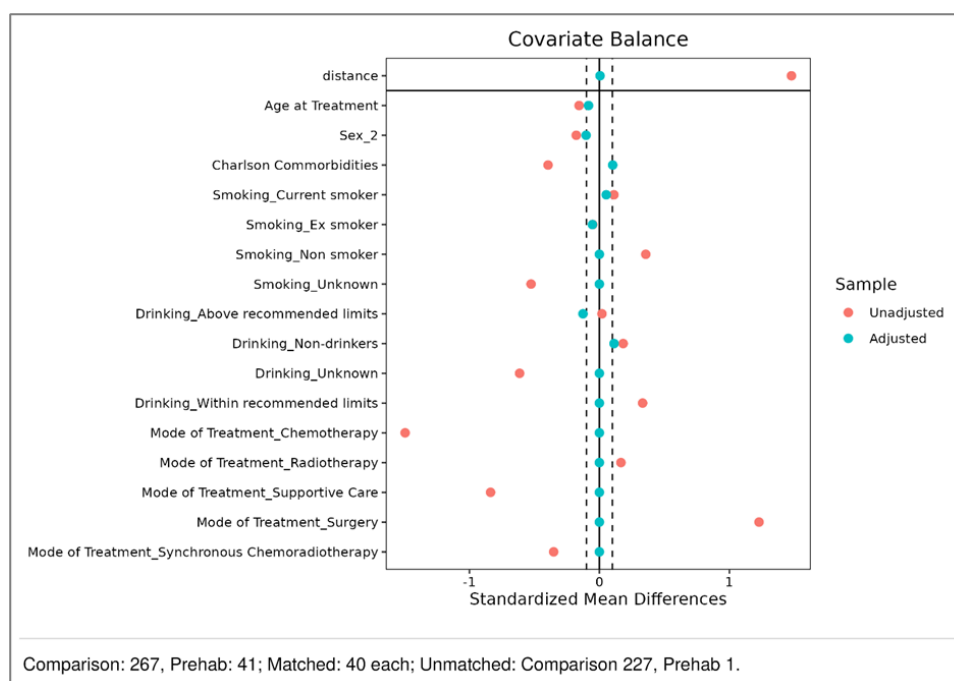
Figure D3. Love plot of SMD before and after matching

Table D3 demonstrates the success of the matching procedure in creating a balanced comparison cohort based on observed covariates. While considerable imbalances were present before matching (evidenced by large unadjusted SMDs), these were substantially mitigated post-matching. The adjusted SMDs were generally close to zero, with most falling below the common threshold of |0.1|. Furthermore, statistical tests comparing the groups after matching yielded non-significant p-values for all assessed covariates. This lack of statistical significance, combined with the low adjusted SMDs, indicates that the matching produced cohorts that are comparable with respect to measured baseline characteristics like age, sex, comorbidities, smoking, drinking, and mode of treatment. We can see what this distribution looks like before and after matching in figure D3.

D2 Mean Weights Across Time-points

Weight change analysis required defining specific time points. For the comparison cohort, a 'review' weight was identified as the measurement closest to the first treatment date (within 0-7 days), and an 'initial' weight was identified as the measurement closest to 14 days prior to treatment (within -31 to -1 days) and a 'post treatment weight' was identified as the measurement closest to a month post treatment (within 8-31 days). For the prehab cohort, recorded initial and review weights were used where available. Where these were missing, weights were imputed using the same method as the comparison cohort's weight data.
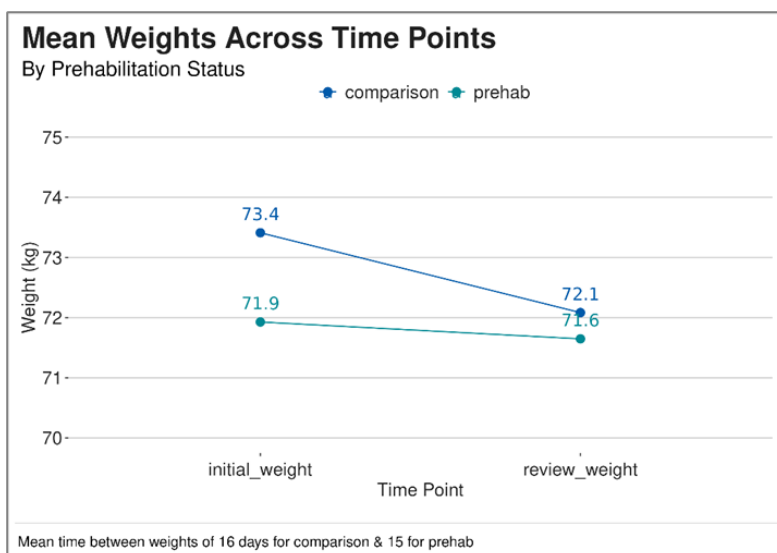
Figure 16. Patient Volume and Prehab Window Trends Over Time

D3: Overall Cohort Average

Ward	% Ward Days	Cost per day (£)
SJH19A	75.9	369.8
SJHITU	15.9	3554
SJH18	6.7	379.4
SJH20 ICU	1.1	3554
SJHDSC	0.3	621.3
Overall Cohort Average (Weighted by Ward Use)	**100**	**913.3**

