

Innovating for Improvement

Preparing For Surgery: The Community Prehabilitation and Wellbeing Project (The PREP-WELL Project)
South Tees Hospitals NHS Foundation Trust



Report Completed by:

- **Prof. Gerard Danjoux (Project Lead)**
- **Dr Garry Tew (Northumbria University)**
- **Esther Carr (Project Manager)**
- **Dr Joanne Gray (Northumbria University)**

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About the project

Project title: Preparing For Surgery: The Community Prehabilitation and Wellbeing Project (The PREP-WELL Project)

Lead organisation: South Tees Hospitals NHS Foundation Trust

Partner organisation(s): South Tees CCG, Public Health Middlesbrough, Northumbria University, York University

Project lead(s): Prof. Gerard Danjoux

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Part 1: Abstract

This information will be used to give a brief summary of your project on our website, and may be revised for web copy. Please ensure that you do not exceed the word count as there is a strict word limit on the website.

Background

Unhealthy lifestyle factors (e.g. smoking and low levels of fitness) are a common risk factor for adverse outcomes with surgery, affecting 10 – 50% of patients. Optimising health and wellbeing in advance of surgery is pivotal in improving outcomes, whilst capturing a recognised ‘teachable moment’ for behaviour change. We designed a community-based programme (PREP-WELL) to address this, using targeted supervised lifestyle interventions, in the weeks immediately prior to surgery. Our service was modelled on the success of the national cardiac rehabilitation platform.

Innovative?

PREP-WELL is the UK’s first comprehensive, community-based programme, specifically designed to support the health of preoperative patients. It is highly innovative in being supported and delivered through a cross health sector partnership from Public Health, primary and secondary care. The service was closely aligned to high-level NHS priorities to promote healthier lifestyles through supported self-management closer to home.

Successes, challenges and enablers

Our main success was embedding the pilot programme into routine clinical care through effective cross-sector collaboration and support. The majority of patients recruited gained significant improvements in their health status and quality of life, and provided our team with excellent feedback. Several patients initially deemed too ‘high-risk’ were able to have surgery by improving their fitness from participation.

Our key enablers were; stakeholder investment with matched project funding, effective team working, central easily accessible location for patients, patient peer-support for one another through our group setting, and our surgical champion programme. Our main unexpected challenge was sickness of the project lead towards project completion.

Future plans

We plan to use the learning from the PREP-WELL pilot to develop our service model further for a wider spectrum of patients. This will be supported over the next 4-years by a Sport England Local Delivery Pilot Award.

Part 2: Progress and outcomes

This section is intended for you to summarise your outcomes and evidence for how these were achieved.

PREP-WELL is a pilot clinical service introduced by South Tees NHS Foundation Trust that aims to improve the fitness, health and wellbeing of patients prior to major surgery. It is the UK's first comprehensive, community-based programme, specifically designed to support the health of preoperative patients. It is highly innovative in being supported and delivered through a cross health sector partnership from Public Health, primary and secondary care. Patients are able to access on-going supervised support for several risk factors in a 1-STOP facility closer to home i.e. not in the secondary care setting.

The programme has the following key features:

- Quick referral to the programme after the decision to proceed with surgery has been made
- An initial evaluation that involves comprehensive screening for perioperative risk factors (ENTRY assessment)
- Development of a personalised lifestyle programme based on individual risk factor profile
- The opportunity to undertake the programme in a community wellbeing hub in Middlesbrough (The Live Well Centre)
- An EXIT assessments to determine changes in health and wellbeing prior to surgery

No significant adjustments were made to our original project plan.

1. Evaluation strategy

Our approach was to use an observational pre-post design involving a mixture of quantitative and qualitative data (i.e. we did not conduct a randomised controlled trial). Our measurement plan sought to collect data on the following:

- Numbers and characteristics of people using the service
- Changes in service users' lifestyle behaviours and health indicators between programme ENTRY and EXIT
- Costs of setting up and maintaining the service
- Resource use implications for primary and secondary care after surgery
- Process issues, including acceptability of the intervention to service users and providers

We successfully collected data on of the above points.

Data analysis was performed by two academics from Northumbria University (Garry Tew, Joanne Gray), who were co-applicants on the original bid.

