GM Prehab4Cancer Independent Evaluation

Catherine Neck / Zoe Bristow / January 2022

Joining the dots across health and care

1: Background

Why was an Independent Evaluation required?

- Prehab4Cancer established using GM Cancer Transformation Funding
- First in UK to deliver a system-wide, multi-modal prehab and recovery programme
- A condition of the funding was a continued evaluation process
- SCW were commissioned to undertake an independent evaluation
- Establish impact P4C had on patient outcomes, pathway and service efficiencies

GM Prehab4Cancer Service Model http://www.prehab4cancer.co.uk/

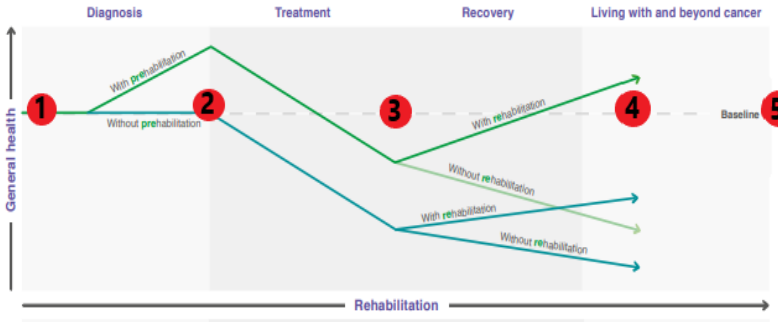
Colorectal, lung or oesophago-gastric surgery.

A prehab to rehab service working with existing ERAS+ initiatives.

Tri-modal programme includes:

- prescribed physical exercise
- nutritional screening and advice
- emotional wellbeing support

GM Prehab4Cancer Service Model



MDT decision to operate

PREHAB 3-6 weeks

ERAS+

Refer to Prehab → A → UNIVERSAL / TARGETED → A → SURGERY → A → REHAB 12 weeks → A → Ongoing exercise in community → A

A 4 assessments are carried out:

- On initial referral
- Pre-op (end of prehab phase)
- Post-op / after surgery
- Completion of rehab phase

A
- 1 year (telephone review – PROMS)

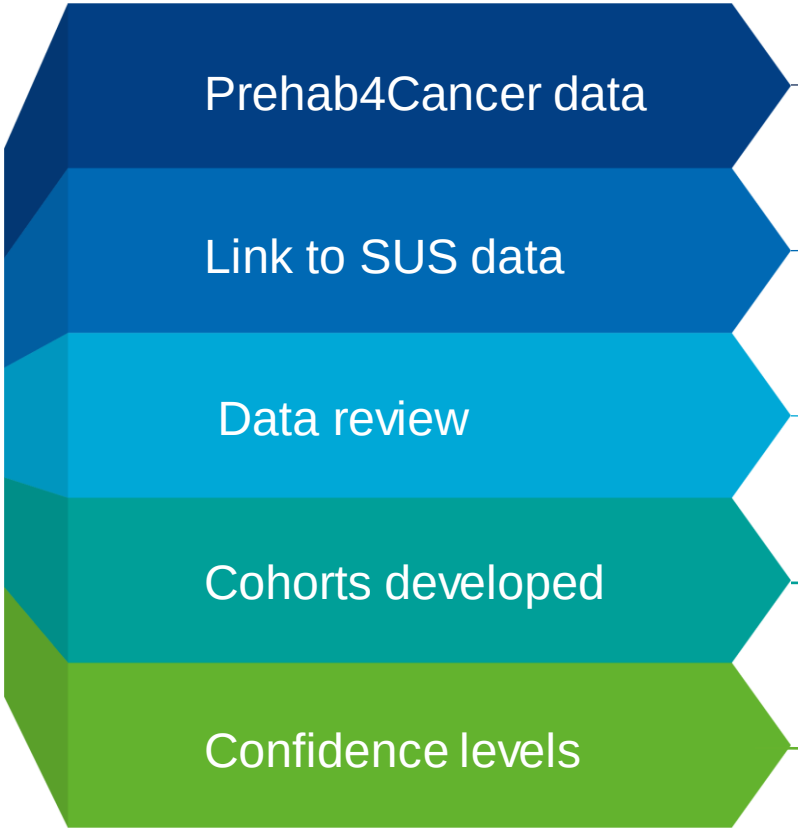
2: Evaluation Methodology

What was evaluated?