Appendix E. Lothian Pilot study-Westerhaven
E1: GP Encounters

GP Encounters: Appendix E1 illustrates average GP encounters for Westerhaven prehabilitation patients, tracked over 30-day intervals leading up to and following the commencement of prehab, by class and group respectively. A significant surge in "Indirect" encounters, driven by "General Administration," peaks at approximately 6 encounters per patient just before prehab initiation. "Direct" GP encounters also show a pre-prehab rise, stabilizing around 2.5 encounters per patient immediately post-prehab. The decline in "General Administration" encounters immediately after prehab starts suggests an impact of the program may be streamlining this administrative burden. The prehab intervention, by addressing patient needs proactively, could potentially reduce future GP encounters or shift the nature of them, although a longer-term follow-up would be needed to confirm this.
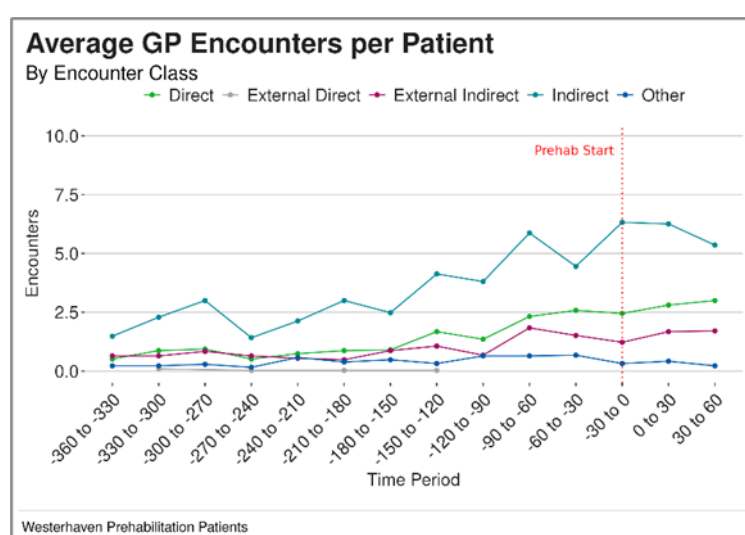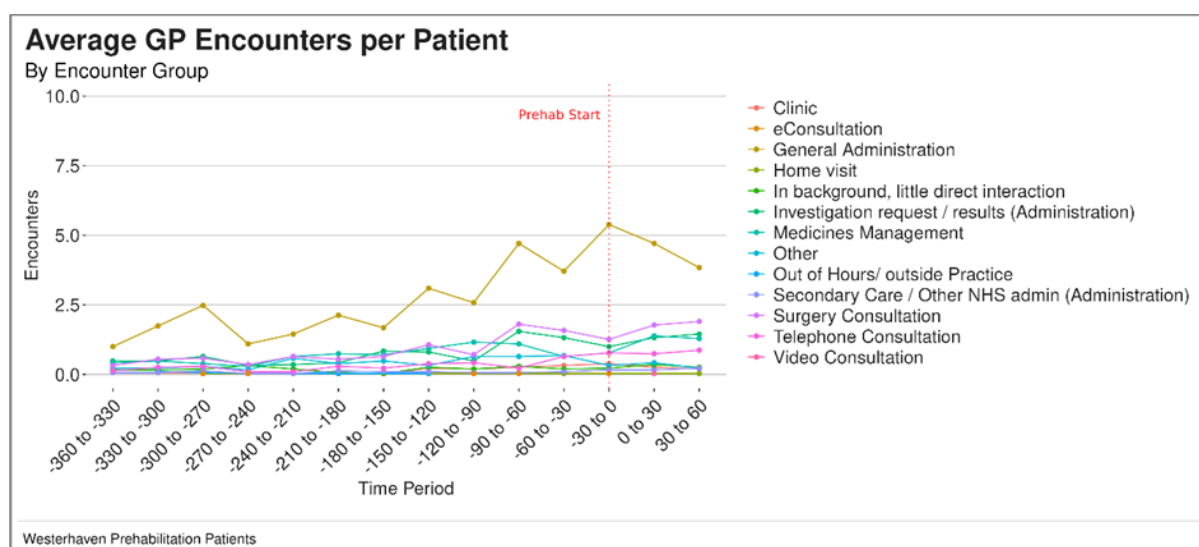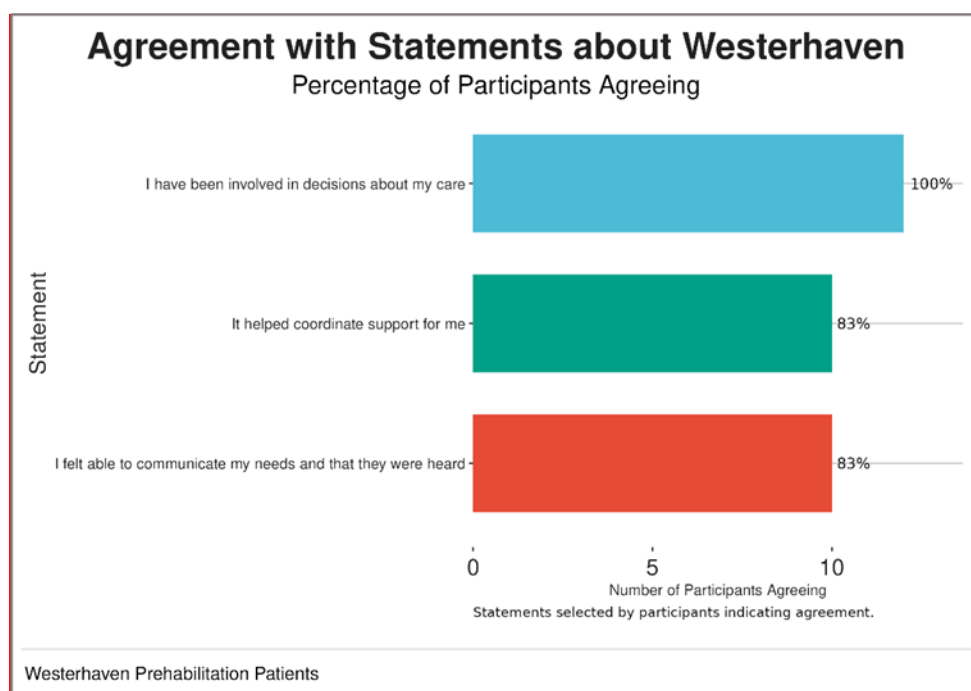