There were very few adjustments to outcome measures during the project. For the first five patients, intervention acceptability was assessed using one-to-one semi-structured interviews. For all subsequent patients, we used a 2-page questionnaire instead of interviewing to obtain feedback.

2. Patient referrals and recruitment

Between January and December 2018, 159 referrals were made with 75 patients (47%) agreeing to participate. The most common reasons for non-participation were lack of interest (n=30), travel/transport difficulties (n=16), and surgery within 4 weeks (n=9).

Surgeons and anaesthetists made the majority of the referrals: 59% and 32% respectively. Patients were recruited from five specialties (vascular, orthopaedic, upper gastrointestinal, urology, colorectal); however, most patients were from vascular (43%) or orthopaedics (37%). The **mean time from referral to ENTRY assessment was 12 days** (range = 0 to 62). Prolonged time periods were usually in orthopaedic patients where no formal date for surgery had been set at the time of referral.

3. Patient programme preferences and ENTRY/EXIT assessments

All 75 participating patients underwent ENTRY assessments with **54 (72%) opting for supervised classes** at the Live Well Centre. The remaining 21 patients (28%) opted for a home-based programme.

Twenty-seven patients (50%) who opted for the face-to-face (F2F) programme completed both ENTRY and EXIT assessments. Five of these patients also completed a 3-month follow-up assessment to determine their progress post-operatively. Four patients who missed their EXIT assessment subsequently completed a 3-month follow-up assessment. Twenty-seven patients from the F2F programme (50%) did not undergo EXIT assessment, with the majority either failing to attend pre-booked appointments (30%) or reason unknown (44%).

4. Duration of programme

For patients attending supervised sessions, and who completed both ENTRY and EXIT assessments, **the mean duration in the programme was 9.3 weeks** (range 2 to 24). The mean number of centre-based sessions attended was 11 (range = 1 to 34).

5. Non-completion of PREP-WELL

Seven participants stopped attending the F2F sessions before the end of their planned intervention period. Known reasons for dropout included; no longer

having surgery (n=3), too far to travel (n=2), and family issues (n=1).

6. Characteristics of the 54 participants undertaking a F2F programme

- Mean (SD) age = 69 (10) years
- 70% male
- 98% white British
- **Commonest co-morbidities:** hypertension (65%) > arthritis (63%) > cognitive impairment (37%) > diabetes (26%)
- Active malignancy in 8 (15%) with 6/8 (75%) undergoing chemo or radiotherapy
- **Adverse lifestyle behaviours:**
 - inactive (Not meeting WHO aerobic and resistance targets combined) 100%
 - alcohol excess 20%
 - smoking 13%
 - morbidly obese 7%, underweight 2%

7. Interventions offered to the 54 participants undertaking a F2F programme

Interventions were offered to participants based on individual need. The following table provides a summary of what was offered.

Intervention area	Summary of what was offered
Smoking cessation	7/54 (13%) were smokers at ENTRY. Two patients agreed to referral, two patients self-referred and three patients wished to stop independently.
Alcohol reduction	25/54 (46%) were alcohol drinkers at ENTRY. 11/25 drinkers accepted verbal alcohol reduction advice from the project manager; one was referred to alcohol cessation services, and one declined all interventions.
Exercise	All 54 participants had exercise as an agreed intervention, with 17 (31%) also receiving inspiratory muscle training.
Weight management	3/54 (6%) participants received dietary advice for weight loss, and one other attended a specialist weight management service. The two participants who were underweight received nutritional supplements.
Frailty management	One patient was classed as frail at ENTRY, with GP and secondary care teams contacted by the programme manager.
Obstructive sleep apnoea	3/54 (6%) participants were classified as being high-risk for sleep apnoea (using STOPBANG questionnaire). Further diagnostics were carried out and one participant required continuous positive airway pressure therapy.
Anaemia	7/54 (13%) participants were anaemic at ENTRY. Five received intravenous iron via the pre-assessment pathway and two were referred to their GP for management.
Anxiety/Depression	7/54 (13%) participants had abnormal HADS Anxiety scores at ENTRY. Five were offered mindfulness training, and one was referred to counselling. One participant declined all interventions. One person with an abnormal depression score was referred for counselling.