Healthcare Resource Use	Mortality	Physiological Measures	Patient Reported Outcome Measures
• Length of stay after cancer surgery • Emergency readmissions • Emergency Department attendances	• One-year survival data	• 6-Minute Walk Test • Rockwood Clinical Frailty Score • Incremental Shuttle Walk Test • BMI / Weight	• WHODAS 2.0 • EQ-5D-5L • IPAQ-SF • Self-Efficacy Scale for Exercise • EORTC QLQ-C30 (version 3)

Did not receive patient data

Evaluation Methodology



Prehab4Cancer comprehensive dataset: 1534 patients from 24th April 2019 - 13th May 2021

- Physiological assessments
- Patient Reported Outcome Measures (PROMS)

Link to Secondary Usage Services data for agreed patient cohorts

Colorectal, lung and oesophagogastric (OG) surgical procedures.

SCW assigned patients to cohorts

(Prehab and Non-Prehab; Pre- and Post-COVID-19; Procedure Risk; CCG; Secondary Care Provider where surgery performed; Agreed List of procedures; Gender, Ethnicity; Age Range)

Length of Stay calculated with 95% upper and lower confidence limits

Comparison Data Methodology – Non-Prehab cohort

1. Search SUS for spell with dominant procedure code from clinically agreed list

- but filter out any that we have Prehab assessment data for.

2. Check primary diagnosis of OG, Colorectal, Lung Cancer

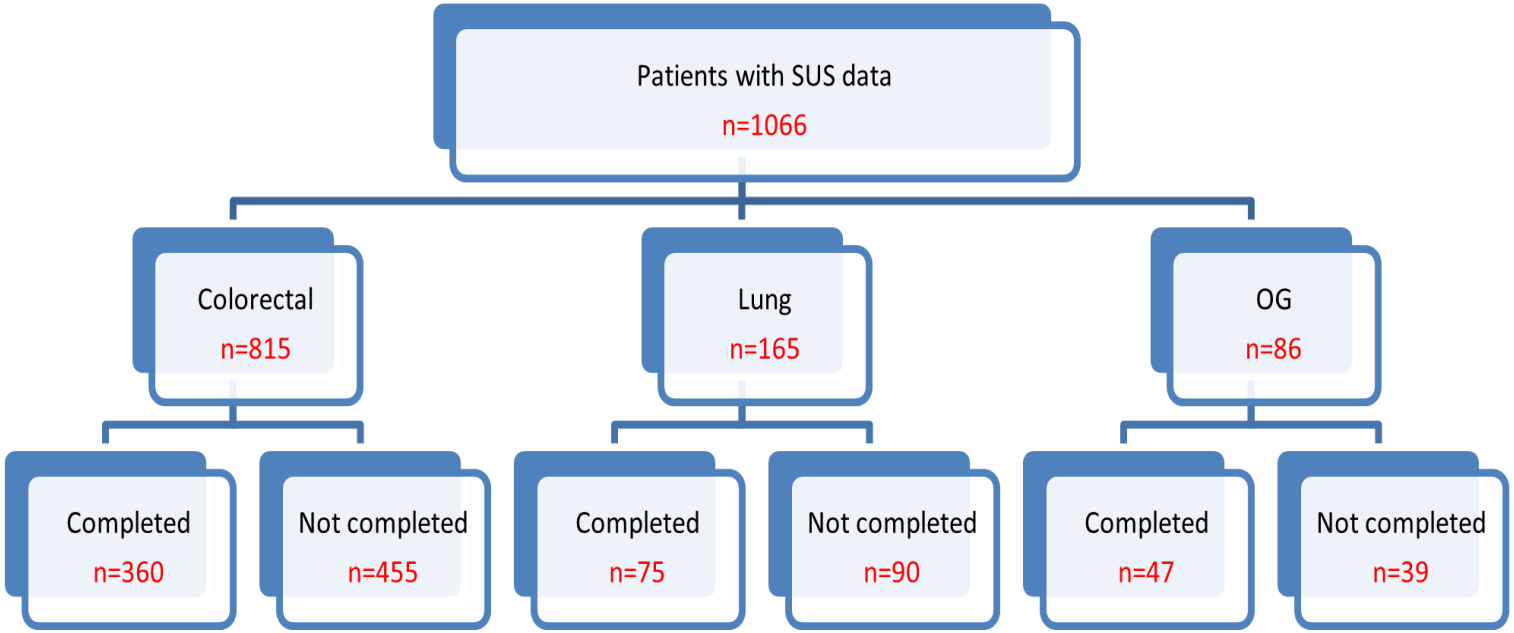
- OG = C15-17
- Colorectal = C18-20
- Lung = C34

Non-Prehab Cohort

Could have patients with a prehab referral in our “Non-Prehab” cohort as they were assumed to not have engaged with the service.