Figure E1a. Westerhaven GP Encounters by Encounter Class

E1b. Westerhaven GP Encounters by Encounter Group
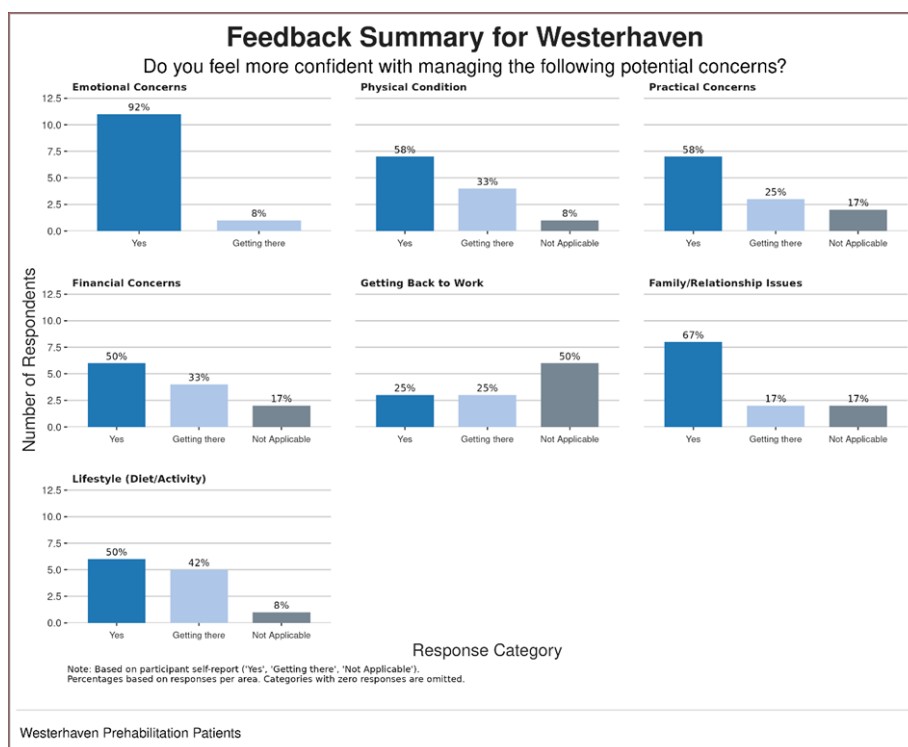
E2: Westerhaven evaluation form (Agreements)

Figure E1. Westerhaven Evaluation Form (Agreement)

E3: Westerhaven evaluation form (Agreements)

E2. Westerhaven Evaluation Form (Managing Concerns)

E4: Westerhaven Case studies

Patient Case Studies

To highlight the benefit of the community Westerhaven project and the impact the services had on individual patients, the team collaborated with patients to write the below case studies.

Miles's Story

Miles, age 62, residing in Southwest Edinburgh was diagnosed with throat cancer in September 2024. At the time of diagnosis, he was told he may only have a few years to live. Understandably, this news caused high levels of anxiety about what was ahead in terms of treatment and the deterioration of his health. Signposted to the Westerhaven Prehab service by a friend, Miles was eager to explore what support he could access.

When he first connected with the service, Miles was experiencing high levels of anxiety and uncertainty, particularly around the prospect of beginning chemotherapy. Through initial conversations, a Holistic Needs Assessment (HNA) and a prehab assessment, where he had a PHQ-4 score of 6 and a PG-SGA score of 9, a personalised care plan was developed to meet his individual needs. This included a referral to our volunteer dietitian, one-to-one emotional support from our cancer support worker, and engagement with mindfulness sessions— something Miles specifically identified as being helpful in his evaluation for managing stress and improving sleep. At evaluation, his prehab assessment scores had reduced to a PHQ-4 score of 2 and a PG-SGA score of 5.