8. Changes in service users' lifestyle behaviours and health indicators between programme ENTRY and EXIT

(analyses are based on data from 27 participants completing both assessments unless otherwise stated)

- Number of smokers **REDUCED** by 4% from 15% at ENTRY to 11% at EXIT
- Participants consuming >14 units/week of alcohol **REDUCED** from 19% at ENTRY to 15% at EXIT
- The percentage of participants achieving the Government-recommended level of physical activity (aerobic and resistance targets combined) **INCREASED** from 0% at ENTRY to 73% at EXIT

- The mean 6-minute walk distance **INCREASED** by 35 m, or 8% (n=18), from 444 m (SD = 177) at ENTRY to 479 m (SD = 155) at EXIT. Fifty-six percent of participants achieved a clinically significant improvement of >25 m; 22% showed a decrease of >25 m
- The mean BMI (n=24) was 30.3 kg/m² (SD = 5.2) at ENTRY and 30.1 kg/m² (SD = 5.2) at EXIT. The percentage of participants with a BMI 20-35 at ENTRY was 81%, and 87.5% at EXIT.
- The percentage of participants with abnormal or borderline abnormal HADS anxiety scores was 19% at ENTRY and 23% at EXIT; the mean scores at ENTRY and EXIT being 5.0 (SD = 4.6) and 5.5 (SD = 5.0), respectively.
- The percentage of participants with abnormal or borderline abnormal HADS depression scores was 12% at ENTRY and 8% at EXIT; the mean scores at ENTRY and EXIT being 4.2 (SD = 4.3) and 3.9 (SD = 4.2), respectively.

9. Patient reported outcomes

- The 5 patients undergoing 1:1 interviews at the beginning of the programme provided universally positive feedback
- Seven participants returned programme EXIT questionnaires: 6 rated the programme as 'excellent', with the other rating it as 'good'. All 7 participants would recommend the programme to others

10. Health Related Quality of Life Changes: HRQOL (EQ5D – 5L)

Score of 1.0 = full health, 0 = a state equivalent to being dead

- HRQOL improved by a mean (SD) score of 0.038 from 0.76 (0.13) at ENTRY to 0.80 (0.13) EXIT.
- **This suggests a meaningful improvement in self-reported HRQOL from programme participation.**

11. Patient stories

Patient stories from the project can be found through the following links:

(a) Why did you come to PREPWELL?

<https://vimeo.com/323701838/6caf7c53d4>

(b) What did you do in the project?

<https://vimeo.com/323709390/f84d8fb9c7>

(c) Would you recommend PREPWELL to others?

<https://vimeo.com/323713515/e15ad54740>

(d) Billy's story

<https://vimeo.com/323740295/6409889c63> (Billy's story)

N.B. Formal consent was obtained for all patient stories presented.

Part 3: Cost impact

This section is intended for you to review the cost impact of your project – giving an indication of whether the intervention is cost saving, cost neutral or requires ongoing investment.

The pilot service was funded through the Health Foundation Innovation grant supported by £26,000 of matched funding from regional stakeholder partners including; South Tees Hospitals, South Tees CCG and Public Health Middlesbrough. A health economist from Northumbria University (Jo Gray) constructed the initial health economic plan and subsequently led the analysis. The full health economic analysis is still being undertaken, therefore only a proportion of outcomes are presented herein (described below). The full plan will include a comparison of hospital length of stay and subsequent healthcare utilisation against a case-matched control group.

A cost outcome study was conducted to evaluate the costs of delivering the intervention and the impact on length of stay and health related quality of life of participants. The costing analysis was conducted from an NHS and Local Authority provider perspective and all costs were priced in 2018 prices. Outcomes were measured as health utilities, using the EQ-5D-5L tool. Quality of life benefits are described in section 2.

The costs associated with the exercise intervention were micro-costed and estimated on a per patient basis. The intervention costs comprised three components: the capital costs of the intervention materials; staff time associated with the delivery of the interventions and evaluations and overhead costs in terms of room rental. Capital costs included; purchase of essential equipment for supplementary home-based sessions, nutritional supplements and patient information materials.