3: Healthcare Resource Use

Cohort Selection



Length of stay - Completed Prehab

Cohort	Number of patients in cohort		Mean total length of stay (days)			Mean Critical care length of stay		Bed-days released	CC Bed-days released	Bed-days released per Prehab patient	CC Bed-days released per Prehab Patient
	In Prehab	Not in Prehab	In Prehab	Not in Prehab	Significance (95% confidence)	In Prehab	Not in Prehab				
Colorectal	360	856	8.4	10.0	Prehab significant	1.4	1.8	550.1	146.6	1.5	0.4
Lung	75	209	5.8	6.2	Prehab significant	1.1	1.3	29.0	19.4	0.4	0.3
OG	47	110	14.7	14.9		5.0	3.5	7.6	-71.6	0.2	-1.5
TOTAL	**482**	**1175**						**586.7**	**94.4**	**0.5**	**0.08**

Emergency Readmissions - Completed Prehab

Cohort	Emergency Readmissions within 30 days		Emergency Readmissions within 30 days per Patient		30-Day Readmissions 'released'	Emergency Readmissions within 90 days		Emergency Readmissions within 90 days per Patient		90-Day Readmissions 'released'
	In Prehab	Not in Prehab	In Prehab	Not in Prehab		In Prehab	Not in Prehab	In Prehab	Not in Prehab	
Colorectal	47	112	0.13	0.13	0.10	71	239	0.2	0.3	29.5
Lung	11	35	0.15	0.17	1.56	16	55	0.2	0.3	3.7
OG	5	20	0.11	0.18	3.55	19	49	0.4	0.4	1.9
TOTAL	**63**	**167**	**0.13**	**0.14**	**5.21**	**106**	**343**	**0.22**	**0.29**	**35.19**

ED Attendances - Completed Prehab

Cohort	Emergency Department Attendances within 30-days of Surgery		Emergency Department Attendances within 30-days per Patient		Emergency Department Attendances within 30-Days 'released'	Emergency Department Attendances within 90-days of Surgery		Emergency Department Attendances within 90-days of Surgery per Patient		Emergency Department Attendances within 90-Days 'released'
	In Prehab	Not in Prehab	In Prehab	Not in Prehab		In Prehab	Not in Prehab	In Prehab	Not in Prehab	
Colorectal	69	148	0.19	0.17	-0.88	102	303	0.3	0.4	3.3
Lung	17	59	0.23	0.28	0.61	32	103	0.4	0.5	0.7
OG	6	25	0.13	0.23	0.50	17	55	0.4	0.5	0.7
TOTAL	**92**	**232**	**0.19**	**0.20**	**0.23**	**151**	**461**	**0.31**	**0.39**	**4.74**

Effect of Prehab on the Older Patient (70 years +)

Number of Patients in Cohort		Mean Total Length of Stay (days)			Mean Critical care Length of Stay (days)		Bed-days released	CC Bed-days released	Bed-days released per Prehab Patient	CC Bed-days released per Prehab Patient
In Prehab	Not in Prehab	In Prehab	Not in Prehab	Significance (95% confidence)	In Prehab	Not in Prehab				
196	267	10.5	12.5	Prehab significant	2.5	2.8	380.8	56.8	1.9	0.3

- Two days shorter length of stay, ‘releasing’ 381 bed days
- Less critical care bed days used, 57 bed days ‘released’
- Lower ED attendances within 30 and 90-days
- Lower 30 and 90-day emergency readmissions

One-Year Survival Post-Surgery

	Number of Patients		Survival at One-Year Post-Surgery			
Cohorts	Prehab	Non-Prehab	Prehab	Non-Prehab	Difference (%)	Significance (P-value)
Colorectal	593	1226	578 (97.47%)	1137 (92.74%)	4.73%	0.03246
Lung	358	454	333 (93.02%)	434 (95.59%)	-2.57%	0.110911
OG	93	91	89 (95.70%)	79 (86.81%)	8.89%	0.03246

- Colorectal – appeared to be significant improvement completed prehab (97.5% compared to 92.7%)
- Lung – there appeared worse survival in the prehab cohort
- OG – appeared to be significant survival advantage completed prehab (95.7% compared to 86.8%)

SCW

Cost efficiency - bed days saved

	Number per Prehab Patient	Value	TOTAL (Based on 1000 participants)
Bed Days released	1.5	£342 per day*	£513,000
Critical Care Bed Days released	0.4	£1214 per day*	£485,000
ED Attendances prevented	0.39	£375 per attendance*	£146,250
Emergency Readmissions prevented	0.29	£342 per admission*	£99,180
Estimated Financial Benefit			**£1,244,030**
P4C Programme Delivery Cost	-	£400 per participant	£400,000
Balance			**£844,030**