Miles already swam and walked regularly when he was first referred and did not want to engage in any further exercise. However, as his health declined, he decided to join our cancer prehabilitation (prehab) exercise class to keep as active as he could through treatment.

Unfortunately, Miles's health deteriorated in the following months limiting his ability to participate in most activities. Despite these challenges, he remained committed to the mindfulness sessions, finding them a vital source of support during a physically and emotionally taxing time.

In February, Miles reached out again to share that he had now entered the palliative stage of his illness much sooner than expected and was devastated, struggling to process that he only had a short time left. In response, Westerhaven worked quickly to adapt his support plan. Urgent counselling was arranged, a Macmillan benefits reassessment was completed to ensure financial support was in place, and one-to-one support was continued with a flexible, person-centred approach tailored to his evolving needs. Although initially sceptical that counselling would be beneficial, he fed back that this safe space had allowed him to speak openly about the fears that he had held back from discussing with family and friends through fear of upsetting them.

> "I am grateful for the support you have provided. My support needs have been constantly changing, and you have all been so flexible and adaptive at each stage. It's been difficult to know what I needed, but chatting this through with you has helped me identify what might support me best. I didn't think Counselling was going to be helpful, but it has surprised me and allowed me to put things into perspective. I didn't want to burden my friends, and this support has given me a space to be honest about my feelings"

Miles sadly passed away in April

Ivan's Story

Ivan, a 37-year-old man originally from Ukraine, has been living in Wester Hailes for the past few years. He was referred to our prehabilitation (prehab) clinic at Wester Hailes Medical Practice in late October 2024 where an initial appointment was carried out including a prehab assessment and a Holistic Needs Assessment (HNA) and a personalised care plan was developed to meet his individual needs. This was a particularly uncertain and distressing time in his life while he waited for a formal diagnosis. Ivan was extremely anxious, isolated, and struggling to cope.

He had been signed off work due to ill health and was increasingly concerned about his financial situation. He felt unable to confide in his family, who remain in Ukraine amidst the ongoing war. He didn't want to burden them further, unsure of how to even begin sharing such worrying news.

Following a confirmed diagnosis of Kaposi's Sarcoma in November 2024, Ivan's situation became more challenging — he lost his job, had no income or savings, and faced significant barriers to meeting his basic needs. Through the Prehab service delivered by Westerhaven, we were able to step in and offer a range of vital supports. We helped Ivan apply for financial assistance and access benefits, including support with housing and a Macmillan grant. We also arranged for regular meal pack deliveries from the charity Empty Kitchen, Full Hearts. In addition, Ivan began attending the weekly Community Lunch run by The Health Agency, where he could enjoy a hot meal and connect with our friendly staff in a supportive environment.

Throughout this time, Westerhaven staff maintained regular contact with Ivan, providing 1:1 support both over the phone and in person (during the prehab intervention his PHQ-4 score dropped from 10 to 4). We also offered complementary therapies such as massage to support his wellbeing. When Ivan started chemotherapy, his nurse recommended he take Silymarin to support his liver. During a check-in, Ivan shared this with our cancer support worker and we were able to connect him with *Grass Roots Remedies*, a partner organisation, who provided the herbal supplement free of charge.

When asked what he valued most about Westerhaven, Ivan shared:

"*I appreciate the constant support, help, and attitude. The unlimited help and the desire to provide as much support, assistance, resources, and advice as possible.*"

After a few months Ivan found the courage to share his diagnosis with his mother in Ukraine, she was of course devastated. But amid her worry, she expressed deep relief and gratitude, saying she was comforted knowing that he was not facing this alone — that there were people by his side who truly cared for him, supporting him when she could not - it was a deeply moving moment for our team. Her response captured exactly why we do what we do: to offer comfort and be a source of strength during uncertain times. It's moments like these that remind us how meaningful our work is—because while kindness is hard to measure, its impact is unmistakable. His referring practice nurse echoed this sentiment when she said:

"Really, what I want to say is how essential and wonderful your service is. Thank you so very much for your whole team's input with Ivan. It's all he has just now."

Ivan's Story in his own words

I want to share my story. It all started with me noticing some changes in my body and I thought it was just an infection and I could get by with antibiotics. But when it got worse and there was no improvement, my GP started to get worried and we started a very long process to figure out what was wrong... It took almost a year because I had to wait a long time to see another doctor, get an appointment, then wait for the results of the tests and when the biopsy was done and I was diagnosed with cancer, I was just mentally destroyed.

I didn't know what to do, how to live on and what would happen to me next. I just gave up. I didn't want anything. But thanks to Westerhaven, I received great moral and financial support. McMillan paid me a grant of £200 so that I could feel more comfortable and Westerhaven helped with filling in forms for other payments and assistance, consulted me, offered me massage sessions, which I still attend with joy, helped with food delivery and also offered to come once a week to charity lunch. They constantly call me and worry about me! Such support is very important! Because people who have been diagnosed with cancer have the right to live and fight for it, and they need support. This is just a small part of the story and what I would like to share!