The sessions were initially planned to be undertaken twice weekly and to last for 6 weeks, but often lasted longer than this. There were 95 supervised exercise sessions which each lasted for 90 minutes with an expected attendance of 9.14 persons. However, the average attendance over the course of the intervention was 5.34 persons. In terms of staff time the Project Manager and two Health Trainers supervised each session.

The average total cost of the intervention per patient was £404.86. When broken down by speciality, average costs varied according to average number of sessions attended per patient which is likely correlated to waiting times for operations; orthopaedics having the highest average costs (£475.92) and urology having the lowest (£203.22). In order, to negate this effect, a weekly average total cost of £52.35 was estimated across all specialities.

Median length of hospital stay for the 37 patients who had undergone surgery was 5 days. Remaining data from all patients, and a matched control group are required to estimate resource implications arising out of potential changes in length of stay

consequent to the intervention.

Outcomes in the economic analysis were identified and measured using a multi-attribute utility measure; EQ-5D-5L. The EQ-5D-5L is a generic, multi-attribute, preference-based health related quality of life (HRQOL) measure. HRQL and associated utilities were obtained at ENTRY and EXIT evaluations. These occurred after a decision to operate was made and prior to surgery. Across all specialities, average health related quality of life scores improved prior to surgery evidencing that the intervention had a positive impact (see section 2).

It is presently not possible to evaluate the impact on other services until the full analysis is completed.

Part 4: Learning from your project

This section is for you to reflect on your learning from implementing your project and identify important lessons for other change makers.

When benchmarked against our initial targets the PREP-WELL project has been very successful. **We achieved our primary aim of implementing a community-based health and wellbeing service for patients before surgery.** We also demonstrated excellent rates of patient engagement, with uptake rates of 43%; comparable with the national Cardiac Rehabilitation uptake rate [NACR, 2018] (which our service was modelled on). Within our recruitment time-window to the programme we enrolled 75 patients against an initial target of 100.

We were also able to demonstrate **effective cross-sector working** across healthcare sectors supported by academic partners. Our results summaries in section 2 and 3 also clearly demonstrate improvements in patient health behaviours and health-related quality of life.

(A) Key Enablers

1. Stakeholder investment

Partnership working across a number of sectors was key to success of the project. All stakeholders had provided a degree of matched funding and were invested from the outset. Partners were involved in the setting up and development of the project with representation on the project steering group. This provided iterative clarity as the project progressed with all groups heavily invested in the success of the pilot.

2. Team working

Team members who were directly delivering the service to patients (physiotherapist and health trainers) were enthusiastic, engaged and keen to provide a positive patient experience. This was key to patient compliance with the programme and was reflected in the feedback.

In addition our anaesthetic and surgical referral “champions” (motivated senior clinicians who ‘believed in’ the concept of prehabilitation) from different specialties, made a major contribution to project success. These individuals were key in making initial referrals to the programme and promoting the service within their clinical teams. Consequently, a ‘spill over effect’, was observed: other clinicians took notice of the success of the programme and began regularly referring patients and encouraging them to take up the offer of prehabilitation.

3. Patient-centred location

The programme benefitted from being run in a community health facility, the Live

Well centre. This is a “one-stop” centre containing a range of public health and lifestyle interventions, including smoking cessation, specialist alcohol services and a gym, meaning patients can access all support services in one setting. The centre affords easy access due to its location in central Middlesbrough, good parking facilities and excellent public transport links.

4. Patient peer-support

The exercise training sessions and introductory seminar (information session for patients and their relatives), were delivered in-group sessions. The peer support networks developed during the group exercise sessions bolstered patient ‘buy in’. These sessions also provided opportunities to discuss any concerns or questions with health professionals. Patients were able to understand that they were not alone in their journey through surgery, with many developing new friendships within the groups.

5. Policy and national drivers

The national drive for patient self-management, care closer to home and integrated working across health sectors was a key recent cultural shift in enabling PREP-WELL to be funded and successful. The project was aligned from the outset to benchmark against high-level policy changes to services and patient care including the 5-year Forward Plan. A regional culture of more integrated working through initiatives such as the Sustainability and Transformation Partnerships was also integral to success.

