Health Innovation
Kent Surrey Sussex

Unity Insights

MUTU® System

Evaluation report

April 2024

Contents

Executive summary

Context

Over one third of women experience long-term post-partum conditions (Vogel et al., 2023), including conditions that can impact their quality of life such as pelvic organ prolapse (POP), urinary incontinence (UI), and dyspareunia (painful sex).

MUTU® System is an online programme that uses pelvic floor exercises, and learning materials to improve pelvic health symptoms. Unity Insights was commissioned by Health Innovation Kent Surrey Sussex to evaluate the impact of MUTU® System across an NHS physiotherapy and GP practice cohort.

Method

Women attending their six-week post-partum GP check-up or those 12-months post-partum who had been contacted by their GP practice ('*NHS GP practice patients*') and women presenting with pelvic health symptoms in a physiotherapy appointment ('*NHS physiotherapy patients*') completed surveys that gathered insights into symptom severity and user feedback.

A self-pay survey, consisting of a larger sample of women who paid for a MUTU® System subscription, completed a similar survey. This sample was used to generalise findings to the wider NHS cohort due to having similar demographic characteristics. A t-test was completed to understand whether MUTU® System led to a significant improvement in pelvic health symptoms.

Staff surveys were also completed to understand the impact of MUTU® System on staff, alongside further patient feedback.

A cost-benefit analysis (CBA) identified the net present value (NPV) of MUTU® System due to reducing NHS treatment costs for POP, UI, and dyspareunia. The per patient cost of MUTU® System was also explored through break-even analysis, observing the point MUTU® System became cost-neutral.

Results

Qualitative insights

Patient surveys identified that women gained knowledge around pelvic health after using MUTU® System for 12 weeks:

- 100% of NHS GP practice patients felt confident locating their pelvic floor muscles and knew which symptoms were normal, with 67% of patients knowing when to see a doctor due to such symptoms.
- 83% of NHS physiotherapy patients felt confident locating their pelvic floor muscles and 67% knew which symptoms were normal and when to see a doctor due to such symptoms.

Overall, **91% of NHS physiotherapy patients and 66% of NHS GP practice patients would recommend MUTU® System**.

Staff surveys noted that **patients should be referred to MUTU® System in a GP setting**; as this is where patients would typically be referred for physiotherapy.

Quantitative insights

MUTU® System led to a significant reduction in POP, UI, and dyspareunia in the self-pay cohort. As an improvement was also identified in POP, UI, and dyspareunia in the NHS physiotherapy cohort, this suggests it is likely that MUTU® System attributed to the improvement observed in this cohort.

Health economic modelling insights

When priced at £50 per MUTU® System user per year, the **CBA identified a positive NPV including QALYs and a negative NPV excluding QALYs when implementing MUTU® System over five years in Kent and Medway Integrated Care System:**

- Including QALYs: NPV = £388k (benefit cost ratio = 1.5).
- Excluding QALYS: NPV = -£169k (benefit cost ratio = 0.8).

Pricing MUTU® System lower than £44 per patient would lead to a positive return on investment when excluding social benefits. Referring patients with dyspareunia alone would result in a negative return on investment as this is rarely presented to GPs; benefits yielded for patients with POP or UI are greater.

Limitations

The current evaluation posed the following limitations:

- Small survey samples meant that insights were limited and may differ to the wider sample of NHS staff and patients.
- The self-pay cohort was assumed to yield similar results to the NHS cohorts in terms of symptom improvement.
- Health economic modelling relied on total annual treatment costs, which resulted in high optimism bias to account for the uncertain accuracy.

Recommendations

As a result of the findings, the following recommendations are suggested:

- Implement MUTU® System in a GP practice setting.
- Ensure NHS patients are aware of MUTU® System in the antenatal stage.
- Examine the impact, uptake, and engagement of MUTU® System in a larger NHS sample.

Conclusion

MUTU® System could provide effective care for NHS patients experiencing post-partum pelvic health symptoms, whilst providing a positive return on investment depending on its applied price point. Future evaluations should seek to obtain a larger sample size to examine whether the significant improvement in pelvic health symptoms remains over a longitudinal period.

1. Introduction

1.1. Context and background

In 2022, there were 605,479 live births in England and Wales (Office for National Statistics, 2022a). Perinatal is the period of time when a mother is pregnant and up to a year after giving birth (Surrey and Borders Partnership NHS Foundation Trust, n.d.). Within this, the antenatal period is when the mother is pregnant or 'before birth', and the postnatal period is after the mother has given birth (Surrey and Borders Partnership NHS Foundation Trust, n.d.). After birth, more than one third of women experience long-term post-partum conditions (Vogel et al., 2023). This can include conditions such as:

- **Pelvic floor dysfunction (PFD):** Includes POP, UI, anal incontinence, sexual dysfunction, or a combination of the above (NHS Milton Keynes University Hospital NHS Foundation Trust, 2023).
    - **Pelvic organ prolapse (POP):** When one or more of the organs in the pelvic slips down from their normal position and bulge into the vagina (NHS England, 2017a).
    - **Urinary incontinence (UI):** The unintentional passing of urine (NHS England, 2017b).
- **Dyspareunia:** Painful sexual intercourse (NHS England, 2018).
- **Diastasis recti:** The separation of the abdominal muscles during pregnancy (NHS England, 2020b).
- **Back pain:** Aching or pain in the back during or following pregnancy (NHS England, 2020a).
- **Perinatal mental health symptoms:** Mental health problems women experience any time from becoming pregnant up until a year after they have given birth (NHS England, n.d.).

These conditions and symptoms in the perinatal period and beyond are fundamentally linked to the physical and mental wellbeing of mothers. Some outcomes associated with pregnancy and pelvic health conditions include (NICE, 2019):

- Up to 50% of mothers experience POP, losing support from their pelvic floor muscles (PFM) after delivery.

- 1 in 10 women will need at least one surgical procedure, with up to 19% requiring further operations.
- 60% of individuals with POP develop incontinence and 20% of mothers endure incontinence without POP.

Although it is evident these symptoms are common, many women are not treated for pelvic health symptoms in their post-partum period, either due to health seeking barriers or inadequate treatment options. This may be due to a lack of knowledge surrounding available treatments, expectations that a clinician will trivialise reported symptoms, and normalisation of bothersome symptoms (Jouanny et al., 2024). For example, many sexual pain issues are '*overlooked or badly managed'* (Mitchell et al., 2017), and many women feel isolated with their symptoms; limiting their social interactions to avoid symptoms such as UI, which can result in greater levels of depression (Curillo-Aguirre & Gea-Izquierdo, 2023).

Pelvic health issues impact on women's wellbeing and quality of life is further perpetuated by a lack of evidence; these issues are often underreported (Kenne et al., 2022). The Royal College of Obstetricians and Gynaecologists (2023) identified that 53% of women who had symptoms of pelvic floor dysfunction did not seek help from a healthcare professional. Further, 69% of women had not spoken to anyone in the NHS about the health of their pelvic floor. Consequently, it is important that women are diagnosed early and receive treatment before symptoms worsen over time (Ansari et al., 2022), as otherwise women's well-being is compromised through '*learning to live'* with symptoms and invasive surgery may be required later in life.

Pelvic health issues for women in their post-partum period consequently represents an unmet healthcare need, as many women with pelvic health symptoms do not present to the NHS. Therefore, such women are not referred to a perinatal pelvic health service to treat their conditions (NHS England, 2024a).

One possible treatment option that may effectively treat mild to moderate pelvic health conditions from pregnancy to a year after birth is pelvic floor muscle training (PFMT). PFMT helps to strengthen the pelvic floor muscles (PFMs) to solve pelvic health issues (Kahyaoglu Sut & Balkanli Kaplan, 2016). Completing PFMT during pregnancy and the post-partum period has been identified to increase PFM strength and prevent pelvic health issues (Kahyaoglu Sut & Balkanli Kaplan, 2016). Further, PFMT has been found to contribute towards increased quality of life (Gagnon et al., 2016). This suggests that PFMT can be used to increase PFM strength and lower symptoms of pelvic floor dysfunction.

The NHS *Long Term Plan* (NHS England, 2023) aims to improve access to post-partum physiotherapy to support women when recovering from birth. NICE (2019) recommends all women within maternity services should be provided with information on pelvic floor dysfunction. Further, women experiencing issues with their pelvic floor should be able to have access to non-surgical interventions such as physiotherapy before discussing surgical interventions (NICE, 2019). This means that interventions focusing on pelvic floor physiotherapy should be implemented in the NHS in line with the NHS *Long Term Plan* to improve access to post-partum physiotherapy.

1.2. MUTU® System

MUTU® System is a digital product that can be offered prior to or following childbirth as a direct alternative to the current information that can be provided to patients via a leaflet or verbal communication. The web-based programme provides evidence-based pelvic floor exercise techniques, including real time video instructions on how to perform exercises effectively within the comfort of the user's home (MUTU® System, 2022). The programme contents can be accessed immediately upon receiving an access code on phones, tablets, laptops, or any other digital device capable of streaming website contents.

A previous survey of 110 women using the MUTU® System at Norfolk and Norwich University Hospitals was conducted. The participants were surveyed at 3, 6, 9, and 12 weeks after starting use of MUTU® System. Outcome questions asked within the programme were based on established clinical questionnaires. Women in their post-partum period who engaged with MUTU® System were asked about improvement in their symptoms, their ability to locate the pelvic floor, and quality of life. Another survey was conducted, which identified the following:

- 97% of women who could not locate or engage their pelvic floor muscles previously were able to after using MUTU® System
- 92% of women who experienced bladder symptoms including urinary leakage saw improvement after using MUTU® System
- 88% of women experiencing symptoms of POP reported improvements after using MUTU® System
- 89% of women who experienced pain during or after sexual intercourse reported an improvement after using MUTU® System
- 94% of women felt an improvement in how they felt about their body and what it is able to do after using MUTU® System
- 94% of women with diastasis recti reported an improvement after using MUTU® System

Taken together, this evidence base suggests that implementing MUTU® System within an NHS setting may help to provide support to women when recovering from giving birth. This could allow for improvement of patient outcomes through guiding users to perform pelvic floor exercises, which has the potential to improve pelvic health symptoms.

1.3. Purpose of the evaluation

MUTU® System intends to improve the long-term provision of pelvic health support for perinatal women through pelvic floor muscle training. MUTU® System is achieving this in the

private sector, however to allow greater access for all women who require such support, the impact of MUTU® System within the NHS is to be examined in the current evaluation. Unity Insights were commissioned by Health Innovation Kent Surrey Sussex (HI KSS) to conduct an evaluation on the implementation of MUTU® System into the existing NHS pelvic health postnatal pathway as part of their support to the Office of Life Sciences commission.

The current evaluation aimed to build on previous MUTU® System evaluation findings, which suggested the solution can reduce symptoms of pelvic health conditions, and understand the impact of MUTU® System in an NHS cohort. This would allow commissioners to make evidence-based decisions surrounding whether to implement MUTU® System into further NHS sites.

1.4. Purpose of the current report

The purpose of this final evaluation report is to outline the methodologies and overall evaluation findings gained through quantitative insights, qualitative insights, and health economic modelling to enable discussion regarding the impact, value, and limitations of MUTU® System, based on the implementation within GP and physiotherapy patient cohorts in Kent and Medway Integrated Care System, and GP cohorts across a wider area.

This report captures the learnings and findings from the current evaluation. Assumptions and limitations were discussed, alongside key recommendations to provide further insight into MUTU® System.

2. Methodology

2.1. Evaluation questions

A logic model workshop was held to illustrate the expected key steps to achieving the desired outcomes of MUTU® System. This is depicted in Appendix A: Logic model workshop. The current evaluation sought to answer the following evaluation questions:

Effectiveness

Quantitative and qualitative insights were used to answer the following evaluation questions:

1) Does MUTU® System lead to a reduction in symptom prevalence for:

    a. NHS Physiotherapy patients

b. NHS GP practice patients

c. Private users (self-pay)

2) Does MUTU® System help to increase patient knowledge of pelvic health in the NHS?

Programme improvement

Qualitative insights were used to answer the following evaluation question:

3) How can MUTU® System be improved for NHS patients?

Enablers and barriers to engagement

Quantitative and qualitative insights were used to answer the following evaluation question:

4) How do various factors contribute to or impede the engagement of NHS patients with MUTU® System?

Economic and social value

Quantitative, qualitative, and health economic modelling insights were used to answer the following evaluation questions:

5) Does MUTU® System result in a cost reduction to the NHS due to a reduction in symptom prevalence?

6) Does MUTU® System lead to an increase in quality of life due to a reduction in symptom prevalence?

Implementation

Qualitative and health economic modelling insights were used to answer the following evaluation questions:

7) What are the enablers and barriers of implementing MUTU® System in the NHS?

8) What setting is MUTU® System best implemented within?

2.2. Cohorts

Initially, only individuals who presented with symptoms related to POP and UI within a physiotherapy setting were invited to use MUTU® System. A limited number of patients were

referred to sign up to MUTU® System. To increase the number of patients being referred to MUTU® System and then completing the programme, GPs also referred patients if they displayed pelvic health symptoms. It should be noted that, as these cohorts were obtained differently, they will be analysed separately.

Physiotherapy cohort

Physiotherapists in Kent Community Health NHS Foundation Trust were provided with promotional codes to give to patients displaying bothersome pelvic health symptoms, allowing them to be referred to MUTU® System. This was a specialist physiotherapy service part of the Kent Continence Service (Kent Community Health NHS Foundation Trust, n.d.), where the clinical lead and team for pelvic health physiotherapy helped to provide patients with codes. Overall, 25 codes were given to patients, with 24 out of 25 codes being redeemed. As these patients were referred through the physiotherapy pathway, this cohort is named the '*physiotherapy cohort*' within the current evaluation. Figure 1 highlights the journey of the physiotherapy cohort within the current evaluation.