Tomasz's Story

Tomasz, 46, originally from Poland, has lived in Wester Hailes for over a decade. In July 2024 he was diagnosed with mouth cancer after delaying medical help due to a relationship break-up and a subsequent period of low mood. It was only after a concerned friend encouraged him, that he finally went to see his GP. At this time he did not want to attend our prehab clinic but he then engaged during his radiotherapy treatment in November 2024.

At the time of engagement, Tomasz was facing multiple challenges including financial hardship, high anxiety, low self-esteem, social isolation, and increased alcohol consumption. With support from Westerhaven staff, he completed a prehab assessment and a Holistic Needs Assessment (HNA) to identify his primary concerns, leading to the development of a personalised care plan.

Westerhaven liaised with Tomasz's Housing Association and Housing Officer to help manage his rent arrears while he awaited the outcome of his Adult Disability Payment application. He was also referred to a Polish Support Service, which provided culturally appropriate counselling and support for alcohol use. In response to his financial difficulties, Tomasz was connected with a free food delivery service, receiving four meals per week that could be blended to accommodate his eating needs post-treatment.

To further support his recovery, we worked with Tomasz's GP to arrange a free bus pass, enabling him to attend hospital follow-up appointments. He also participated in regular one-to-one sessions with a Cancer Support Worker, helping to reduce his isolation and build confidence and resilience. Additionally, he joined prehab exercise classes and accessed therapeutic massage sessions, which helped to alleviate muscular pain, improve strength and energy levels, improve sleep, and boost his overall well-being. Tomasz's expressed that he had benefited from the structure of attending one-to-one appointments, as this gave him a reason

for leaving his home. He was also having increased communication with his family and friends, which had improved his mood and reduced his isolation.

In February 2025, Tomasz shared the positive news that he had been given the all-clear from cancer, though he will continue to attend hospital follow-up appointments. He expressed deep gratitude to Westerhaven for the support provided, which he credits with reducing his anxiety, strengthening his resilience, and improving his emotional well-being. Tomasz is aware that he can self-refer back to Westerhaven at any time in the future should he need further support.

> "I am very happy to have found the Westerhaven service. I did not know all these supports existed or that someone would be able to make referrals on my behalf. It has taken the pressure off me when I was going through a difficult time. I feel much happier now that I am free of cancer, and I want to say thank you "

Sarah's Story

Sarah, a 61 year old autistic woman living in Wester Hailes was referred into our prehab clinic at the Wester Hailes Medical Practice after being diagnosed with Stage 1 womb cancer in December 2024. She was experiencing emotional distress with the diagnosis triggering traumatic memories from earlier in her life. This emotional strain was compounded by anxiety around her upcoming treatment and recovery. In particular, the uncertainty regarding her return to work and the possible financial impact this would have, was causing Sarah great concern.

The Holistic Needs Assessment (HNA) helped Sarah identify that she was seeking a combination of emotional, physical, and social support to navigate this challenging time. Counselling was arranged to take place before her operation, which supported Sarah with the processing of difficult emotions whilst helping her to develop positive coping strategies. Sarah also participated in prehabilitation exercise classes to prepare for treatment by strengthening her physical condition and enhancing her recovery after surgery. Sarah had also expressed a desire to lose weight in preparation for surgery, and she was referred to our dietitian for nutritional support.

Additionally, Sarah joined our Arts and Crafts group, where she connected with others facing similar challenges. This made her feel less isolated and gave her an invaluable sense of shared understanding and a creative outlet for her emotions. She also attended massage sessions, which helped to alleviate tension and improve her well-being. We also referred Sarah to the Macmillan benefit advice service.

After a period of emotional and physical recovery, Sarah returned to work on a phased return, feeling confident that she was physically and emotionally able to. She continued to attend counselling and session times were adjusted so that this fitted in with her employment duties and she continued to attend 1:1 meetings with our Cancer Support Worker. Additionally, Sarah continues to take part in our Arts and Crafts group, be more physically active and is on the waiting list to attend our Make a Change Healthy Lifestyle course.

This holistic approach empowered Sarah to not only cope with the challenges of her diagnosis but also regain the confidence and strength to return to her normal life.

> Feedback from Sarah included "I have been offered the best support and help imaginable," and she conveyed that it played a key role in helping her come to terms with her diagnosis. She reported feeling stronger, both mentally and physically, and appreciated the holistic approach that she felt had benefited and addressed her emotional, physical, and social needs. Sarah reflected that she views the cancer diagnosis as a wake up call and that it has given her the chance to make changes to her lifestyle to safeguard her future health.

Summary

These case studies demonstrate the vital role of delivering integrated, community-based support for cancer patients living in areas of significant deprivation — where over half of local data zones rank within the most deprived 5–10% according to the SIMD 2020. The individuals we supported would have been unlikely to access help through more centralised services. By embedding our project within the local community, we were able to provide immediate, holistic support tailored to each person's needs. This included one-to-one counselling, regular check-in calls, nutritional guidance, gentle exercise, massage, and peer support. Often, we were able to offer help even before patients fully recognised what kind of support they needed, a proactive approach that contributes meaningfully to both emotional wellbeing and physical recovery.