Another key enabler was the current focus nationally on improving patient care and outcomes following surgery. The Royal College of Anaesthetists (RCoA) is running a national Perioperative Medicine initiative, across Royal Colleges, which provided high-level endorsement for the project. Indeed our team were invited to represent the RCoA nationally at a New Models of Care conference, providing an opportunity to present our work as an exemplar of innovation (October 2017).

(B) Not quite going to plan!

1. Over-ambitious set of outcome measures

The service was closely modelled on cardiac rehabilitation and the evaluation and outcome measures were appropriately aligned. Although in the main we were very successful in achieving this, on reflection the short set up timeframe and limitation on funding made this strategy slightly over-ambitious. Mitigation was achieved by iteratively focussing resources on areas deemed to be higher priority by the project steering committee. Predictable.

2. Project manager (PM) role

A full-time, band 6 physiotherapist with a Cardiac Rehabilitation background was employed to work with the project lead. This post had a diverse range of

requirements including patient-facing interactions, stakeholder-facing interactions, delivery of interventions, data collection and communications within the team. At the outset this was manageable for the PM, however as the project gained momentum the role became more challenging. This was mitigated through support from other team members including trainee doctors invested in the project. Moving forwards our team are aware that there is a significant piece of work in addressing this potential issue in securing a sustainable model of delivery. Predictable.

(C) Unexpected challenges

The main unexpected challenge was an enforced period of sick leave for the project lead for 2 months in October/November 2018. This caused difficulty around the time of project completion and data collection/analysis. During sick leave a consultant colleague was able to step in and provide supervision for the PM and study team. On return the project lead completed a full appraisal and led the team through an intense period of data collection and analysis in January 2019. Although delayed by approximately 4-6 weeks this showed the benefits of good project leadership and team working.

(D) Unexpected benefits!

1. 'Unfit' patients able to have surgery

The initial study plan was to include patients listed and planned for surgery. Three patients with abdominal aortic aneurysms were initially deemed too high risk for surgery at MDT evaluation. A decision was endorsed to offer these patients the opportunity to improve their 'fitness' through the 6-week programme. All 3 patients significantly improved their fitness and underwent surgery uneventfully.

2. Project endorsement by 'sceptical' surgeons

One of the vascular surgeons initially had significant reservations about the benefits of prehabilitation. He reluctantly agreed to occasionally send the odd patient to the service. One of his patients had significant risk factors and had recently suffered a chest infection. A decision was made through MDT to defer surgery for 6 weeks and include the patient in the programme. The patient made significant improvements in fitness and underwent high-risk surgery uneventfully, leaving hospital in a shorter timeframe than average. This single case converted the surgeon who has subsequently become a big advocate of the programme!

(E) Main reflections and learning

1. The main reflection that our team will take away from the project is that although it was incredibly hard work, we were able to successfully implement a previously untried new model of care in a relatively short timeframe. This was despite several areas of uncertainty including; working together across health sectors, delivery in a community-based setting, patient uptake and attendance.

2. There is little that we would have done differently. We knew from the outset the project was highly ambitious to put in place and deliver to time and budget. As such the PM was appointed and interviewed before we had actually been informed whether our application to the Health Foundation had been successful. Without this strategy we wouldn't have been able to achieve as much as we did within the project timeframe.

(F) Key learning points in adoption for others:

1. Ensure full engagement of all relevant stakeholders prior to project commencement.
2. Be ambitious and hit the ground running – see example above of appointment of project manager.
3. Ensure the right expertise is available within the team for project development, implementation and analysis. For us this included; clinicians (primary and secondary care), allied health professionals, health trainers, health economists, exercise scientists and public health specialists.
4. Visiting other teams who have successfully worked in similar fields e.g. cardiac rehabilitation services was key for us

Part 5: Sustainability and spread

This section is intended for you to communicate your plans for sustainability within your organisation and spread beyond your project team.

(A) Sustaining PREP-WELL

The PREP-WELL pilot has provided a wealth of useful pilot learning and data to inform our next stage plans for service development, embedding and spread. Further discussion and dissemination of findings with local and regional stakeholders will be crucial in securing local sustainability and spread to other regions.

The programme will continue to be funded locally, in the medium term, through a Sport England Local Delivery Pilot grant. The findings from the pilot have shown that we need to develop 2 pathways, as there appear to be 2 distinct patient groups with differing prehabilitation requirements:

1. Pathway 1 - will be based on the current PREP-WELL model and will be aimed at 'high risk' patients. This pathway will continue to include patients undergoing higher risk surgical procedures but will be expanded to encompass more patient groups scheduled for cancer surgery.