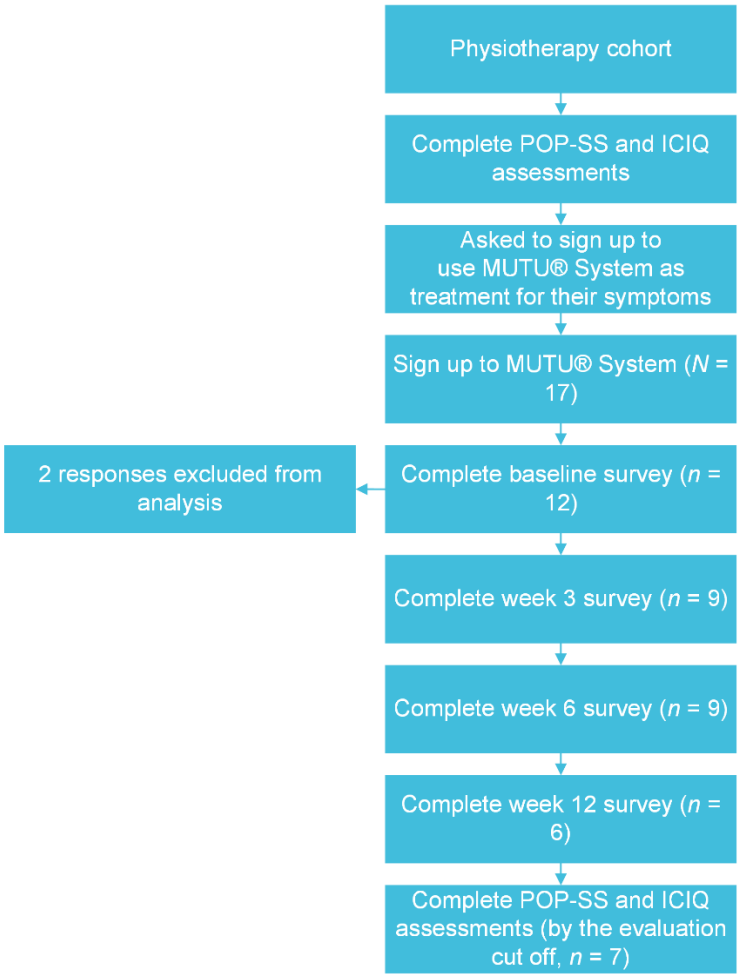


Figure 1: The journey of the physiotherapy cohort within the evaluation.

GP practice cohort

Initially, the physiotherapy cohort was the only patient cohort included in the current evaluation, however due to the limited number of referrals during the pilot period, the GP practice cohort was also included to increase the number of responses within analysis.

GP practice sites were within:

- NHS Kent and Medway ICB
    - Medway South primary care network
    - Amherst Medical Practice
- NHS Sussex ICB
    - St Lawrence Surgery
- NHS Frimley ICB

- Farnham Dene Medical Practice

- Buckinghamshire, Oxfordshire, and Berkshire West ICB
  - Woodley Practice

Patients in the GP practice cohort were referred to MUTU® System during their six-week post-birth GP check-up appointment if they displayed concerns related to pelvic health. Overall, 44 patients signed up to MUTU® System through their GP practice. Hence, this cohort is named the '*GP cohort*' within the current evaluation. Appendix A: Logic model workshop depicts the frequencies of enrolment by GP practice. To encourage enrolment, SMS messages were sent to patients (Appendix B: GP practice enrolment). Figure 2 highlights the journey of the GP cohort within the current evaluation.

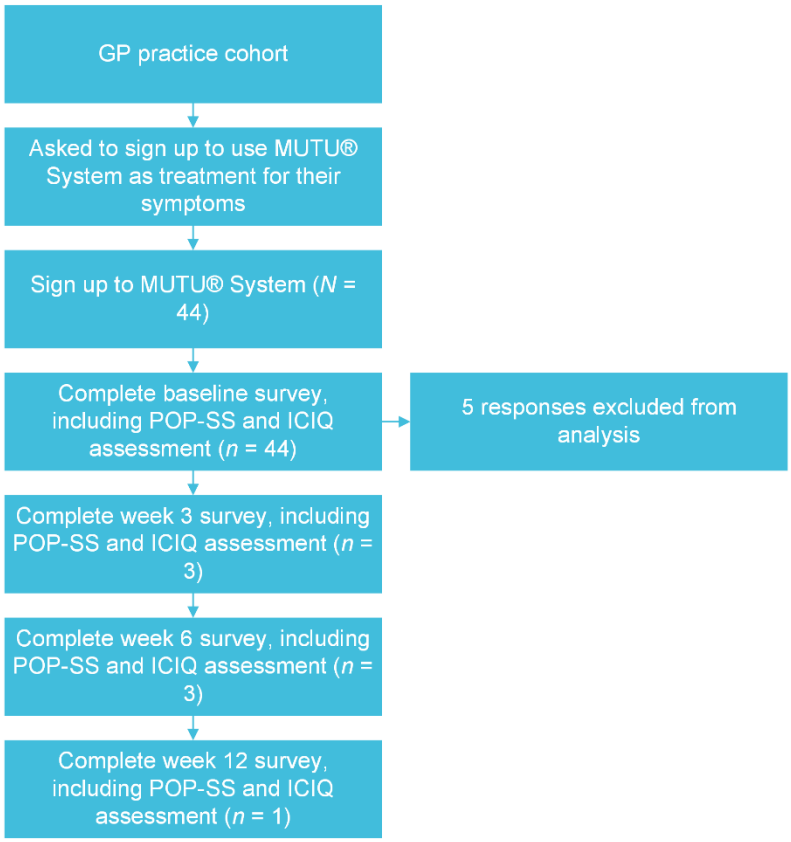


Figure 2: The journey of the GP practice cohort within the evaluation.

Self-pay cohort

Few participants completed more than one survey within the GP practice and physiotherapy cohorts. It is assumed this is due to the surveys not being a strict requirement to allow use of MUTU® System, or because some participants stopped using MUTU® System. To gain further insight on whether symptoms improved over time in an NHS cohort, the self-pay

cohort was also included in the analysis to allow comparison with the physiotherapy and GP practice cohorts. This cohort shared similarities in terms of perinatal stage (Figure 3).

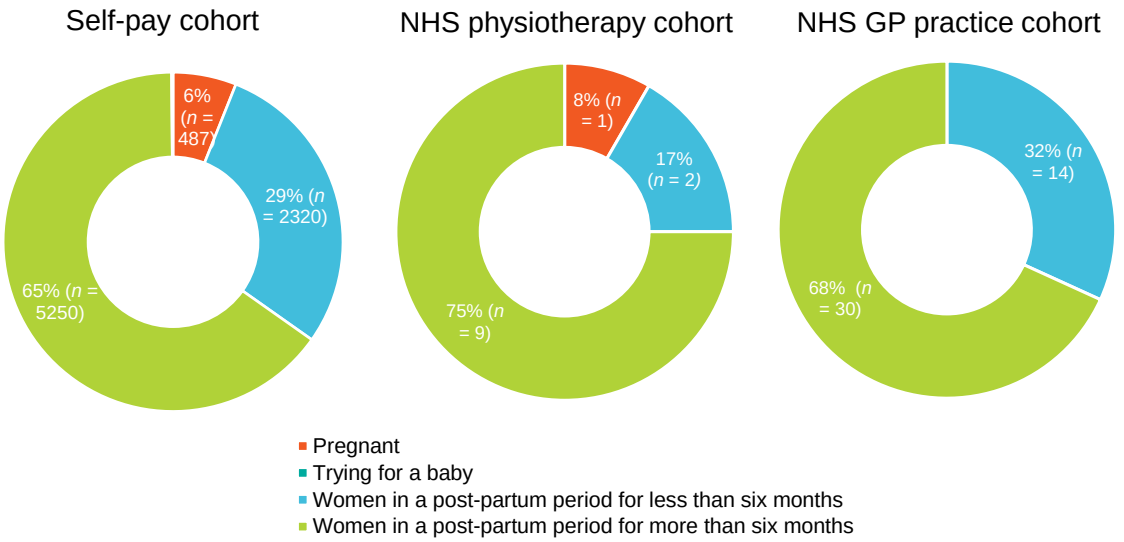


Figure 3: Comparing the self-pay cohort against the NHS physiotherapy and NHS GP practice cohort baseline survey responses to determine suitability of comparisons between groups in terms of demographics. Please note that '*trying for a baby*' was not identified in physiotherapy or GP practice cohorts and individuals in the self-pay cohort could select multiple options so numbers may not equal the total number of respondents in the baseline survey.

The self-pay cohort also shared similarities in terms of age with the NHS cohorts (Figure 4). Here, the GP practice and physiotherapy cohorts were merged to create the NHS cohort, with the age group categories being combined to allow comparison between NHS and self-pay cohorts.

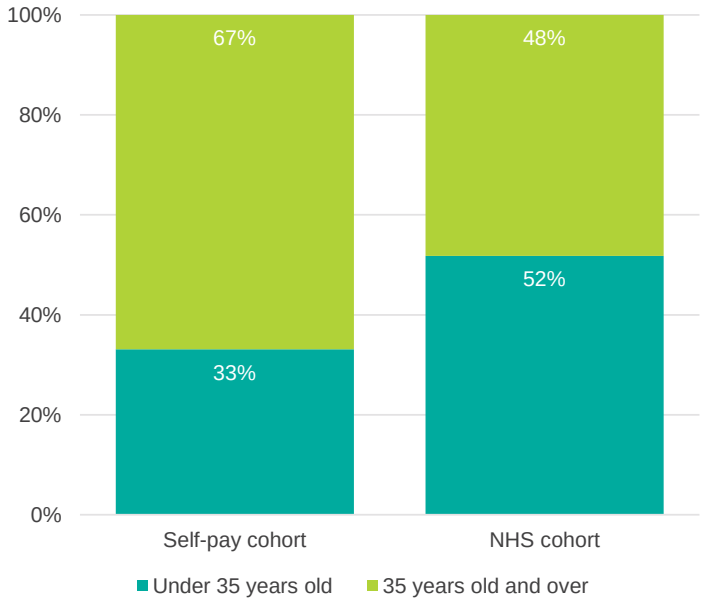


Figure 4: Age distribution comparison between the NHS and self-pay cohorts.

This cohort was also used to understand the medium-term impact of MUTU® System, where it is assumed that NHS patients use the system in a similar manner. It should be noted that these individuals did not obtain a MUTU® System subscription through the NHS. Please see Section 4.1 for the limitations surrounding this in the current evaluation. The self-pay cohort consisted of 9,942 individuals who paid £99 for a MUTU® System subscription. Upon data cleaning, this reduced to 8,467 individuals.

2.3. Qualitative insights

Patient and staff surveys were conducted. Here, multiple choice questions were analysed using frequency distributions and free-text questions were analysed through thematic analysis.

Patient surveys

Physiotherapy and GP practice cohort surveys

Patient surveys were conducted with individuals who signed up to use MUTU® System. Physiotherapy patients completed surveys between February 2023 and January 2024, whilst GP practice patients completed surveys between September 2023 and January 2024. GP practice patients started completing surveys after physiotherapy patients due to the time taken to identify this new cohort. The GP cohort baseline survey did not ask questions

surrounding baseline knowledge of pelvic floor exercises and symptoms with the intention of reducing participant fatigue to increase uptake levels in this cohort.

They were invited to complete four surveys. The baseline survey was completed when participants first signed up to MUTU® System and gathered information based on the severity of their symptoms. The week 3, 6, and 12 surveys were completed after 3, 6, and 12 weeks respectively of using MUTU® System and gathered information on the patient experience of using MUTU® System and whether their symptoms had improved.

The questions within the patient surveys aimed to understand patient symptom severity and knowledge surrounding pelvic health over time. The week 3, 6, and 12 surveys aimed to explore user feedback surrounding MUTU® System, such as helpful and unhelpful elements and ease of use. A set of questions for the GP practice cohort sought to understand their mental health, with similar questions to the *Short Warwick-Edinburgh Mental Wellbeing Scale* (SWEMWBS) being used. This helped to answer evaluation questions 1, 2, 3, 4, 6, 7, and 8 (Section 2.1).

All GP cohort surveys included Pelvic Organ Prolapse Symptom Score (POP-SS) and the International Consultation on Incontinence Questionnaire (ICIQ) questions to understand the severity of POP and UI over time. The physiotherapy cohort completed the POP-SS and the ICIQ questionnaires during their consultation, so these questions were not included in their survey. For an overview of the questions asked and the scoring for the POP-SS and the ICIQ, please refer to Appendix C: POP-SS and ICIQ questionnaire and scoring.

DEMOGRAPHICS

PHYSIOTHERAPY COHORT

There were 17 survey responses overall, with 12 participants responding to the baseline survey, 9 responding to the week 3 survey, 9 responding to the week 6 survey, and 6 responding to the week 12 survey. Across all the surveys, most participants were women in a post-partum period for more than six months (76%; n = 13), followed by women in a post-partum period for less than six months (24%; n = 4).

Most women in the baseline survey (58%; n = 7) were between 30 and 34 years old (Figure 5). According to the Office for National Statistics (2021), the average age when giving birth in the UK is 30.9 years old. Hence, the physiotherapy population appeared representative of the overall population of women who had given birth in the UK.