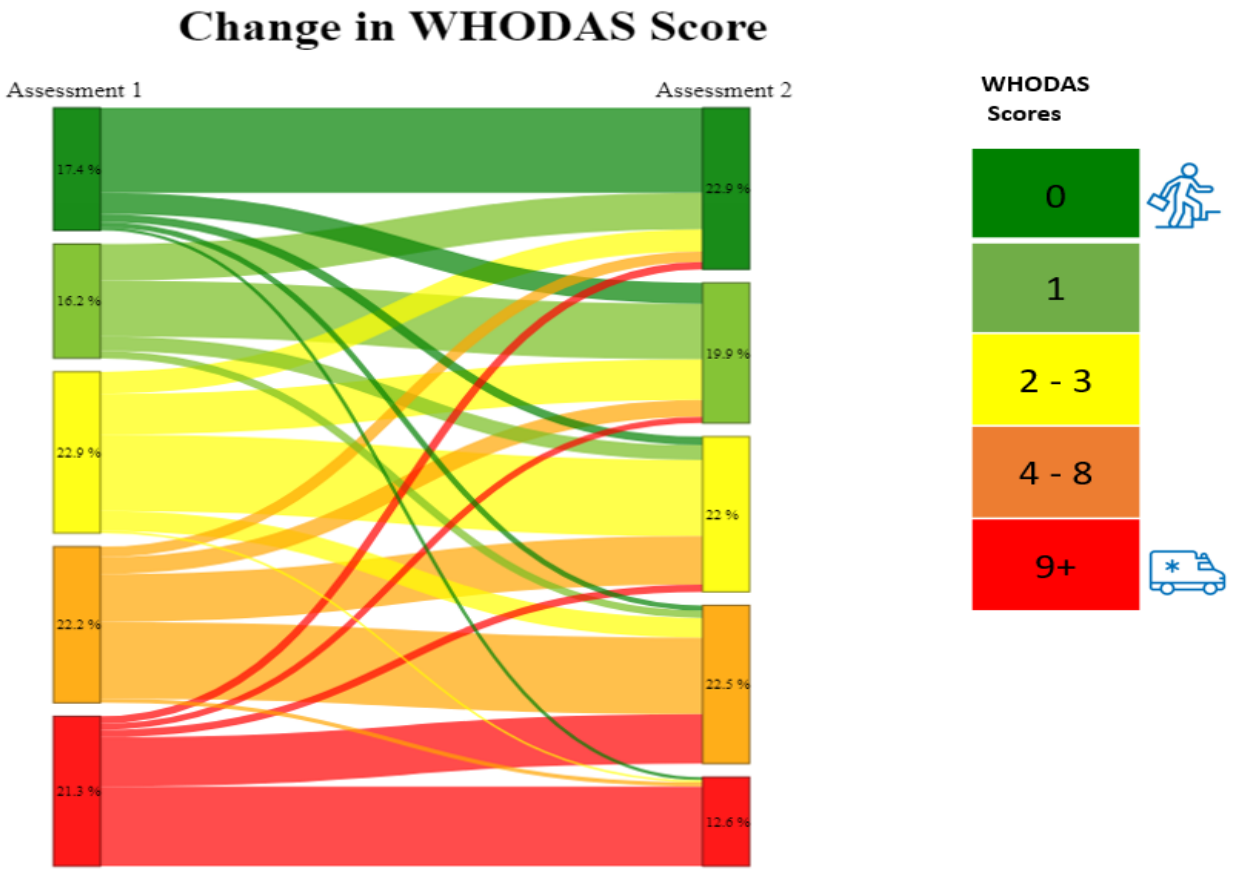
Data from the “completed prehab” cohort was used to identify cost efficiency in terms of bed days saved for 1000 colorectal patients.