*All the client names have been changed to protect their identity

Appendix F. NHS Board Level Scoping and Mapping Projects

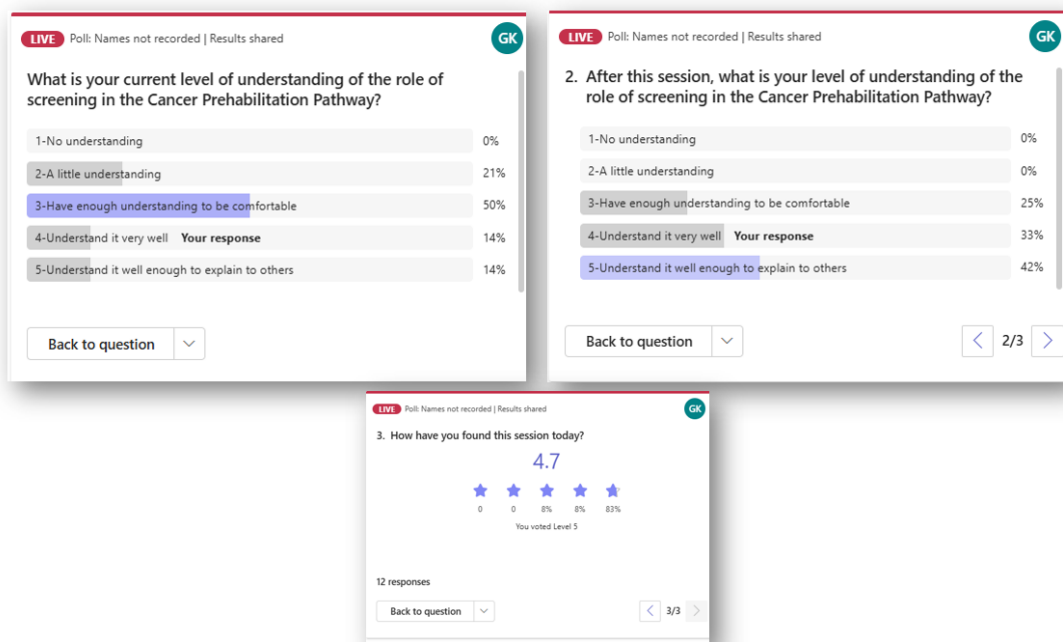### F1: Structure of the Short Life Working groups

Health Board	Group Name	Project Management (PM)	Group Members	Group Structure	Meeting Frequency	Benefits of structure
NHS Fife	Fife Cancer Prehabilitation Working Group	Supported through the SCAN PMs	• Includes approx. 28 members • Clinical Leads • Clinical nurse specialists • ICJ Team representatives • Cancer improvement managers • Third sector members • Primary care leads • Missing Diet and nutrition leads	• Chair sets meeting agenda with SCAN project manager input • All points discussed as group during meeting • Feedback and input requested between meetings via e-mail and forms • Group members liaise with other members of their teams	4-6 week working group meetings	Working group can contribute to discussion and add valuable experience and insights to each area of implementation as they are the people doing the work. The higher number of members represents a variety of opinions across different cancer types and different services. Members act as a communication waterfall to their other teams for insights, feedback and communication.
NHS D and G	D and G Cancer Prehabilitation Working Group	Supported through the SCAN PM with local PMO	• Includes approx. 19 members • Clinical Leads • Clinical nurse specialists • ICJ Team representatives • Cancer improvement managers • Third sector members • Primary care leads	• Chair sets meeting agenda with SCAN Project manager input • All point discussed as group • Feedback and input requested between meetings via e-mail and forms • Each prehabilitation modality has a service area lead who oversees the input and insight from that modality	4-6 week working group meetings	Having a lead for each modality helps give structure to the information gathering during the scoping and mapping, assessing gaps and making decisions about specific recommendations. It allows for detailed insight for the service to be gathered and feedback to teams.
NHS Borders	Borders Prehabilitation Project Board	Project support through Borders cancer service team with connection to SCAN PMs	• 5 board members • Much smaller group including key people involved in project • Committed to stakeholder engagement outside of the working group • Lead cancer information and support manager who oversees cancer pathway operations is part of the group meaning action can be taken swiftly	• Project support works with board members to set agenda for meetings • As options were already approved, meeting actions discussed fall under prep-approved direction • New items, require governance level approval before actions taken	8 weekly Board working meetings	A smaller group means decisions can be made quickly and the pre-approval of the option around improving universal pathways means that this is the only board to have implemented changes which allow the signposting and monitoring of all patients to universal prehabilitation offerings. The addition of screening implementation and data collection to the plan allows this site to work towards a deeper understanding of their service need and gaps.
NHS Lothian	Pilot Project Groups	Supported by SCAN and Lothian Strategic Planning	• Pilot projects were driven at cancer pathway level with project management oversight	• Key stakeholders involved in project delivery. • Linked into SCAN Steering Group and Lothian Prehabilitation and ERAS Board.	Monthly	Pilot studies were able to progress well with clinical oversight. Clinical partners worked to establish and deliver a workshop which included key stakeholders to gather information on challenges and barriers across many areas.