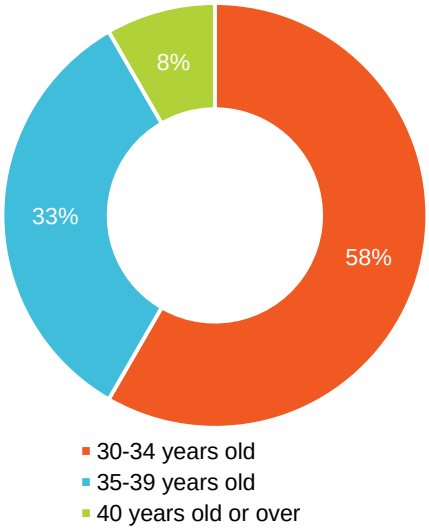


Figure 5: The breakdown of age groups in the baseline physiotherapy patient survey.

GP PRACTICE COHORT

In total, 44 patients responded to the baseline survey, three responded to the week 3 and week 6 surveys, and two responded to the week 12 survey. Most women (68%; *n* = 30) were more than six months post-partum, with the remaining being between six weeks and six months post-partum (30%; *n* = 13) or less than six weeks post-partum (2%; *n* = 1). Finally, most participants were aged 30 to 39 years old (70%; *n* = 31), with the remaining 30% being either 40 years old or over (18%; *n* = 8) or between 25 and 29 years old (11%; *n* = 5). As with the physiotherapy cohort, this population is likely representative of the overall population of mothers in the UK according to the Office for National Statistics (2021).

Self-pay cohort surveys

Survey data collected between August 2021 and November 2023 that was not collected as part of the current evaluation was also analysed. This consisted of women in their post-partum period that did not complete MUTU® System as part of the current evaluation, but instead paid to use MUTU® System – the self-pay cohort. Data was cleaned to ensure that the population used in the analysis was suitable for comparative analysis against the GP practice and physiotherapy cohorts. It should also be noted that some women in their post-partum period completed the surveys more than once. For example, such women began to use MUTU® System, however stopped using the programme for some time. After this, they started MUTU® System again, so completed the baseline, week 3, week 6, and week 12 surveys again. Data was cleaned to link surveys within the same attempt where applicable.

For the self-pay cohort, a baseline (*n* = 7,178, with 7,361 attempts), week 3 (*n* = 964, with 966 attempts), week 6 (*n* = 670, with 681 attempts), and week 12 (*n* = 381, with 390 attempts) survey was completed, which yielded similarities to the above surveys. This cohort was used to understand the potential level of improvement in POP and UI symptoms over

time in a larger cohort; there were few responses to the week 6 and 12 surveys within both the Physiotherapy and GP cohorts. The drop-off across surveys could be due to mothers being busy or the potentially sensitive nature of the surveys, due to covering topics such as mental health. For a detailed description of how improvement was identified, please see Appendix C: POP-SS and ICIQ questionnaire and scoring.

DEMOGRAPHICS

In the self-pay cohort, there were 7,361 responses to the baseline survey, 966 responses to the week 3 survey, 681 responses to the week 6 survey, and 390 responses to the week 12 survey. There were 5,250 women who were more than six months post-partum and 2,320 women who were less than six months post-partum. There were 487 pregnant women and 11 women trying for a baby who completed the baseline survey. Most participants were aged 35 to 44 (62%; *n* = 4,192), followed by 25 to 34 years old (35%; *n* = 2,389). Again, this population is likely representative of the overall population of mothers in the UK according to the Office for National Statistics (2021).

When comparing the self-pay cohort to the GP practice and physiotherapy cohorts, all cohorts appear to show similarities in demographic variables. Hence, the self-pay cohort can be used to assume similar responses and similar effectiveness levels of MUTU® System where there are few responses to the GP practice and physiotherapy surveys.

Staff surveys

Staff experience survey

GP and physiotherapy staff who had referred patients to MUTU® System were sent a short free-text response questionnaire using an online survey collection website to gain insight surrounding their experience with MUTU® System in terms of programme features, implementation, and pathway fit. In total, two general practitioners and four physiotherapists responded to the survey, which was open between January 2024 and February 2024. These questions were analysed using thematic analysis to generate themes within the response data.

Patient experience staff survey

Due to few responses within the GP patient survey, a staff survey consisting of only free-text response questions was sent out to staff members through an online survey collection website who had referred patients to MUTU® System. The aim of the survey was to collate any feedback patients had provided staff members with surrounding MUTU® System. Overall, three staff members responded to the survey, which was open between January 2024 and February 2024. Thematic analysis was employed to examine questions, extracting recurring themes from the response data.

2.4. Quantitative analysis

General approach to symptom improvement

Qualitative patient survey responses were used to understand symptom improvement following MUTU® System. Here, the self-pay patient survey was used due to the large sample size allowing for greater reliability and confidence in results compared to the GP practice and physiotherapy cohorts. Here, it was assumed that similar findings would be yielded in the GP practice and physiotherapy cohorts due to all cohorts sharing similarities in demographic variables such as age and post-partum stage.

Data were sorted so that one participant survey response depicted one attempt at completing MUTU® System and completing the baseline to week 12 surveys. The following exclusion criteria was applied to the data:

- Exclude rows that have a baseline survey response, however no responses to the week 3, 6, or 12 surveys
- Exclude rows that have no baseline survey response and no improvement identified in any of the week 3, 6, or 12 surveys

From this, coding was applied to each survey response. Please see Appendix D: Measuring symptom improvement for a breakdown of the coding applied.

To understand symptom improvement across time, the maximum level of improvement across weeks 3 to 12 was identified. For entries with no baseline survey response with a week 3, 6, or 12 response showing an improvement, the negative of the maximum improvement value was used as the baseline. Here, it is assumed that even though no response was provided for the baseline survey, an improvement was identified, suggesting that there were already concerns surrounding this symptom. An example of this can be seen in Appendix D: Measuring symptom improvement.

To identify the percentage of improvement over time, the average score for each question response was generated and the following calculated:

- The average week 3 response was subtracted from the average baseline response
- The average week 6 response was subtracted from the average week 3 response
- The average week 12 response was subtracted from the average week 6 response

The above figures were divided by four, to represent the four levels of severity at baseline, and converted to a percentage to identify the overall improvement over the course of the four surveys. The above was completed for each of the following symptoms: POP, UI, DR, back pain, dyspareunia, body fat, and mental health related to symptoms.

Mental health scores

In the GP practice cohort, mental health responses were coded to convert into quantitative data. Please see Appendix D: Measuring symptom improvement for how responses were coded. From this, coded responses were summed for each survey to create an overall understanding of the mental health score of an individual. The baseline survey score for each patient was used as their score before using MUTU® System. The latest score from each patient in the week 3, 6, and 12 survey was used as their final score after using MUTU® System. The before and after scores were compared in Appendix E: Quantitative insights , however there are limitations due to the sample size within the GP practice cohort.

Statistical testing

To understand whether MUTU® System led to an improvement in symptoms over time, a paired *t*-test was conducted on the self-pay survey response data. This allowed insight to be gained surrounding whether there was a significant improvement in symptoms following 12 weeks of MUTU® System. This was completed for each of the following symptoms: POP, UI, DR, back pain, dyspareunia, body fat, and mental health related to symptoms.

A paired *t*-test results in a *t*-value and a *p*-value. The greater the *t*-value, the greater the significant difference between the two groups. In this case, the significance level was chosen to be $p < 0.05$. If the *p*-value is less than 0.05, this suggests that the observed difference is unlikely to have occurred by random chance alone. Hence, there is a statistically significant difference.

POP-SS scores

POP-SS scores range from 0 (no symptoms) to 28 (severe symptoms). The percentage severity depending on the MUTU® System participant's POP-SS score was identified splitting the 29 scores into equal brackets and converting into a percentage. From this, the average improvement for pressure, discomfort, or heaviness in the abdominal area (symptom of POP) identified by the survey respondent can be multiplied by the percentage score to identify the severity of POP (please see Appendix D: Measuring symptom improvement for how the scores change following MUTU® System).

ICIQ scores

ICIQ scores range from 0 (no symptoms) to 21 (severe symptoms). The percentage severity depending on the MUTU® System participant's ICIQ score was identified splitting the 22 scores into equal brackets and converting into a percentage. From this, the average improvement for urinary or faecal leakage (symptom of UI) identified by the survey respondent can be multiplied by the percentage score to identify the severity of UI (please see Appendix D: Measuring symptom improvement for how the scores change following MUTU® System).

2.5. Health economic modelling

General approach

The evaluation produced an ex-ante (forecasted) appraisal of the prospective impact of MUTU® System, which was estimated through best available evidence. The appraisal was assessed in line with *The Green Book* (HM Treasury, 2022). The HM guidance is applied throughout the public sector to ensure consistent estimation of costs and benefits in cost-benefit appraisals. In recent years, the framework has been supplemented by several departmental or sectorial '*external supplementary guidance*' documents (HM Treasury, 2022). The modelling presented within this document considered up to five-year outcomes of the deployment of MUTU® System within the NHS.

Cost-benefit analysis methodology

A cost-benefit analysis (CBA) aims to determine whether the economic value of an intervention can justify the service's costs by comparing the cost of two or more alternatives and reviewing the return on investment (ROI) based on a static model of the world. Savings are estimated from the perspective of the UK society. It is not possible to include all costs and benefits within the appraisal, however, the service's effects should be considered and outcomes that are most likely to determine the difference between alternative options should be included within the appraisal. The net present value (NPV; Equation 1) and benefit cost ratios (BCRs; Equation 2) are important economic and summary measures that can be derived from such an appraisal and consist of the following formulae:

$$Net\ present\ value = \frac{Net\ cash\ flow}{(1 + Discount\ rate)^{Time\ of\ the\ cash\ flow}}$$

Equation 1: The equation for net present value, used within the health economic modelling.

$$Benefit\ cost\ ratio = \frac{Present\ value\ benefits}{Present\ value\ costs}$$

Equation 2: The equation for benefit cost ratio, used within the health economic modelling.

The BCR measures the present value of benefits against the present value of costs. This ratio summarises the overall relationship between relative benefits and costs of MUTU® System (for example, £X return for every £1 invested). A BCR greater than one indicates that MUTU® System may deliver a positive NPV (for example, a BCR of two indicates that for every £1 spent, there is an expected £2 return). If the BCR is equal to one, then the present value of the benefits equals that of the costs. Where the BCR is less than one, the value of the costs will outweigh the benefits.

It is important to remember that summary measures are not without limitations (for example, measures may not fully capture all potential impacts of the intervention with MUTU® System and counterfactual pathways).

Optimism bias

Optimism bias (OB) is defined as "*the tendency for a project's costs and duration to be underestimated and / or benefits to be overestimated*" (MacDonald, 2002), as found by historical UK government reviews on public sector procurement. To account for such optimistic estimates, the health economic model applied OB correction factors in response to the level of uncertainty in the data or assumptions used within the model. More information on how OB correction factors have been applied in the model, and how this approach aligns with government best practice, can be found in Appendix F: Health economic modelling methodology.

Adjusting for inflation

Ensuring that costs and benefits are adjusted for inflation removes the general effects of inflation and presents costs and benefits included within the appraisal in '*real'* base year prices, rather than in nominal prices (in other words, the first year of the intervention). Within this, a Gross Domestic Product (GDP) deflator of 2% (Office for Budget Responsibility, 2022) was used to covert nominal to real values. Various rates were applied depending on data type, namely:

- CPI Inflation rate (Office for Budget Responsibility, 2022)
- The NHSCII Pay and Prices (PSSRU, 2021)

Discounting

Discounting is a technique that enables the comparison of costs and benefits on a consistent basis, and accounts for the concept of '*social time preference*' (in other words, allows costs and benefits that occur at different time periods to be compared on a present value basis). Discounting was applied to all future costs and benefits and was not applied retrospectively. A discount rate of 3.5% was applied to all non-QALY benefits, and a rate of 1.5% to all QALY benefits included to deflate outcomes to real terms and reflect the changing value of healthcare within GDP (HM Treasury, 2022).

Scenario analysis

Scenario analysis is a form of '*what if*' analysis and is beneficial where there are future uncertainties within a project. In the current report, results of the health economic modelling were presented across three separate scenarios. Appendix F: Health economic modelling methodology provides more detailed figures relating to scenario assumptions.

As part of the evaluation, patients with either POP or UI symptoms who had presented to a GP or physiotherapist in Kent and Medway ICS were offered free annual access to MUTU®

System. In scenario 1, impacts (both including and excluding QALY benefits) were modelled over the evaluation period (10-month period) to reflect the patients that were engaged as part of the evaluation period.

In scenario 2 and 3, it was assumed that the prospective implementation of MUTU® System in the medium and longer term would involve all women in their post-partum period attending a GP six-week post-partum check appointment and presenting with either POP or UI symptoms would be offered free annual access to MUTU® System. To estimate these patient populations, the expected annual pregnancy rate for a typical population was estimated by dividing the number of births by the total population (males and females) of England and Wales.

Scenarios 2 and 3 are modelled over a five-year period to project the expected benefits (both including and excluding QALY benefits) that may arise from utilising MUTU® System based on the uptake and engagement rates recorded in the evaluation period. Although the GP practices engaged as part of the evaluation were not exclusively based in Kent and Medway ICS (instead were located in NHS Kent and Medway ICB, NHS Sussex ICB, NHS Frimley ICB, and Buckinghamshire, Oxfordshire, and Berkshire West ICB), it was assumed that women in their post-partum period in these regions will likely exhibit similar uptake and engagement rates.

Scenario 1: All evaluation sites

Utilising the data received from evaluation sites at seven GP practices involved in the pilot (*N* = 44) and Kent Community Health NHS Foundation Trust Physiotherapy service (*N* = 24), scenario 1 investigated the impact of the evaluation roll-out of MUTU® System in the NHS. The purpose of this scenario was to analyse the return on investment based exclusively on existing evaluation patient enrolment figures. It important to note that the evaluation patients were engaged at different points from February 2023 to November 2023 (10-month period), so the evaluation period does not reflect a full year of implementation.