2. Pathway 2 - Alongside this a second pathway will be developed for 'higher volume' surgical procedures; initially this will include orthopaedic patients but could in time be rolled out to include other pathways where there are large numbers of patients. This population have 'lighter touch' needs and more emphasis will be made on self-management.

This strategy will help facilitate support at the right level for all groups of patients.

We are in the process of securing some QI coaching support to assist us to successfully develop these pathways.

(B) Recognition and spread

1. International interest and recognition

PREP-WELL has attracted visiting teams from New Zealand, Canada and across the UK. The Royal College of Anaesthetists (RCoA), Royal College of General Practitioners and the New Models of Care team have also shown interest in the project. This provides high profile recognition for the project internationally. Much of the interest was as a consequence of an invited guest editorial in the RCoA bulletin (Appended). As a consequence our team are recognised as pioneers internationally.

2. Conference presentations

The concept of the PREP-WELL project has been presented at a number of

national and international conferences, including the 2nd World Prehabilitation Conference (Holland 2018). Additionally the RCoA invited the project team to present, on their behalf, at a national New Models of Care conference as an exemplar of innovative working in perioperative medicine. The team received excellent commendation and were one only three teams (from 18) subsequently mentioned in the Directors conference communication.

The project lead has received a further 4 invitations to present project findings at international/national conferences in 2019.

3. Publications and media interest

Much of the project interest generated has stemmed from an invited editorial in the RCoA bulletin (March 2018, appended). On completion of the analysis of our pilot project findings we are planning 2 manuscripts to be submitted to peer-reviewed journals; a main publication relating to pilot study findings and a more detailed health economic evaluation publication.

4. Press coverage

When the project was initially launched South Tees Hospitals released a press statement (appended) which gained significant local interest (January 2018). Subsequently the lead applicant and project manager have been interviewed and presented on local radio (BBC Tees, January 2019) about the project and benefits of improving patient fitness for surgery.

5. Strategy for spread

The project team has made widespread local, national and international contacts to help enable both spread of findings and uptake on a wider scale. This has been facilitated through links established by the project team through Royal Colleges, Macmillan Cancer Support and national Public Health networks.

6. Innovation Spread

In the next twelve months we intend to keep testing and refining the PREPWELL intervention by widening uptake across South Tees and robustly testing a low and high volume pathway to build the local case for sustainability and describe return on investment. Funding has been secured from Sport England (as part of a wider activity agenda) to support this and we have created a team of clinicians, Public Health specialists, commissioners, managers and a QI experts to take this forward.

Alongside this core work, we will enter into discussions with potential early adopters from geographically neighbouring CCG areas interested in achieving uptake in their regions. This will inform the design of our wider regional spread model for the North East. With these partners and an economic plan, we will engage with commissioners within the Integrated Care System footprints to evaluate opportunities for regional spread across the North East and North Yorkshire.

We will also engage with interested parties outside of the Northern region through dissemination, publications of project findings, conference presentations and the establishment of a new social media campaign to raise awareness. Our strategy here would be to seed interest that might generate informal adoption routes.

We would welcome the chance to discuss the potential for on-going support from the Health Foundation to achieve these three steps, should the opportunity and interest arise.

Appendix 1: Resources and appendices

Please attach any leaflets, posters, presentations, media coverage, blogs etc. you feel would be beneficial to share with others.

The following have been appended to the application:

1. Project story – link: <https://www.youtube.com/watch?v=sLPuKDtAgTU>
2. Project Patient Information Leaflet (PIL)
3. PIL for home-based supplementary exercise
4. Royal College of Anaesthetists guest editorial on PREPWELL (March 2018)
5. Project logic model and flow diagram
6. South Tees Hospitals press release at launch of project – link: <https://neconnected.co.uk/one-stop-health-shop-prepare-patients-surgery/>
7. Northumbria University project piece – link: <https://www.northumbria.ac.uk/research/research-impact-at-northumbria/health-impact/improving-the-fitness-of-patients-for-surgery/>