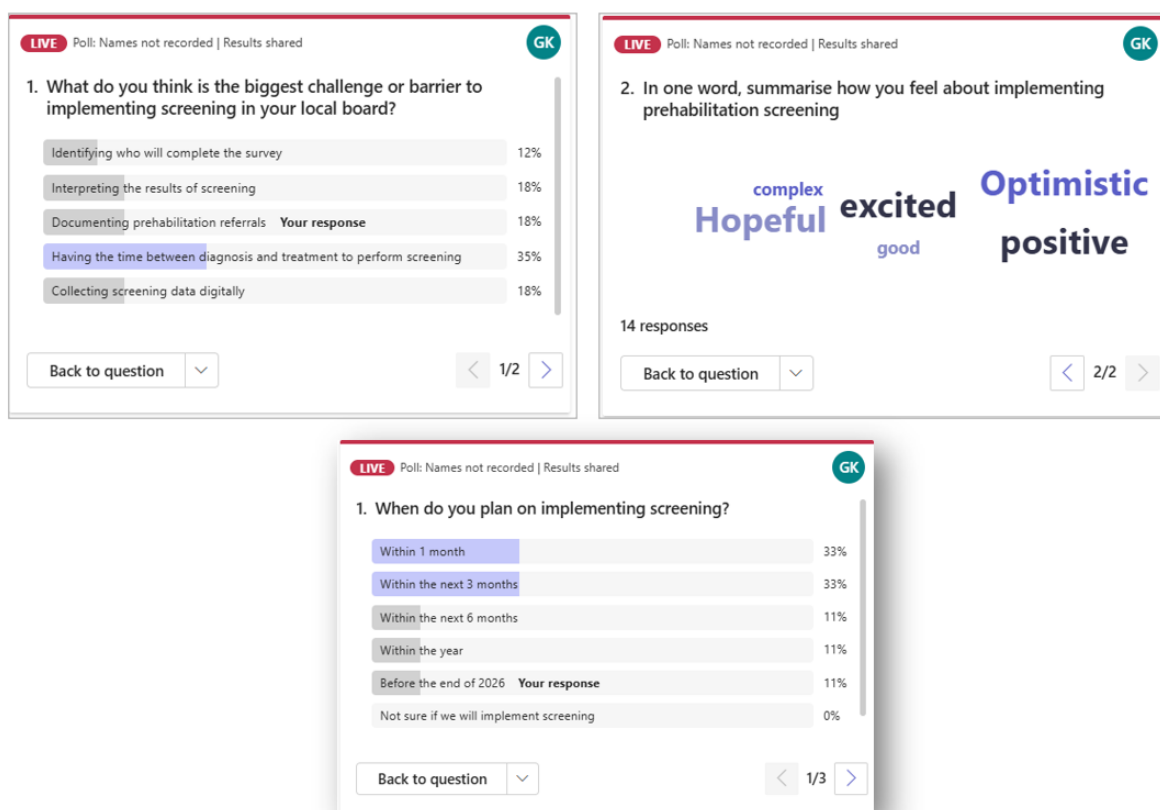## F2: SCAN Regions NHS Boards Stakeholder Engagement Methods

Health Board	Workshops	Interviews	Surveys	Other
NHS Fife	No workshops have been organised in Fife. Screening education/discussion session included an invitation to all stakeholders involved in the patient cancer pathway who may be involved in the screening process.	1:1 interviews have been conducted with various staff in NHS Fife including Cancer data scientists, Cancer Nurse Specialists (CNSs) from different tumour site pathways, Members of Improving the Cancer Journey (ICJ), Clinical leads and General practitioners (GPs)	• An NHS Fife staff survey included returns from 55 • A patient survey included X returns • Third sector survey included four responses	• A SCAN spreadsheet to outline the prehabilitation services was sent to the working group to add information on existing services • A form was created to collect feedback on final recommendations
NHS D and G	The initial stakeholder meeting was delivered as a workshop to understand the prehabilitation landscape with an overview of the Macmillan prehabilitation guidance given. A smaller working group was formed from this initial workshop.	1:1 interviews have been conducted with various staff in NHS Dumfries and Galloway including Cancer Nurse Specialists (CNSs) from different tumour site pathways, Members of Improving the Cancer Journey (ICJ), Clinical leads, (GPs) and various operations managers	• A service survey was conducted to gather the initial information on what prehabilitation services were already available	• A SCAN spreadsheet to outline the prehabilitation services was sent to the working group to add information on existing services • A form was sent to gather questions for the Prehabilitation screening workshop • The options appraisal was communicated in a spreadsheet and shared with the SLWG for comment and feedback
NHS Borders	A stakeholder event was designed early on in the project to understand current services available and staff opinion	The lead cancer GP organised and attended several interviews with various services to understand services on offer and staff opinion of prehabilitation	• A patient experience survey before changes was sent to 50 patients •	• A SCAN spreadsheet to outline the prehabilitation services was sent to the working group to add information on existing services
NHS Lothian	Prehabilitation Workshop to assess pathways and challenges to prehabilitation screening and pathway was delivered after the launch of the TRAKcare screening form.	As this board included individual pilot studies, those teams have been fully involved in giving feedback on pathways adjustments and inclusion of prehabilitation into existing pathways. Project team meetings have allowed lots of discussion and input to be collected.	• Patient experience surveys formed part of some of the pilot studies, this included post intervention surveys • Staff experience surveys formed part of some of the pilot studies	• A SCAN spreadsheet to outline the prehabilitation services was sent to the Lothian project manager to add information on existing services