Scenario 2: Seven hypothetical GP practices across Kent and Medway ICS

This scenario was modelled over the course of five years to demonstrate the medium-term, annualised impact of MUTU® System if all women in their post-partum period with POP or UI symptoms registered at seven hypothetical GP practices across Kent and Medway ICS were offered the programme.

Scenario 3: Kent and Medway ICS

The potential annualised impact of the utilisation of MUTU® System by all women in their post-partum period who gave birth within the current year residing within Kent and Medway ICS. This scenario was modelled over the course of five years to demonstrate the medium and longer-term impact of MUTU® System for the NHS.

Breakeven analysis

To estimate the breakeven pricing point of implementing MUTU® System within the NHS, an additional pricing analysis was conducted. The purpose of this analysis was to demonstrate the potential breakeven point from an NHS system budgetary perspective, and as such, any non-cash releasing, social benefits (QALYs) were excluded. The breakeven analysis was conducted only for the wider ICS population (scenario 3), and initially analysed how the NPV may vary as the annual cost of the programme was adjusted to £25, £50, and £75. Thereafter, the analysis determined the expected benefits that may be realised if implementation were to breakeven (in terms the expected benefits per number of births per year and number of women in their post-partum period using MUTU® System), assuming uptake and engagement rates hold in a wider deployment scenario.

Modelling assumptions

There are two key assumptions that drive the health economic modelling. The first pertains to the uptake of MUTU® System. This is defined as the number of women in their post-partum period who log in to use MUTU® System divided by the total number of women in their post-partum period who are invited and given access (Equation 3). In other words, uptake is determined by the rate of women in their post-partum period who enrol for MUTU® System once offered by a healthcare provider. Uptake is the key driver of costs in the model because all patients must sign up to MUTU® System to incur the cost of the annual license.

$$Uptake = \frac{Accepted}{Total\ invited}$$

Equation 3: The equation for uptake, used within the health economic modelling.

The second key assumption is engagement with the MUTU® System. This is defined as the number of women in their post-partum period who continue to use MUTU® System divided by uptake (Equation 4). Engagement is the key driver of benefits in the model because it is assumed that patients must utilise MUTU® System for at least three weeks before they may experience improvement in their symptoms.

$$Engagement = \frac{Continued\ use\ (21\ days+)}{Uptake}$$

Equation 4: The equation for engagement, used within the health economic modelling.

In scenario 1, the uptake rate was modelled as 100% because all patients had used MUTU® System at least once. It should be noted that all benefits and costs (namely, the cost of the

programme based on an annual license fee) are assumed to be incurred within one year following user engagement, albeit that the evaluation population are based on a 10-month evaluation period. All remaining variables were calculated using a weighted average of GP and physiotherapy patient cohort figures (Table 1; detailed figures included in Appendix F: Health economic modelling methodology).

Table 1: Uptake, engagement, prevalence, and symptom improvement figures used in scenarios 1, 2, and 3.

Variable	Scenario 1	Scenario 2	Scenario 3
Uptake	100%	34%	34%
Engagement	72%	67%	67%
Prevalence			
Urinary incontinence	87%	30%	30%
Pelvic organ prolapse	83%	35%	35%
Dyspareunia	62%	39%	39%
Improvement in symptoms			
Urinary incontinence	29%	34%	34%
Pelvic organ prolapse	27%	37%	37%
Dyspareunia	22%	21%	21%

In scenarios 2 and 3, uptake and engagement rates were obtained from the evaluation GP patient cohort and improvement rates were based on self-pay users of the MUTU® System programme. Due to a lack of certainty regarding symptom prevalence within larger populations; however, prevalence rates from reputable literature sources used in scenario 2 and 3. More detail relating to figure calculations and their relevant sources are included in Appendix F: Health economic modelling methodology.

Benefit and cost streams

To realise economic outcomes, benefit and cost streams must be monetised. Outcomes can be categorised as either direct (NHS related outcomes), indirect (to other public sector

organisations), or social outcomes (wider UK society). Within this report, cash-releasing and non-cash releasing benefits were expected to be identified; the latter of which help to reduce the demand and strain on NHS services, but a financial value cannot be realised without the decommissioning of services. There may be additional benefits and costs that were not explored as part of this evaluation; however, these unmodelled components would not significantly impact the overall result of the model, based on the key components identified in the logic model workshop. Appendix F: Health economic modelling methodology provides more detailed calculations and source references according to each benefit and cost stream.

Benefits

The following benefits streams were created under the assumption that MUTU® System would reduce the prevalence of each respective symptom for women in their post-partum period who engage and adhere to MUTU® System for at least three weeks, who may have otherwise required one year of treatment for the condition in the baseline:

- **Benefit stream 1:** Reduction in UI treatment costs due to MUTU® System
- **Benefit stream 2:** Reduction in POP treatment costs due to MUTU® System
- **Benefit stream 3:** Reduction in dyspareunia treatment costs due to MUTU® System

The following benefits streams were created under the assumption that MUTU® System would improve the quality of life for those post-partum individuals with POP or UI respectively who engage and adhere to MUTU® System for at least three weeks who may have otherwise had a compromised quality of life due to the condition in the baseline.

- **Benefit stream 4:** Improvement in quality of life due to utilising MUTU® System to manage symptoms of POP
- **Benefit stream 5:** Improvement in quality of life due to utilising MUTU® System to manage symptoms of UI

Costs

MUTU® System was expected to incur an assumed annual cost of £50, which may be adjusted in sensitivity and breakeven analysis to determine how this may affect the benefit cost ratio (BCR). This created the following cost stream:

- **Cost stream 1:** Cost of MUTU® System

3. Results

3.1. Patient qualitative insights

This section highlights a breakdown of the main qualitative evaluation findings. For more insight, please refer to Appendix G: Qualitative insights detailed.

Knowledge of pelvic health

Physiotherapy cohort

Following MUTU® System, four out of six patients (67%; *n* = 4) knew when to see a doctor because of their pregnancy-related symptoms compared to 7 out of 12 patients before using MUTU® System (58%; *n* = 7; Figure 6).

67%

knew when to see a doctor because of their pregnancy-related symptoms after using MUTU® System, compared to 58% before

Figure 6: The percentage of respondents in the baseline (*n* = 12) and the latest response provided in the week 3, 6, and 12 surveys (*n* = 6) who selected '*strongly agree*' or '*agree*' to the statement *'I know when to see a doctor because of my pregnancy-related symptoms*'.

Confidence in locating pelvic floor muscles increased after using MUTU® System. Here, five out of six patients could locate their pelvic floor muscles after using MUTU® System (83%; *n* = 5), compared to 7 out of 12 before using MUTU® System (58%; *n* = 7; Figure 7).

83%

felt confident in locating their pelvic floor muscles after using MUTU® System, compared to 58% before

Figure 7: The percentage of respondents in the baseline (*n* = 12) and the latest response provided in the week 3, 6, and 12 surveys (*n* = 6) who selected '*strongly agree*' or '*agree*' to the statement '*I feel confident in locating my pelvic floor muscles*'.

Four out of six patients (67%; *n* = 4) knew which symptoms were normal after using MUTU® System compared to 3 out of 12 patients before MUTU® System (25%; *n* = 3; Figure 8).

67%

knew which symptoms were normal after using MUTU® System, compared to 25% before

Figure 8: The percentage of respondents in the baseline (*n* = 12) and the latest response provided in the week 3, 6, and 12 surveys (*n* = 6) who selected '*strongly agree*' or '*agree*' to the statement '*I know which symptoms are normal after birth and how I can work on them*'.

Overall, knowledge of how to perform pelvic floor exercises remained unchanged (Before: 83%; *n* = 10, After: 83%; *n* = 5) following use of MUTU® System in the physiotherapy cohort, where patients may be seeking care for more severe symptoms. It could be likely that such patients have already tried performing pelvic floor exercises themselves before using MUTU® System to manage their symptoms.

GP practice cohort

Following MUTU® System, most patients (67%; *n* = 2) knew how to perform pelvic floor exercises correctly (Figure 9).

67%

knew how to perform pelvic floor exercises correctly after using MUTU® System

Figure 9: The percentage of '*strongly agree*' and '*agree*' responses to the statement '*I know how to perform pelvic floor exercises correctly*' using the latest response provided by each survey respondent from the week 6 and 12 surveys.

Most patients (67%; *n* = 2) knew when to see a doctor because of their pregnancy-related symptoms after using MUTU® System (Figure 10).

67%

knew when to see a doctor because of their pregnancy-related symptoms after using MUTU® System

Figure 10: The percentage of '*strongly agree*' and '*agree*' responses to the statement '*I know when to see a doctor because of my pregnancy-related symptoms*' using the latest response provided by each survey respondent from the week 6 and 12 surveys.

All GP practice patients (100%; *n* = 3) felt confident in locating their pelvic floor muscles after using MUTU® System (Figure 11).

100%

felt confident in locating their pelvic floor muscles after using MUTU® System

Figure 11: The percentage of '*strongly agree*' and '*agree*' responses to the statement '*I feel confident in locating my pelvic floor muscles*' using the latest response provided by each survey respondent from the week 6 and 12 surveys.

All GP practice patients who responded (100%; *n* = 3) knew which symptoms were normal after using MUTU® System (Figure 12).

100%

knew which symptoms were normal after using MUTU® System

Figure 12: The percentage of '*strongly agree*' and '*agree*' responses to the statement '*I know which symptoms are normal after birth and how I can work on them*' using the latest response provided by each survey respondent from the week 6 and 12 surveys.

Helpful and unhelpful elements of MUTU® System

Physiotherapy cohort

All respondents noted they found aspects of MUTU® System helpful (*n* = 12; Figure 13). Most participants throughout all weeks found the core (*n* = 11) and intensive (*n* = 6) workout videos the most helpful, as well as learning about pelvic health (*n* = 8). Fewer respondents noted text / email alerts (*n* = 2) helpful, with no respondents noting customer service, and the posture and alignment videos helpful.

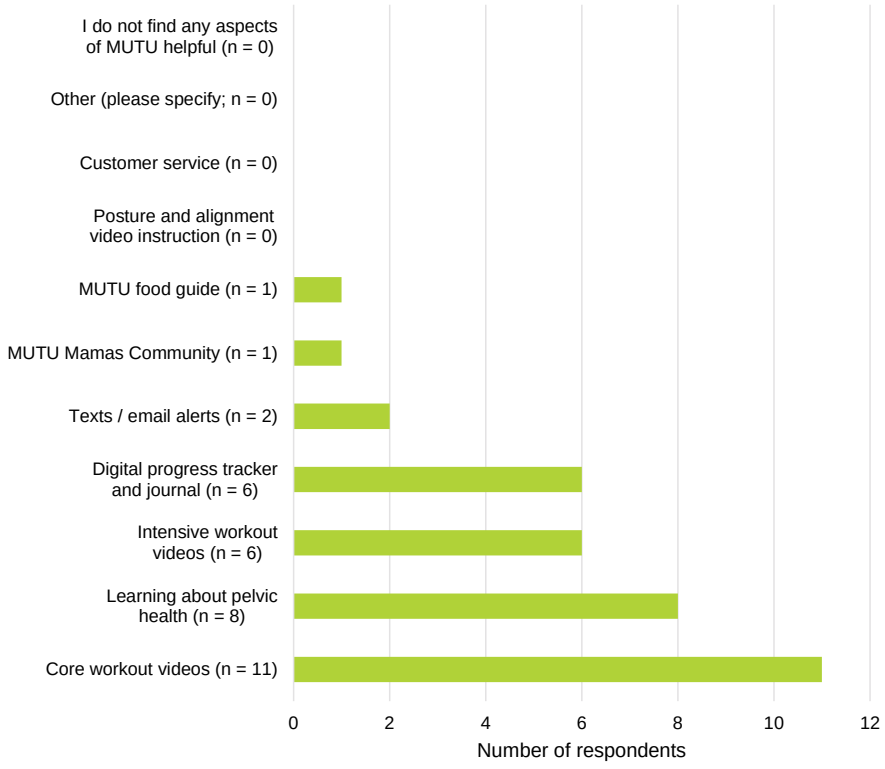


Figure 13: Elements MUTU® System users found helpful (*n* = 12).

Respondents were asked why they found these aspects helpful. Out of those who provided a response, five noted elements surrounding ease of use. Here, respondents noted that the videos and exercises were easy to follow.

> *"I don't have to think. I just have to listen and do and after long days with the children or work this helps me to get on and do my workouts!"*
>
> - *Physiotherapy survey respondent*

Three respondents also noted that MUTU® System was motivational. Finally, two respondents respectively noted that they enjoyed the workouts and tracking their progress.

Most respondents in the physiotherapy surveys did not find any aspects of MUTU® System unhelpful (*n* = 8; Figure 14). Of those who did identify unhelpful aspects, most were related to the MUTU food guide (*n* = 3), and the MUTU Mamas Community (*n* = 3).