- £400 cost per participant to deliver
- £1,244 provider efficiencies per patient

Enables the programme to be delivered to a further 2,110 patients

4: Patient Reported Outcome Measures

WHODAS Scores – Completed Prehab (n=672)



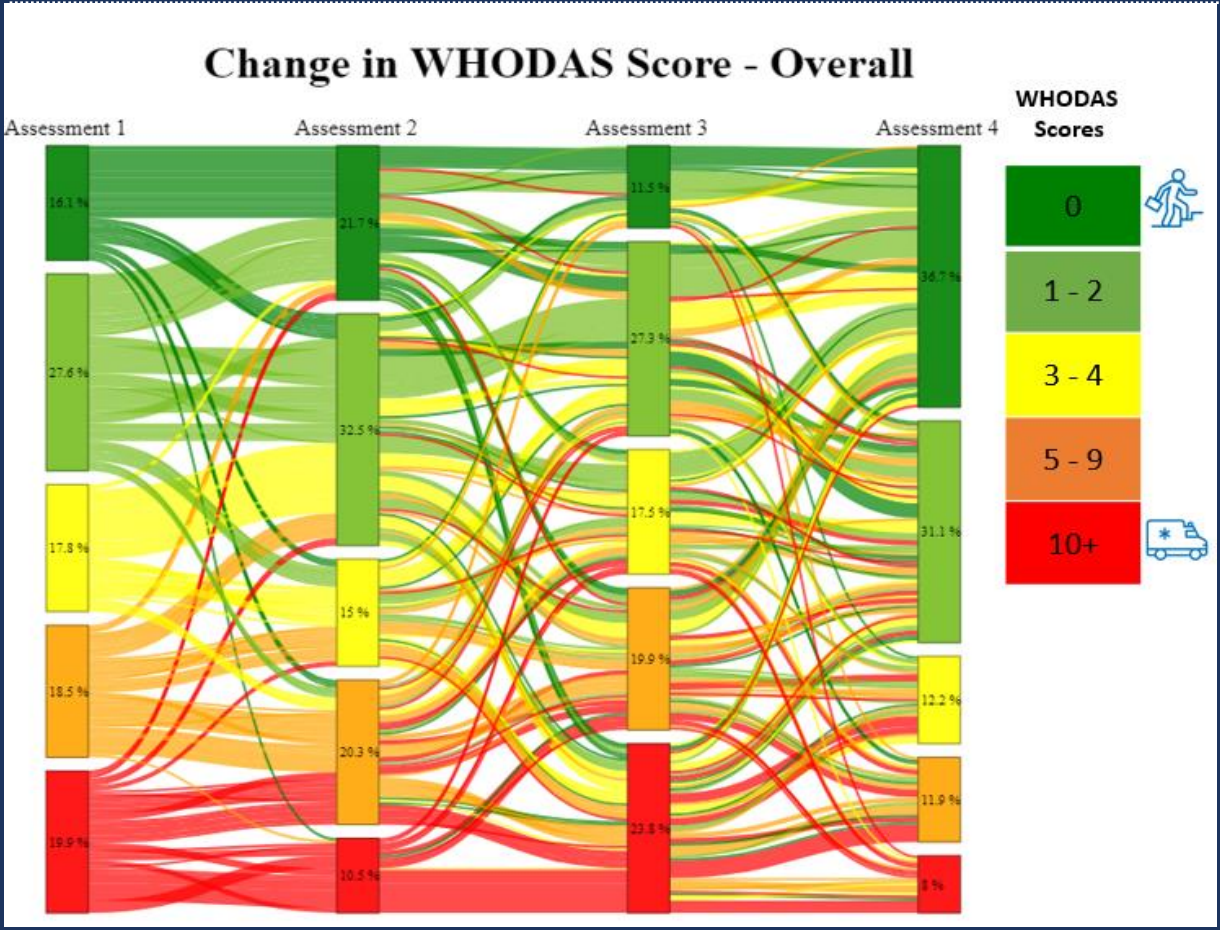
A lower overall score on the WHODAS indicates greater function and lower disability.

34% score 0-1 on assessment 1 increasing to 43% after completing prehab

The group with the lowest functional ability make up 21% of the total at assessment 1 and reduce to 13% at assessment 2