F3: Results on the Impact of the Screening education Session

LIVE Poll: Names not recorded | Results shared   GK

What is your current level of understanding of the role of screening in the Cancer Prehabilitation Pathway?

1-No understanding	0%
2-A little understanding	21%
3-Have enough understanding to be comfortable	50%
4-Understand it very well Your response	14%
5-Understand it well enough to explain to others	14%

Back to question

LIVE Poll: Names not recorded | Results shared   GK

2. After this session, what is your level of understanding of the role of screening in the Cancer Prehabilitation Pathway?

1-No understanding	0%
2-A little understanding	0%
3-Have enough understanding to be comfortable	25%
4-Understand it very well Your response	33%
5-Understand it well enough to explain to others	42%

Back to question   < 2/3 >

LIVE Poll: Names not recorded | Results shared   GK

3. How have you found this session today?

4.7
★ ★ ★ ★ ★
0   0   8%   8%   83%
You voted Level 5

12 responses

Back to question   < 3/3 >

F4: Results on the engagement during the Screening education session

LIVE Poll: Names not recorded | Results shared   GK

1. What do you think is the biggest challenge or barrier to implementing screening in your local board?

Identifying who will complete the survey	12%
Interpreting the results of screening	18%
Documenting prehabilitation referrals Your response	18%
Having the time between diagnosis and treatment to perform screening	35%
Collecting screening data digitally	18%

Back to question   < 1/2 >

LIVE Poll: Names not recorded | Results shared   GK

2. In one word, summarise how you feel about implementing prehabilitation screening

complex   excited   **Optimistic**
Hopeful
good   **positive**

14 responses

Back to question   < 2/2 >

LIVE Poll: Names not recorded | Results shared   GK

1. When do you plan on implementing screening?

Within 1 month	33%
Within the next 3 months	33%
Within the next 6 months	11%
Within the year	11%
Before the end of 2026 Your response	11%
Not sure if we will implement screening	0%

Back to question   < 1/3 >

Appendix G. Cancer Prehabilitation Aspirational Model Test of Change SBAR

Cancer Prehabilitation Aspirational Model Test of Change SBAR – May 2025

Situation

As part of the SCAN final prehabilitation report for Macmillan Cancer Support, Katelyn Gilmour Macmillan SCAN Prehabilitation Project Manager has requested an SBAR from NHS Borders showing what resources would be required to expand our universal prehabilitation offer into targeted and specialist.

Background

NHS Borders were given funding from Scottish Government and Macmillan Cancer Support to complete a Prehabilitation Scoping Project. This project was completed and evaluated earlier than planned, see appendix 1. The remaining project time was used to develop a prehabilitation pathway, see appendix 2. It is important to note that other than the project funding there is no additional funding at present for prehabilitation, therefore any pathway developed had to remain within existing resources. NHS Borders Board have been very clear from the onset of the project that they are not in a position to provide any additional funding. The only achievable offer within existing resources was a universal pathway. We plan to go live with the Single Point of Contact (SPOC) offering prehabilitation screening to patients newly diagnosed with Cancer from Monday 2nd June 2025.

Given Katelyn's request, it was agreed at our local project board that we are not in a position to provide a detailed submission of requirements with costings as we have no live data to base this on. As part of our general evaluation we indicated general costs based on estimates, see page 11 of appendix 1.

However, it was agreed, that in order for us to accurately know our realistic evidence-based need we will collect 6 months of data from go live 2nd June – 30th November 2025. This will allow us to be more accurate in our forecast the local need for targeted and specialist services and what this means for resources.

Assessment

To achieve the request we would need to gather the following data for 6 months (see appendix 3 for full spreadsheet):

Data Item	Aim of Data Item
Number of patients offered prehab screening	To gain accurate count of potential users
Number of patients accepting or declining offer – if declining noting reasons for decline	To gain accurate count of uptake If uptake was low would allow us to review reasons for decline and amend conversations and/or pathway
The screening scores of those accepting – universal, targeted, specialist	To gain accurate count of patient need to inform resource requirement for targeted and specialist pathway
For those who complete screening where are they referred onto/what is the outcome*	To identify additional service need

*It has been agreed with the Wellbeing Service and LIVE Borders that for patients referred to them they will record any onward referrals and will be able to retrospectively provide these to using their existing data collection methods

Recommendation

- 6 months data should be gathered locally and analysed to allow production of evidence-based resource requirements
- NHS Borders should remain committed to providing a universal prehabilitation service within current resource with an aim to review potential development of this into targeted and specialist should any permanent external funding become available

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