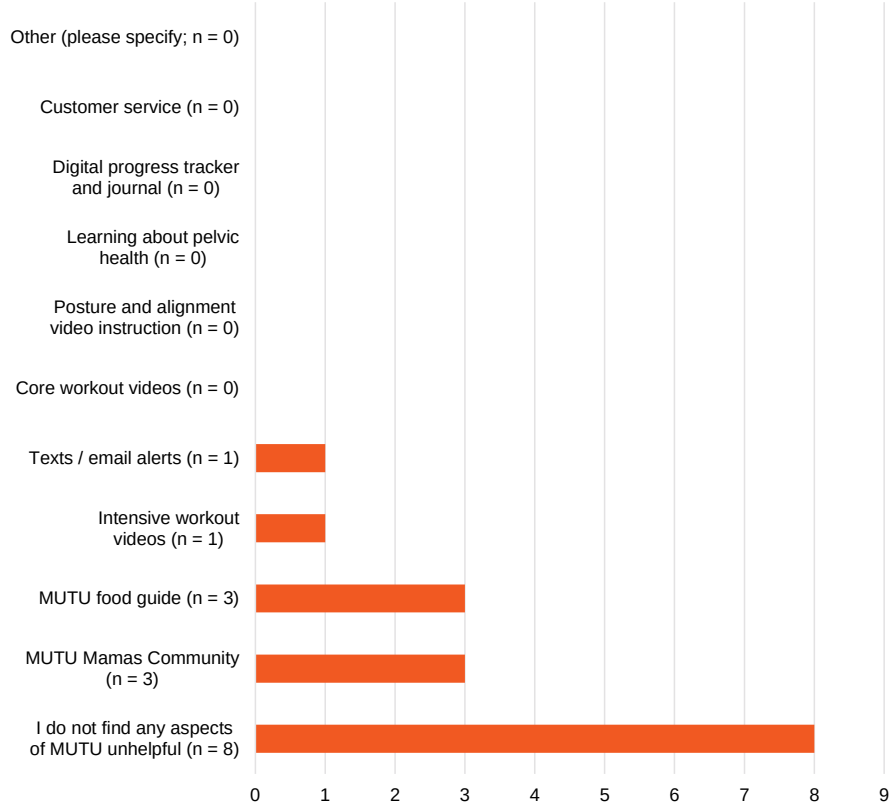


Figure 14: Elements MUTU® System users found unhelpful (*n* = 12).

When asked to explain why respondents found these aspects unhelpful, three out of six respondents noted that they personally did not want to change their diet, so did not use the food guide. One participant highlighted the food guide was too strict. Another participant noted struggles with adherence: "*It is common sense really but I find it almost impossible to live to the eating habits, with a busy life and 3 young kids*". Another respondent noted they would like more education. Despite this, it should be noted that the MUTU food guide would

not be included as a component of MUTU® System when implemented in future NHS sites. They also noted that the "MUTU Mamas Community" was not used much by its users, with another respondent noting they had not used this either.

GP practice cohort

Of those who provided a response, all three respondents highlighted that the core workout videos were helpful. When asked to elaborate, two respondents noted that the instructions were clear, with the remaining highlighting that the exercises were helpful.

> *"Simple instructions, weeks building on each other and increase in intensity. Beforehand I just would try 3 mins of pelvic floor exercises to 3x a day but half way through just forget what I was doing. The core exercises keep me engaged in the task and vary as well for positions. it is the same amount of time I would have spent doing very basic exercises sitting. After a few weeks I need to admit I find them really relaxing and calming and don't want to miss the core exercises"*
>
> - *GP practice survey respondent*

Ease of use

Physiotherapy cohort

Most MUTU® System users (83%; *n* = 10) considered the programme easy to use (Figure 15).

Figure 15: The latest response provided by respondents in the week 3, 6, and 12 surveys who selected '*strongly agree*' or '*agree*' to the statement '*MUTU is easy to use*'.

GP practice cohort

When asked whether MUTU® System was easy to use, one respondent noted '*strongly agree*' (*n* = 1), '*neither agree nor disagree*' (*n* = 1), and '*disagree'* (*n* = 1) respectively. This means that findings appear inconclusive in terms of this cohort; a larger sample size is required to generate accurate insights.

Recommending MUTU® System

Physiotherapy cohort

Findings from responses were sorted to understand how many individual respondents would recommend MUTU® System. Overall, 91% (*n* = 10) of MUTU® System users who completed surveys would recommend MUTU® System to other women who are pregnant or have given birth (Figure 16).

91%

of participants surveyed would recommend MUTU® System to other women who are pregnant or have given birth

Figure 16: The latest response provided by physiotherapy respondents in the week 3, 6, and 12 surveys when asked '*how likely are you to recommend MUTU to other women, who are pregnant or have given birth?*' across week 3, 6, and 12 surveys (*n* = 10).

Most women in their post-partum period who explained their likelihood of recommending MUTU® System noted that the exercises were effective and achievable (*n* = 4). One respondent noted that MUTU® System was "*easy to follow*", and another noting that MUTU "*is accessible as it can be done from home"*.

GP practice cohort

Out of the three GP practice cohort respondents who provided a response, two out of the three would recommend MUTU® System to other women who are pregnant or have given birth. When asked why, these respondents highlighted that the exercises were helpful, effective, and they could identify improvements in their symptoms. Further, they noted MUTU® System was easy to use. The remaining respondent was neutral and highlighted that they struggled to navigate MUTU® System.

Potential improvements to MUTU® System

Physiotherapy cohort

Respondents suggested the following improvements to MUTU® System:

- Improvements to exercise component
  - Include stretching videos (*n* = 3)
  - More instructions during workouts (*n* = 2)
  - Slow down the exercises (*n* = 2)
  - More affordable workout kit (*n* = 1)
- Improvements to the food guide
  - Less restrictive food guide (*n* = 1)

One respondent noted that they struggled with the pressure to keep up to date with their MUTU® System tasks, despite having external issues resulting in not having the time to dedicate towards MUTU® System. Despite this, it was unclear why the respondent felt this pressure; MUTU® System did not apply pressure to women to complete the programme.

GP practice cohort

When asked how MUTU® System could be improved, one respondent noted that MUTU® System should be easier to navigate. Another respondent suggested "*additional logging of days if staying longer on a module*". The remaining respondent highlighted the need for an app-based version as the "*website crashes frequently*". MUTU® System has an ORCHA approval rating of 92%. It is rated 100 in terms of usability and accessibility, suggesting that the website crashing appears to be in the minority of users and not a major issue.

3.2. Staff qualitative insights

Staff experience survey

Physiotherapy cohort

Staff members in the physiotherapy cohort highlighted the importance of ensuring patients are aware of MUTU® System to allow for effective implementation. Here, it was suggested that women should be made aware of MUTU® System as early as possible, ideally within the antenatal period. Staff noted that it was often hard to identify patients at the correct time in their recovery. Women were often busy after just giving birth, so may not be able to complete the programme correctly straight away. Promoting early recognition of MUTU®

System would enable women to familiarise themselves with the programme, so that when they start noticing bothersome symptoms, they are aware that they can use MUTU® System to alleviate them.

> *"Mother's have shown a great interest in the MUTU system, and have enjoyed the concept of doing additional 'core' type exercises as well as the 'traditional' pelvic floor exercises. Another benefit was that the programme is online and the women can do it in their own time which suits them"*
>
> - *Physiotherapy staff survey response*

Referring patients to MUTU® System was noted to take up time within appointments; staff had to explain how MUTU® System worked and the benefits it intends to provide. This meant that sessions often took longer than normal when referring patients to MUTU® System.

Staff suggested that patients perceived MUTU® System to be useful as they could access the programme online and complete the exercises in their own time. Despite this, staff noted limitations for complex patients due to the online nature; complex patients often require face-to-face appointments and hands-on treatment. This means that MUTU® System may not be as convenient for some patients. There may be a limitation in the extent MUTU® System can be used to manage more severe symptoms.

> *"Patients having more complex needs requiring more face to face appointments and hands on treatment, instead of being sent away to work with MUTU independently. Time pressures on staff in clinic - to explain the Pilot, explain how it works, the intended benefits etc, this takes a little longer than a normal session when we would be rebooking a standard follow up session."*
>
> - *Physiotherapy staff survey response*

GP practice cohort

Staff members highlighted the importance of raising awareness of MUTU® System. One staff member suggested the need for more information, such as case studies, to discuss with patients when introducing them to MUTU® System. Posters were also suggested to be placed to raise further awareness of MUTU® System.

Sending text messages through Accurx, a healthcare messaging platform, to patients who had given birth in the last month was beneficial in implementing MUTU® System within the GP practice cohort. Despite this, staff noted that it was often too early for women to identify bothersome symptoms at this time. It was suggested that patients should be made aware of MUTU® System during the antenatal period and encouraged to complete MUTU® System during the post-partum period through including this information in their post-delivery pack. This showed similarities with the physiotherapy cohort; staff in both cohorts suggested that women should be made aware of MUTU® System in the antenatal period and encouraged to use MUTU® System in the post-partum period.

Hosting video group clinics was also suggested to help implement MUTU® System within the current GP practice pathway. These clinics helped to provide additional support for women in their post-partum period. Further, one GP practice staff member suggested more free programmes. Assuming this is referring to more coupon codes being available to women, this implies that there is desire to refer more GP practice patients to MUTU® System. This highlights the potential demand within GP practice settings for MUTU® System.

Patient experience staff survey

In terms of the patient experience, one staff member stated that patients appeared happy to be offered an online solution. Another staff member recalled that they received no complaints surrounding their experience of engaging with MUTU® System. This highlights the positive experiences patients provide to staff members surrounding MUTU® System.

Similar to the staff experience survey findings, staff members in the patient experience survey suggested themes surrounding patient awareness:

- Introduce MUTU® System to women in the antenatal period, then encourage uptake within the post-partum period
- Place posters in GP practices
- Encourage midwives, health visitors, and locums to promote MUTU® System

Other suggestions were made surrounding including MUTU® System as part of a mother and baby application from pre-pregnancy to the child reaching 18 years old. Here, the staff member suggested that the *what0-18* website was an example of this, however noted that an integrated approach made sense.

Staff members also highlighted willingness to participate in future implementation opportunities and encouraged more coupon codes being available to women. Making MUTU® System freely available for patient referrals was noted to be beneficial, allowing patients to self-refer if they are experiencing symptoms. Despite this, they acknowledged that funding may be a barrier. This suggests the demand within GP practice settings for MUTU® System, similar to the staff experience survey.

3.3. Quantitative insights

This section highlights a breakdown of the main quantitative evaluation findings. For more insight, please refer to Appendix E: Quantitative insights .

Symptom analysis

Self-pay cohort

Improvement over time was analysed in the self-pay cohort. Here, improvements were identified for POP, UI, DR, back pain, dyspareunia, body fat, and mental health concerns when comparing baseline, week 3, week 6, and week 12 responses (Figure 17).

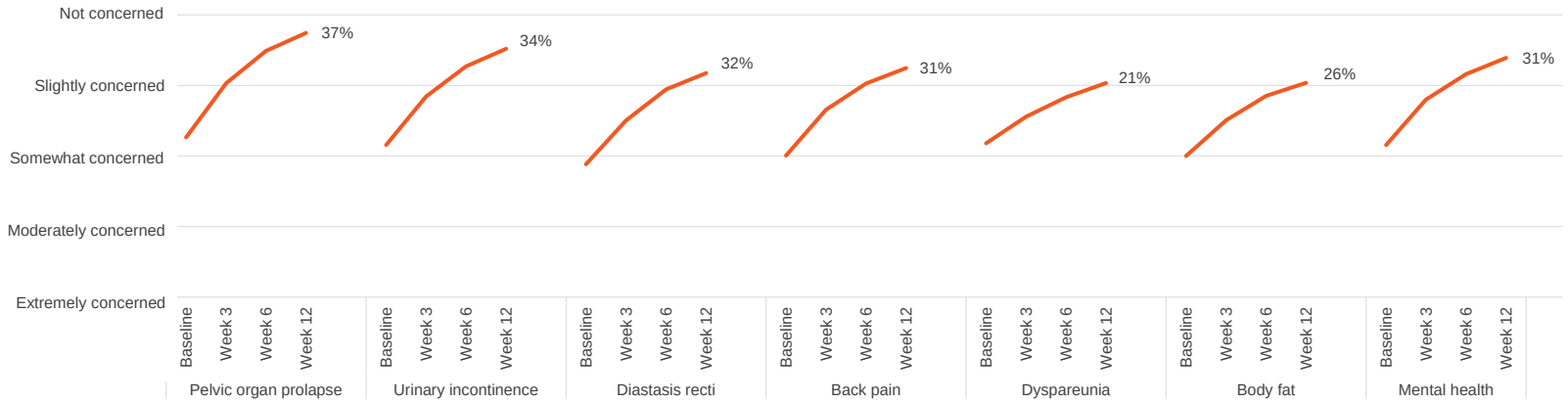


Figure 17: Percentage of improvement in symptoms related to POP, UI, DR, back pain, dyspareunia, body fat, and mental health concerns from the baseline to the week 12 self-pay surveys. For example, a 37% improvement in POP symptoms means that patients have moved from being somewhat concerned to almost not concerned at all.

A paired *t*-test was conducted on the data for each symptom to understand whether there was a significant difference between baseline and week 12 responses (Table 2). Overall, all symptoms suggested a statistically significant difference in week 12 scores compared to baseline scores. This suggests that MUTU® System does lead to a statistically significant improvement in symptoms following 12 weeks of use.

Table 2: Paired *t*-test findings for each symptom within the self-pay cohort.

Symptom	*m*	*SD*	*df*	*t*-statistic	*p*-value	Cohen's d	Significant?
Pelvic organ prolapse							
Baseline	-1.74	0.80	1,348	0.00	$p < 0.05$	-2.29	Yes
Week 12	-0.26	0.83	1,349				
Urinary incontinence							
Baseline	-1.84	0.91	1,360	0.00	$p < 0.05$	-2.30	Yes
Week 12	-0.48	0.97	1,360				
Diastasis recti							
Baseline	-2.12	1.11	1,839	0.00	$p < 0.05$	-2.46	Yes
Week 12	-0.83	1.23	1,839				
Back pain							
Baseline	-1.99	0.97	1,598	0.00	$p < 0.05$	-2.29	Yes
Week 12	-0.75	1.12	1,598				
Dyspareunia							
Baseline	-1.82	0.96	856	0.00	$p < 0.05$	-1.93	Yes
Week 12	-0.97	1.18	856				
Body fat concerns							

Baseline	-2.00	1.09	1,727	0.00	$p < 0.05$	-2.24	Yes
Week 12	-0.96	1.32	1,727				
Mental health							
Baseline	-1.84	0.70	1,826	0.00	$p < 0.05$	-2.06	Yes
Week 12	-0.61	0.93	1,826				

Physiotherapy cohort

Improvement over time was analysed in the physiotherapy cohort. Here, improvements were identified for POP, UI, diastasis recti, back pain, dyspareunia, and pelvic floor dysfunction when comparing baseline, week 3, week 6, and week 12 responses (Figure 18). Throughout this section, it is important to consider the small sample size within the physiotherapy cohort (Section 4.1).