SCW

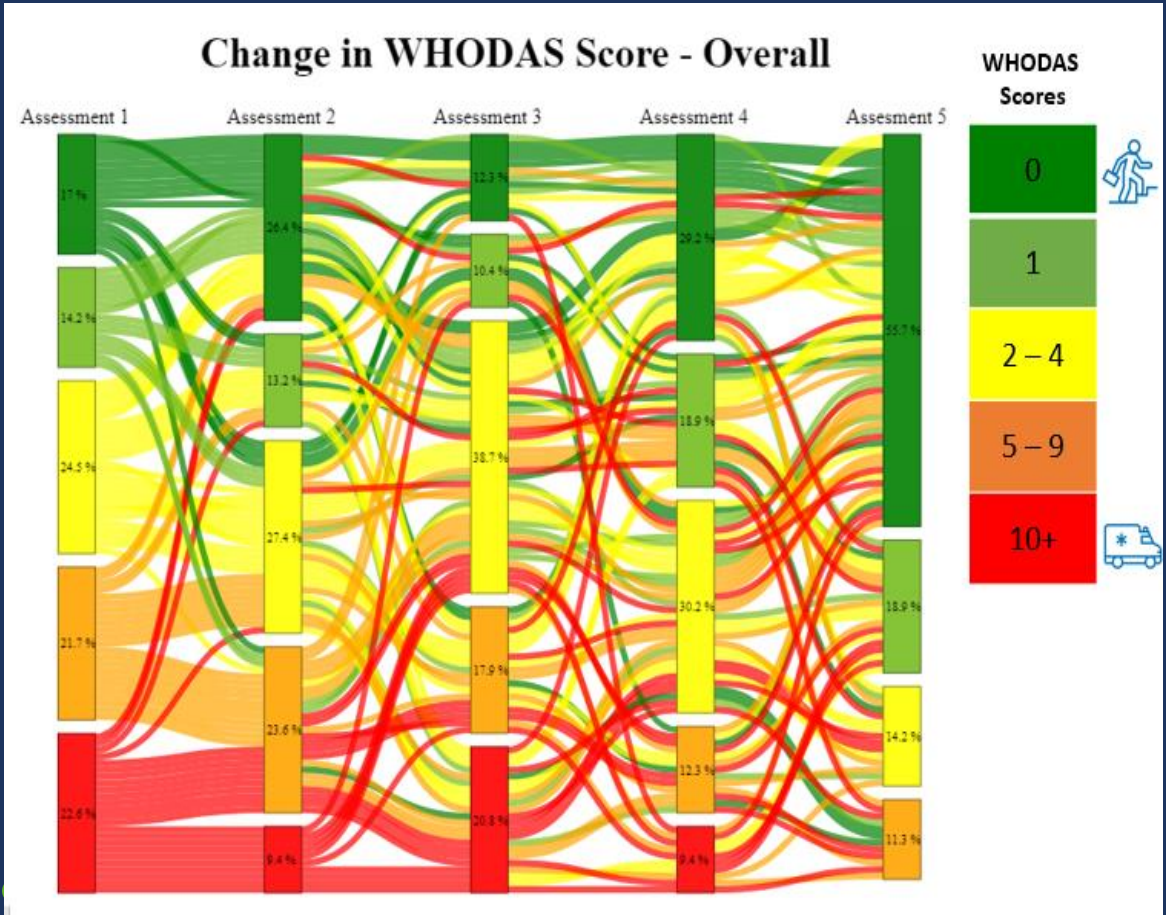
WHODAS Scores - Completed Prehab and Rehab (n=286)



44% of patients score 0-2 at assessment 1 increasing to 68% at programme completion.

The group with the lowest functional ability make up 20% of the total at assessment 1 and reduce to 8% at assessment 4.

WHODAS 1-year Follow Up (n=106)



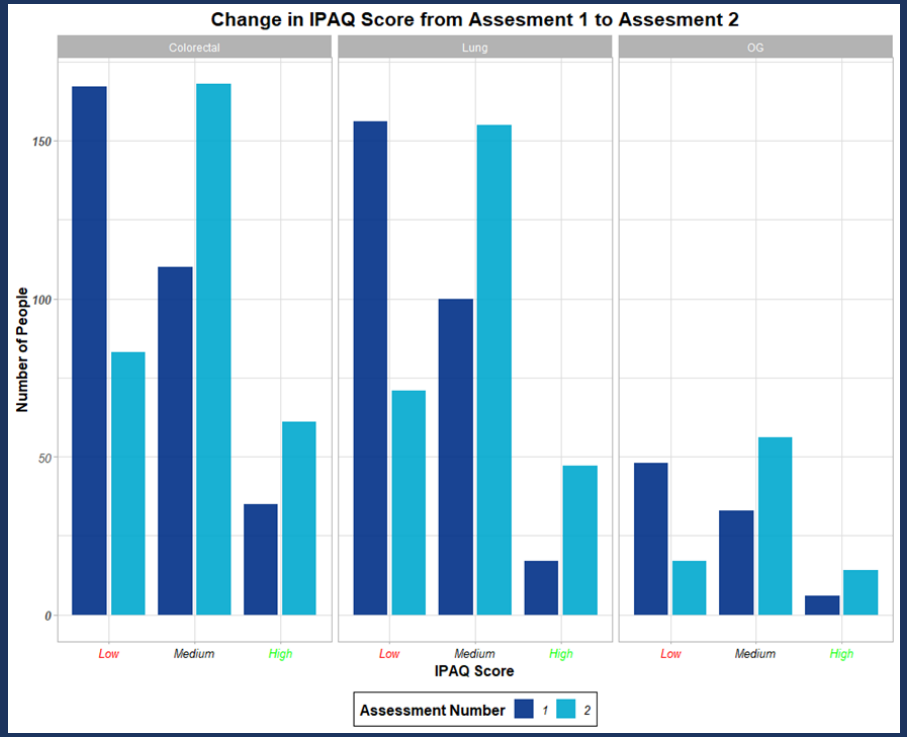
Green scores increase from 31% to 75%

Red scores drop from 22% to none

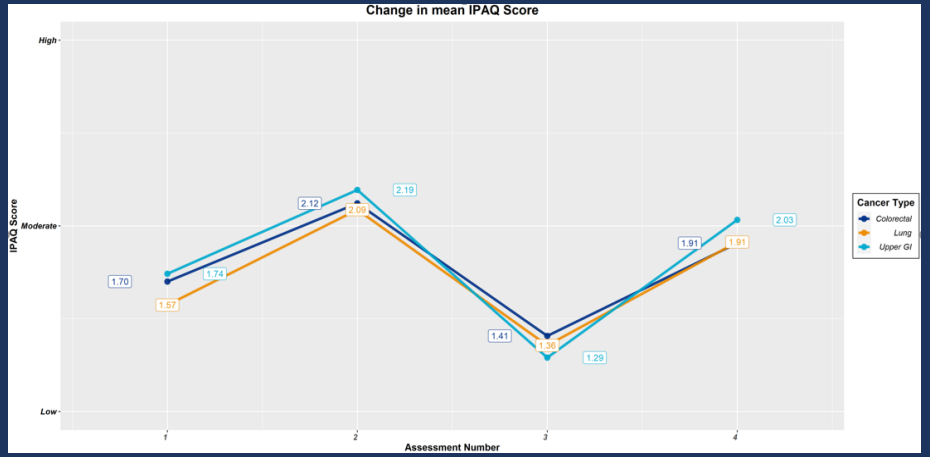
Assessment	Mean score	Variation in score (Standard Deviation)
1: Initial P4C Referral	5.91	7.13
2: Pre-op	3.7	4.88
3: Post-op	5.24	5.50
4: Completion of rehab	3.21	5.26
5: 1-year follow-up	1.32	2.17

International Physical Activity Questionnaire- Short Form

Completed Prehab (n=672)

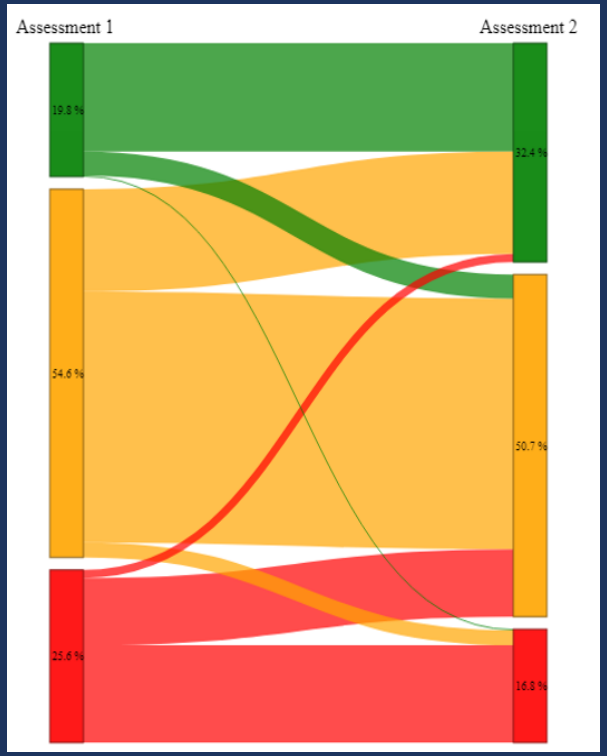


Completed Prehab and Rehab (n= 286)