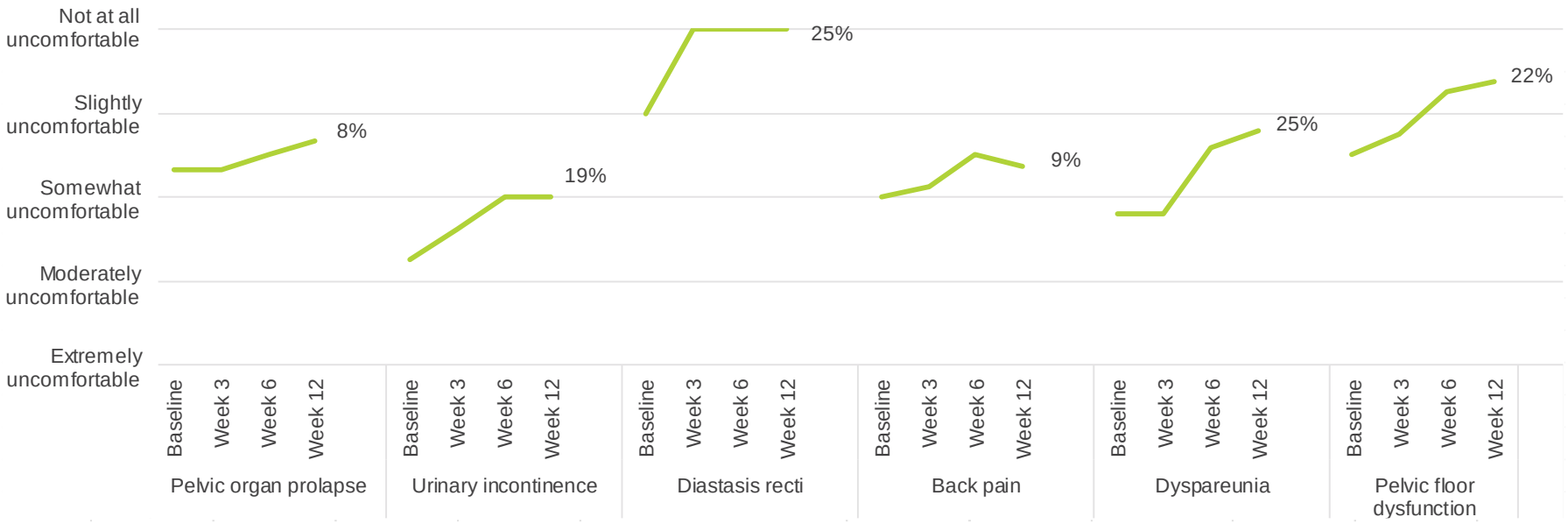


Figure 18: Percentage of improvement in symptoms related to POP, UI, DR, back pain, dyspareunia, and pelvic floor dysfunction from the baseline to the week 12 physiotherapy surveys. For example, a 19% improvement in UI symptoms means that patients have moved from being moderately uncomfortable to somewhat uncomfortable.

There was an increase in quality of life within the physiotherapy cohort from baseline to 12 weeks of using MUTU® System (Figure 19). Here, a 23% improvement in symptoms was identified, where responses moved from strongly disagree to neither agree nor disagree.

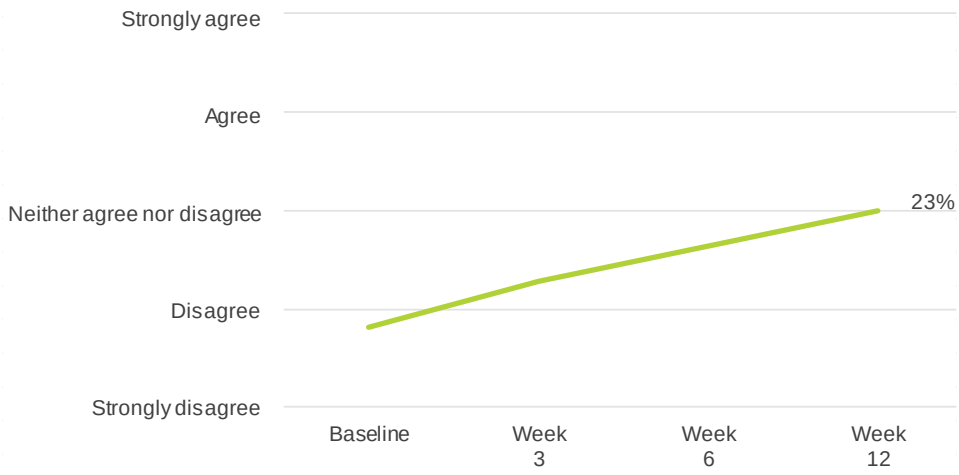


Figure 19: Percentage improvement in quality of life from the baseline to the week 12 physiotherapy surveys from strongly disagree (1) to strongly agree (5), where a higher score over time indicates an improvement in quality of life.

There was a decrease in level of comfort with body fat within the physiotherapy cohort overall (Figure 20). Despite this, after weeks 3 and 6, a slight improvement was identified after week 12. This could be due to the small sample size; a greater sample size would produce a more accurate representation of how level of body fat concerns may change following MUTU® System.

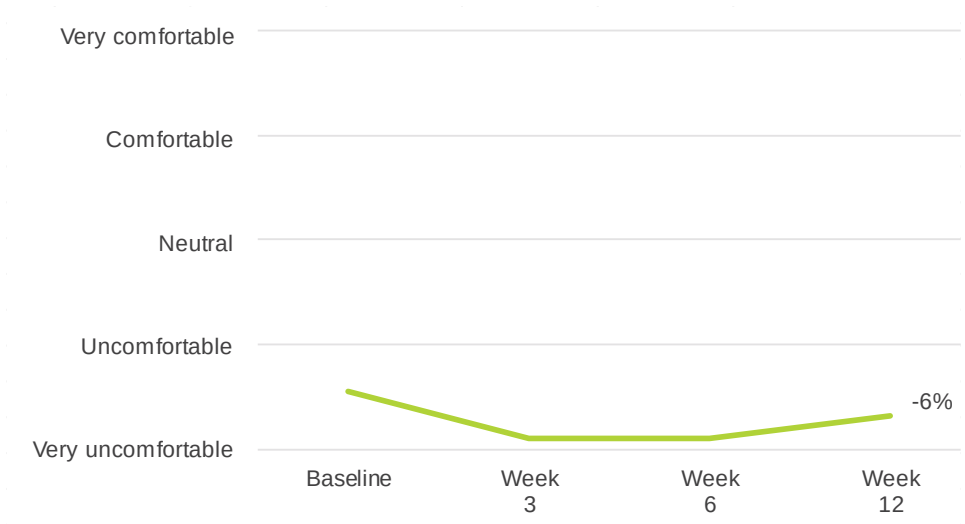


Figure 20: Decrease in body fat concerns from the baseline to the week 12 physiotherapy surveys.

There was an improvement in mental health due to pelvic health symptoms within the physiotherapy cohort from baseline to 12 weeks of using MUTU® System (Figure 21). Here, mental health symptoms improved by 19%, moving from below average to above average.

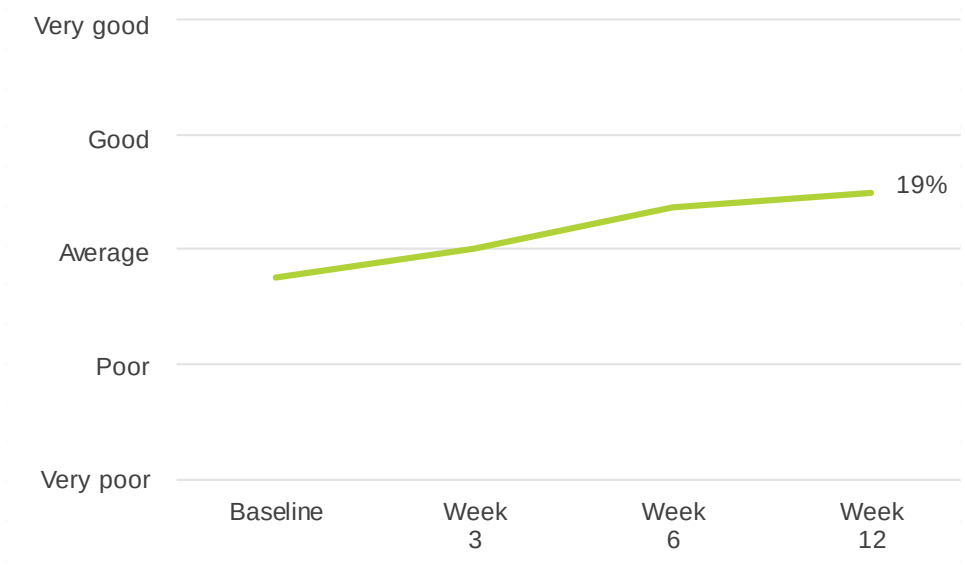


Figure 21: Increase in mental health from the baseline to the week 12 physiotherapy surveys.

A paired *t*-test was conducted on the data for each symptom to understand whether there was a significant difference between baseline and week 12 responses in the physiotherapy cohort (Table 3). A statistical test was not conducted for diastasis recti due to limited responses (n = 1). Overall, there was a statistically significant difference in week 12 scores

compared to baseline scores for UI, dyspareunia, PFD, mental health, and quality of life. There was no statistically significant difference in week 12 scores compared to baseline scores for POP, back pain, and body fat concerns. This suggests that MUTU® System does lead to a statistically significant improvement in symptoms for UI, dyspareunia, PFD, mental health, and quality of life following 12 weeks of use. This is likely due to the large standard deviation indicating variance around the mean and a small sample size.

Table 3: Paired t-test findings for each symptom within the physiotherapy cohort.

Symptom	*m*	*SD*	*df*	*t*-statistic	*p*-value	Cohen's d	Significant?
Pelvic organ prolapse							
Baseline	-1.16	1.03	5	0.17	$p > 0.05$	-1.37	No
Week 12	-1.33	1.03	5				
Urinary incontinence							
Baseline	-2.75	1.16	7	0.00	$p < 0.05$	-2.10	Yes
Week 12	-2.00	1.51	7				
Back pain							
Baseline	-2.00	1.20	7	0.20	$p > 0.05$	-1.88	No
Week 12	-1.63	1.77	7				
Dyspareunia							
Baseline	-2.20	0.84	4	0.03	$p < 0.05$	-2.10	Yes
Week 12	-1.20	1.30	4				
Pelvic floor dysfunction							
Baseline	-1.50	0.76	7	0.00	$p < 0.05$	-1.63	Yes
Week 12	-0.63	0.74	7				
Body fat concerns							
Baseline	-1.44	0.53	8	0.65	$p > 0.05$	-0.96	No

Week 12	-1.67	1.58	8				
Mental health							
Baseline	-0.25	1.39	7	0.01	$p < 0.05$	-1.99	Yes
Week 12	0.50	1.07	7				
Quality of life							
Baseline	-1.18	0.40	10	0.00	$p < 0.05$	-1.18	Yes
Week 12	0.00	0.00	10				

POP-SS and ICIQ scores

Physiotherapy cohort

Nine patients had a POP-SS score before starting MUTU® System. After MUTU® System, treatment was still ongoing for three patients, so data on these patients was unavailable at the time of analysis. Further, one patient did not attend their follow-up, leaving four patient scores remaining to understand change in POP-SS scores before and after MUTU® System. The average change in POP-SS score following MUTU® System was four, indicating an improvement in POP symptoms.

Overall, 15 patients had an ICIQ score before starting MUTU® System. After MUTU® System, treatment was still ongoing for six patients, so data on these patients was unavailable at the time of analysis. Further, two patients did not attend their follow-up, leaving seven patient scores remaining to understand change in ICIQ scores before and after MUTU® System. The average change in ICIQ score following MUTU® System was two, indicating an improvement in UI symptoms.

GP practice cohort

In the GP practice cohort, the average baseline POP-SS score was eight, lowering to five after 12 weeks (Figure 22). It is important to note that the weeks 3 to 12 surveys had very few responses so findings may lack accuracy. Despite this, when predicting the average POP-SS score after 12 weeks using the self-pay cohort data, a POP-SS score of eight led to a predicted score of five after 12 weeks.

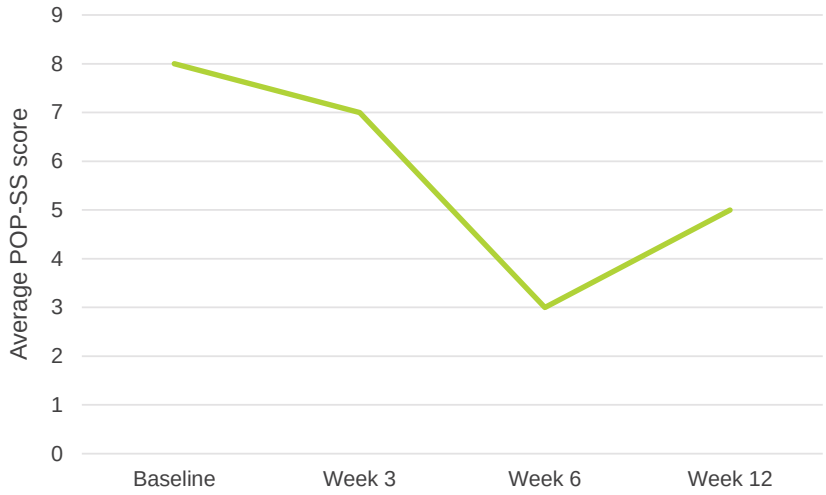


Figure 22: POP-SS scores for the GP practice cohort from baseline to 12 weeks of using MUTU® System.

In the GP practice cohort, the average baseline ICIQ score was six, lowering to three after 12 weeks (Figure 23). Between baseline and week 12, symptoms appear to reduce in severity after three weeks of MUTU® System usage, however, very slightly worsen after six weeks and remain constant after 12 weeks of usage. It is important to note here that the weeks 3 to 12 surveys had very few responses so findings may lack accuracy. When predicting the average ICIQ score after 12 weeks using the self-pay cohort data, an ICIQ score of six led to a predicted score of four after 12 weeks, differing slightly.

Figure 23: ICIQ scores for the GP practice cohort from baseline to 12 weeks of using MUTU® System.

3.4. Health economic modelling

This section highlights a breakdown of the main health economic modelling evaluation findings. For more insight, please refer to Appendix H: Health economic modelling insights .

Scenario 1: All evaluation sites

The modelled benefits, total costs, and net benefit of the cost benefit analysis for scenario 1 are presented in Table 4. Although this scenario was presented in terms of the net benefit in 2023 figures, the evaluation duration was only 10 months (February 2023 to November 2023). When the annual price of the programme was set to £50 per NHS patient in their post-partum period using MUTU® System, scenario 1 predicted a positive forecasted net benefit including QALY benefits totalling £1.8k (BCR = 1.4). The largest modelled benefit streams were the reduction in UI and its related QALY gain, generating a total saving of £2.9k and accounting for more than half of the total benefit over one year. Excluding QALY benefits; however, yielded a negative forecasted net benefit of -£1.0k (BCR = 0.7).

Table 4: Scenario 1 health economic outcomes within the evaluation sites (GP and physiotherapy practices) for the 2023 financial year.

Evaluation sites (£, net benefit in 2023 figures)	Evaluation period (10 months; during 2023/24)
Benefits	
Reduction in urinary incontinence	£1,462
Reduction in pelvic organ prolapse	£1,288
Reduction in dyspareunia	£157
Total benefits excluding QALYs	**£2,906**
POP-related QALY gain	£1,294
UI-related QALY gain	£1,468
Total benefits including QALYs	**£5,669**
Costs	
Cost of MUTU® System	**£3,910**

Net benefit including QALYs	
Net benefit	**£1,759**
Benefit-cost ratio	**1.4**
Net benefit excluding QALYs	
Net benefit	**-£1,004**
Benefit-cost ratio	**0.7**

For a breakdown of the sensitivity analysis, please see Appendix H: Health economic modelling insights detailed.

Scenario 2: Seven hypothetical GP practices across Kent and Medway ICS

The modelled benefits, total costs, and net present value (NPV) of the cost benefit analysis for scenario 2 are presented in Table 5. This scenario is an ex-ante analysis for if MUTU® System was implemented across seven GP practices in Kent and Medway ICS. For the five-year period following the 2023/24 financial year if the annual price of MUTU® System was set to £50, scenario 2 predicted a positive forecasted NPV including QALY benefits totalling £14k (BCR = 1.5) for a hypothetical seven GP practices within Kent and Medway ICS, based on patients from GP practices engaged during the evaluation. The two largest modelled benefit streams were the reduction in POP and its related QALY gain, generating a total saving of £25k (£13k excluding QALYs and £12k including QALYs) and accounting for almost 60% of the total benefit over five years. Excluding QALY benefits; however, yielded a negative forecasted NPV of -£6k (BCR = 0.8).

Table 5: Scenario 2 health economic outcomes within the evaluation sites (GP and physiotherapy practices) for the 2023/24 financial year. The figures above may not sum as they have been rounded to the nearest £1k.

GP practices across Kent and Medway ICS (£, net present value in 2023 figures)	Year 1 2023/24	Year 2 2024/25	Year 3 2025/26	Year 4 2026/27	Year 5 2027/28	Five years (2023/24 to 2027/28)
Benefits						
Reduction in urinary incontinence	£2k	£2k	£1k	£1k	£1k	£7k

Reduction in pelvic organ prolapse	£3k	£3k	£3k	£2k	£2k	£13k
Reduction in dyspareunia	£0k	£0k	£0k	£0k	£0k	£1k
Total benefits excluding QALY gain	**£5**	**£4**	**£4**	**£4**	**£4**	**£22k**
POP-related QALY gain	£3k	£3k	£2k	£2k	£2k	£12k
UI-related QALY gain	£2k	£2k	£2k	£2k	£1k	£8k
Total benefits including QALY gain	**£9k**	**£9k**	**£8k**	**£8k**	**£8k**	**£42k**
Costs						
Cost of MUTU® System	£6k	£6k	£6k	£5k	£5k	**£28k**
Net present value including QALYs						
Net present value	£3k	£3k	£3k	£3k	£3k	**£14k**
Benefit-cost ratio	1.5	1.5	1.5	1.5	1.5	**1.5**
Net present value excluding QALYs						
Net present value excluding QALYs	-£1k	-£1k	-£1k	-£1k	-£1k	**-£6k**
Benefit-cost ratio excluding QALYs	0.8	0.8	0.8	0.8	0.8	**0.8**

For a breakdown of the sensitivity analysis, please see Appendix H: Health economic modelling insights .

Scenario 3: Kent and Medway ICS

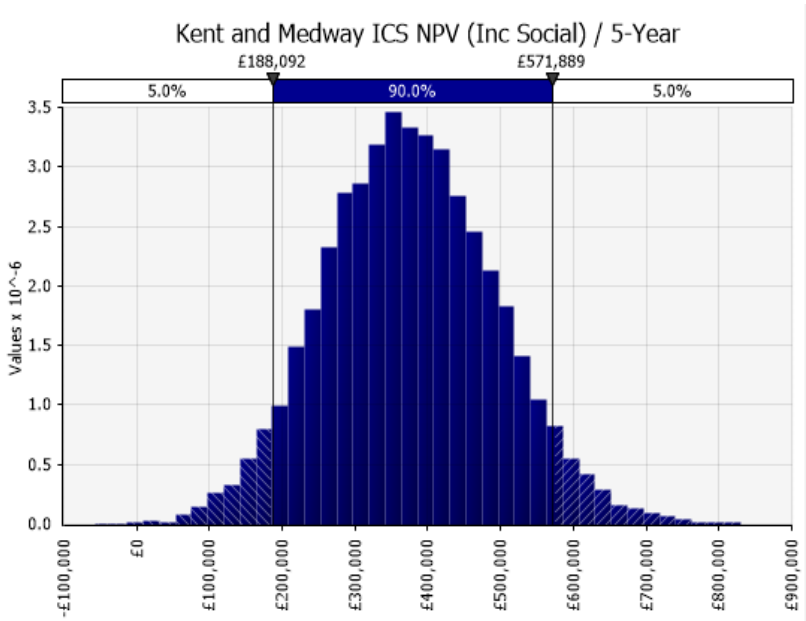
The modelled benefits, total costs, and net present value (NPV) of the cost benefit analysis for scenario 3 are presented in Table 6. For the five-year period following the 2023/24 financial year if the annual price of MUTU® System was set to £50 per NHS patient in their post-partum period MUTU® System, scenario 3 predicted a positive forecasted NPV including QALY benefits totalling £388k (BCR = 1.5). The largest modelled benefit stream was the reduction in POP and its related QALY gain, generating a total saving of £682k (£349k excluding QALYs and £333k including QALYs), respectively, and accounting for almost 60% of the total benefit over five years.

Table 6: Scenario 3 health economic outcomes within the evaluation sites (GP and physiotherapy practices) for the 2023 financial year. The figures above may not sum as they have been rounded to the nearest £1k.

Kent and Medway ICS (£, net present value in 2023 figures)	Year 1 2023/24	Year 2 2024/25	Year 3 2025/26	Year 4 2026/27	Year 5 2027/28	Five years (2023/24 to 2027/28)
Benefits						
Reduction in urinary incontinence	£43k	£42k	£41k	£40k	£40k	**£205k**
Reduction in pelvic organ prolapse	£73k	£71k	£70k	£69k	£67k	**£349k**
Reduction in dyspareunia	£8k	£8k	£8k	£8k	£8k	**£40k**
Total benefits excluding QALY gain	£124k	£121k	£119k	£117k	£114k	**£595k**
POP-related QALY gain	£73k	£70k	£67k	£64k	£61k	**£333k**
UI-related QALY gain	£49k	£47k	£45k	£43k	£41k	**£224k**
Total benefits including QALY gain	£245k	£238k	£230k	£223k	£216k	**£1,152k**
Costs						
Cost of MUTU® System	£160k	£158k	£153k	£149k	£144k	**£746k**
Net present value including QALYs						
Net present value	£85k	£80k	£77k	£74k	£72k	**£388k**
Benefit-cost ratio	1.5	1.5	1.5	1.5	1.5	**1.5**
Net present value excluding QALYs						
Net present value excluding QALYs	-£37k	-£37k	-£34k	-£32k	-£30k	**-£169k**
Benefit-cost ratio excluding QALYs	0.8	0.8	0.8	0.8	0.8	**0.8**

Sensitivity analysis

The sensitivity analysis (performed using @Risk; Figure 24; Figure 25) assessed how various sources of uncertainty within the model contributed to the model's overall uncertainty. Over a five-year period, the sensitivity analysis for scenario 3 indicated that the modelled NPV varied between £188k and £572k at the 90% confidence interval, with a mean expected outcome of £376k including QALYs (Figure 24). The outcomes presented in Table 6, however, were the most likely outcome for this model.

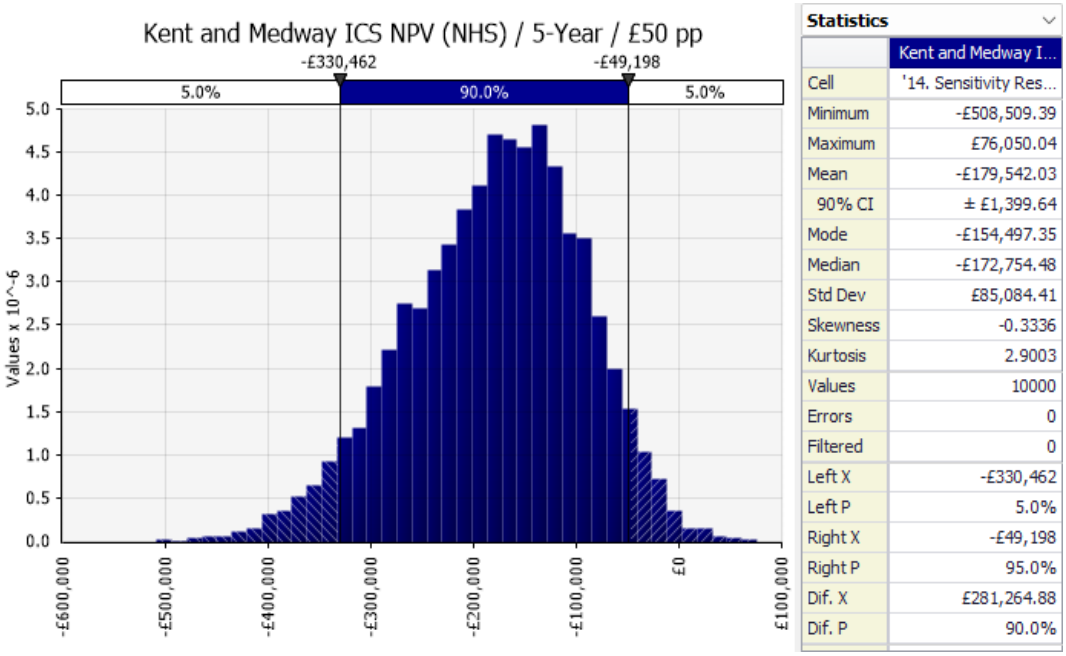


Statistics

	Kent and Medway I...
Cell	'14. Sensitivity Res...
Minimum	-£57,683.00
Maximum	£829,461.81
Mean	£376,169.47
90% CI	± £1,926.67
Mode	£360,361.38
Median	£372,880.10
Std Dev	£117,122.27
Skewness	0.1381
Kurtosis	3.0101
Values	10000
Errors	0
Filtered	0
Left X	£188,092
Left P	5.0%
Right X	£571,889
Right P	95.0%
Dif. X	£383,797.92
Dif. P	90.0%

Figure 24: Scenario 3 (including QALYs) sensitivity analysis results.

Over a five-year period, the sensitivity analysis for scenario 3 indicated that the modelled NPV varied between -£331k and -£49k at the 90% confidence interval, with a mean expected outcome of -£180k excluding QALYs (Figure 25).



Statistics

	Kent and Medway I...
Cell	'14. Sensitivity Res...
Minimum	-£508,509.39
Maximum	£76,050.04
Mean	-£179,542.03
90% CI	± £1,399.64
Mode	-£154,497.35
Median	-£172,754.48
Std Dev	£85,084.41
Skewness	-0.3336
Kurtosis	2.9003
Values	10000
Errors	0
Filtered	0
Left X	-£330,462
Left P	5.0%
Right X	-£49,198
Right P	95.0%
Dif. X	£281,264.88
Dif. P	90.0%

Figure 25: Scenario 3 (excluding QALYs) sensitivity analysis results.

Analysis using tornado charts (Figure 26) showed that a variation to the prevalence of dyspareunia had the greatest effect on the mean NPV. Similarly, the prevalence of UI and POP were also influential factors, in addition to engagement with MUTU® System (as estimated using the engagement of GP patients during the evaluation).