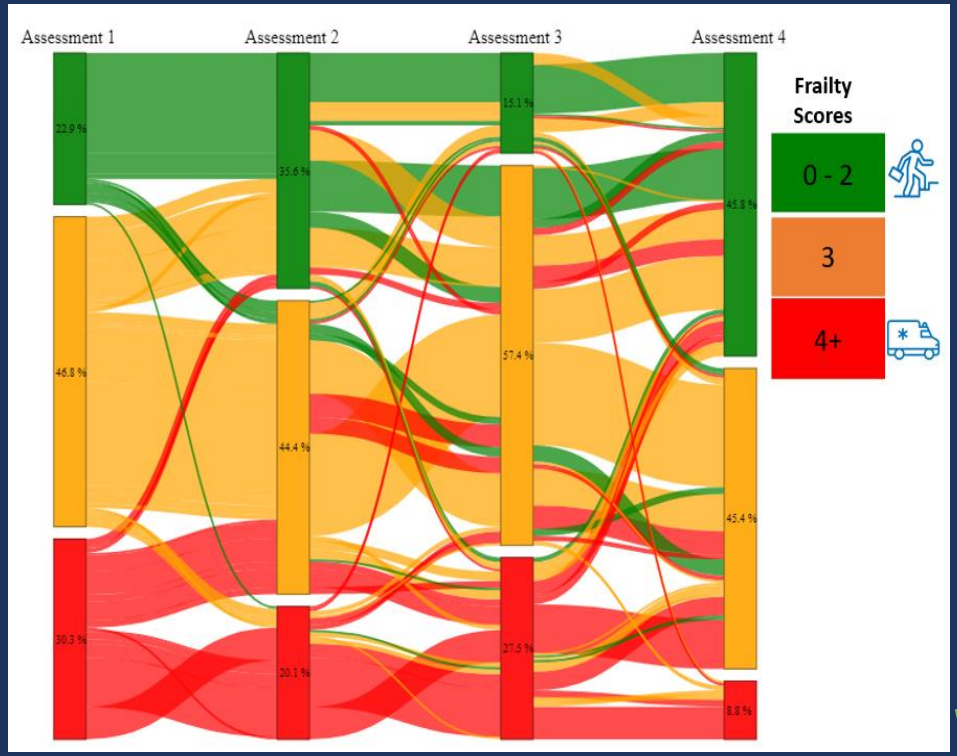


Rockwood Clinical Frailty Scale

Completed Prehab(n=672)



Completed Prehab and Rehab (n=284)



Euro Quality of Life - EQ-5D-5L

- Results for patients who completed prehab showed a significantly 'better' health state in four of the five domains suggesting that P4C was effective in improving quality of life for patients who completed prehab.

Metric	Assessment Point Mean Score		Significant Change
	1	2	
Mobility	1.5	1.35	**Yes**
Self-Care	1.14	1.1	**Yes**
Anxiety and Depression	1.41	1.31	**Yes**
Having pain or discomfort	1.74	1.55	**Yes**
Doing usual activities	1.74	1.71	**No**

Six Minute Walk Test (6MWT)

A significant change correlates with the shorter Length of Stay seen in the secondary healthcare usage data

Assessment	Mean score (Metres)	Variation in score (Standard Deviation)
1: Initial P4C Referral	332.63	92.56
2: Pre-op	375.23	94.51
Difference	+42.60m (Significant)	

42 metres = clinically significant

Patient & Family feedback

"I have found my energy and fitness levels improved tremendously"

"Prehab was a different way of exercising. Quick, intense but really enjoyable and massively beneficial."

"I have radiotherapy at an ungodly hour in the morning. Then usually good for some exercise in the afternoon."

"When the Consultant suggested the gym, we didn't really understand how that was going to benefit"

"If someone had previously told me that I would be going to the gym, I'd have laughed at them"

"My Wellbeing increased over the weeks before surgery because the exercise really helped me focus"

"The team and classes provide camaraderie and understanding."

"In these times of isolation it has been my main point of contact with other human beings"

5: Summary and Recommendations

Benefits are shown for patients, pathways and systems:

- Patients are optimised prior to surgery
- Long-lasting health benefits following rehabilitation
- Quality of life, physical activity improvements, long-term behaviour change
- Improvements are seen in both ward and critical care bed day usage
- Efficiency improvements to pathways
- Evidence supports improved survival in patients who complete prehab
- Cost-effective

Implications for Future

- The dashboard can be used to enhance the evidence base, enable capacity benefits to be maximised and patient outcomes improved for larger populations.
- Evidence can be utilised by commissioners, Cancer Alliances and new pilot sites.
- Relevance to emerging ICSs considering introduction of prehab to rehab.
- Supports expansion of the programme to wider patient cohorts, realising more patient and pathway benefits. Cancer and non-cancer pathways.

Recommendations to the GM P4C team

1. Embed P4C across other cancer treatments and non-cancer surgery to obtain maximum benefits

2. Use the SCW developed dashboard to enhance the P4C evidence base

3. Utilise learning from COVID-19 to develop a virtual, face to face and blended prehab to rehab offer to maximise effectiveness

4. Ensure equity of access to the P4C programme

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