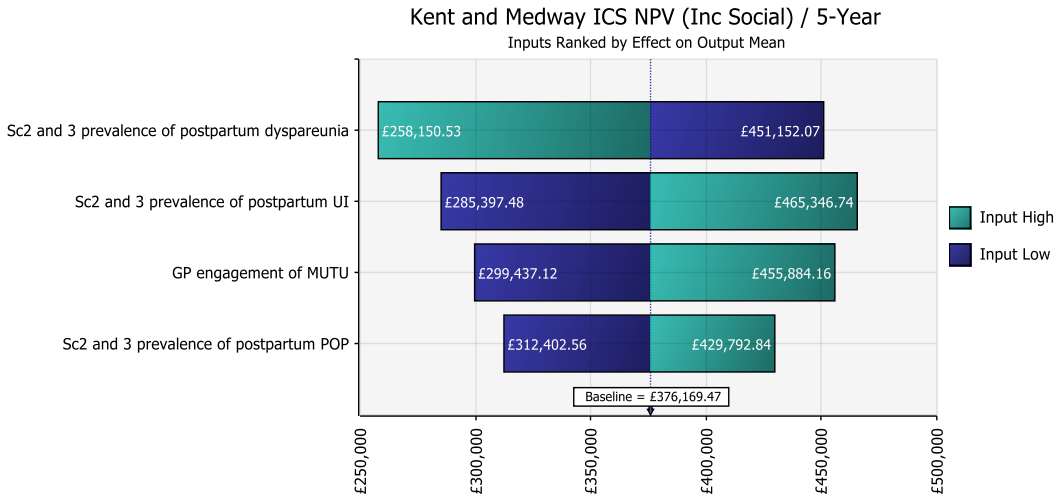


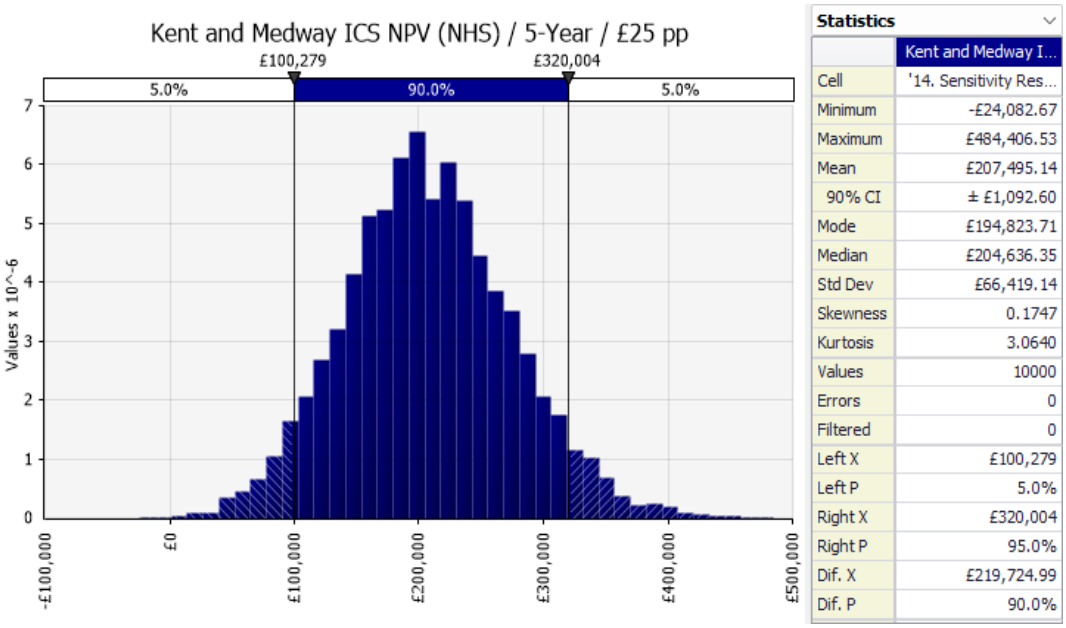
Figure 26: Tornado chart showing factors ranked by their effect on the output mean impact for scenario 3. The key indicates the expected change in outcomes when each factor is changed according to the minimum and maximum within the stipulated sensitivity range. The baseline figure is representative of the output mean. Blue represents the impacts to the mean NPV when the maximum sensitivity input is considered. Teal represents the impacts to the mean NPV when the minimum sensitivity input is considered.

Breakeven analysis

To estimate a breakeven point for implementing MUTU® System within the NHS, the following pricing analysis based on scenario 3 was conducted. The purpose of this analysis was to inform the return on investment from an NHS system perspective, and as such, any social benefits (QALYs) were excluded. The difference in ROI and BCR when pricing MUTU® System at different price points per NHS patients in their post-partum period is highlighted in Figure 27.

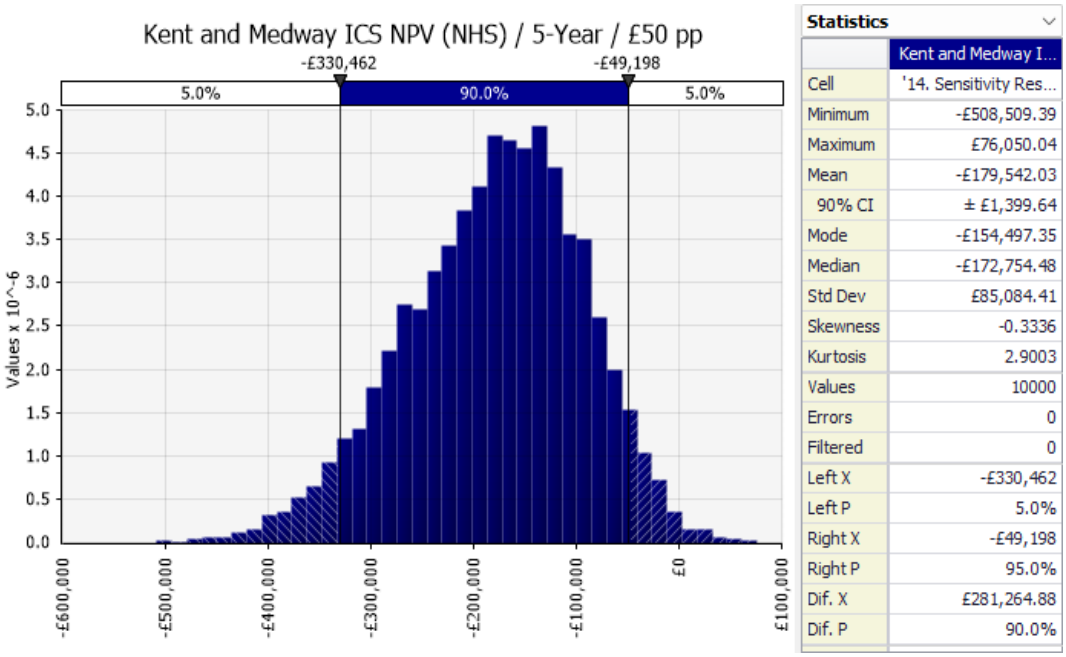
Figure 27: The ROI and BCR when pricing MUTU® System at £25, £50, and £75 per NHS patient in their post-partum period using MUTU® System.

Sensitivity analysis was run for three pricing points, namely the cost of a MUTU® System license was adjusted to £25, £50, and £75, as shown in Figure 28, Figure 29, and Figure 30, respectively.



Statistics	Kent and Medway I...
Cell	'14. Sensitivity Res...
Minimum	-£24,082.67
Maximum	£484,406.53
Mean	£207,495.14
90% CI	± £1,092.60
Mode	£194,823.71
Median	£204,636.35
Std Dev	£66,419.14
Skewness	0.1747
Kurtosis	3.0640
Values	10000
Errors	0
Filtered	0
Left X	£100,279
Left P	5.0%
Right X	£320,004
Right P	95.0%
Dif. X	£219,724.99
Dif. P	90.0%

Figure 28: Sensitivity analysis results for scenario 3 excluding social benefits (QALYs) with a £25 cost of MUTU® System.



Statistics	Kent and Medway I...
Cell	'14. Sensitivity Res...
Minimum	-£508,509.39
Maximum	£76,050.04
Mean	-£179,542.03
90% CI	± £1,399.64
Mode	-£154,497.35
Median	-£172,754.48
Std Dev	£85,084.41
Skewness	-0.3336
Kurtosis	2.9003
Values	10000
Errors	0
Filtered	0
Left X	-£330,462
Left P	5.0%
Right X	-£49,198
Right P	95.0%
Dif. X	£281,264.88
Dif. P	90.0%

Figure 29: Sensitivity analysis results for scenario 3 excluding social benefits (QALYs) with a £50 cost of MUTU® System.

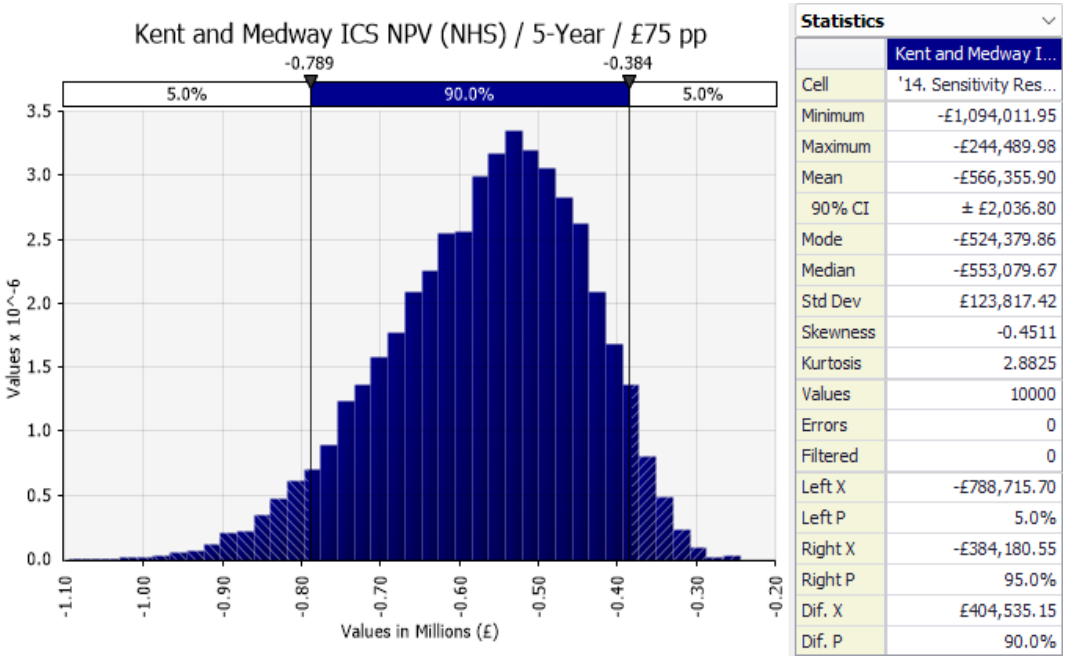


Figure 30: Sensitivity analysis results for scenario 3 excluding social benefits (QALYs) with a £75 cost of MUTU® System.

When social benefits are excluded, setting the annual price of MUTU® System to £50 or £75 yielded a negative mean NPV (-£180k and -£566k, respectively; Figure 29; Figure 30) at the 90% confidence interval. Figure 28 indicates that the annual price point of £25 yielded a positive NPV at the minimum, mean, and maximum (£100k, £207k, and £320k, respectively).

To determine the benefits that may be realised at the breakeven point, Table 7 shows the expected benefits in terms of the total modelled and uptake population.

Table 7: Benefits realised for each scenario when pricing of MUTU® System at breakeven point (2023/2024 figures).

Scenario	Benefit per total modelled population	Benefit per uptake population
Scenario 1 (*n* = 68)	-	£42.74
Scenario 2 (*n* = 765)	£5.89	£44.28
Scenario 3 (*n* = 20,985)	£5.89	£44.28

Table 7 indicates that the breakeven point for scenario 1 was £42.74 per NHS patient who signed up to use MUTU® System. It is important to note that scenario 1 modelled the impacts of the programme for women in their post-partum period who were using the programme during the evaluation period (100% uptake; 10-month period).

The total modelled population represents the annual number of births, or number of women in their post-partum period, and the uptake population represents the women in their post-partum period who utilised MUTU® System. A key insight provided in Table 7 is that the cost associated with the breakeven pricing point in scenarios 2 and 3 in terms of total births per year is £5.89; however, the expected benefits per MUTU® System user may be as high as £44.28, if uptake and engagement rates hold in a wider deployment scenario.

If the annual cost of the programme was set at any price below £44.28 per NHS patient in their post-partum period using MUTU® System for larger populations within Kent and Medway ICS, implementation would yield a positive ROI. For example, considering that the number of live births in Kent and Medway were 20,101 between November 2022 and October 2023 (NHS Kent and Medway, 2023), implementing MUTU® System in this region may cost approximately £118k at the cost neutral price point (£5.89; Table 7), and yield £44.28 benefits per NHS patient in their post-partum period using MUTU® System.

4. Limitations

4.1. Qualitative insights

Insufficient responses in the physiotherapy cohort meant that a new cohort, the GP practice cohort, had to be sought to generate a greater volume of insight overall. Although this did allow for a broader dataset, gaining all insight from only the physiotherapy cohort would have resulted in greater depth of information in one cohort, which could have led to more understanding within a physiotherapy cohort. This was not feasible due to resourcing and staff turnover at the selected site, resulting in a slower uptake. From this, the GP practice cohort was identified to understand how MUTU® System would best fit into the pathway.

A subset of participants who were assigned coupon codes did not sign up for MUTU® System. These individuals were not considered to be in the uptake group as they did not activate the code. Further, engagement from some participants lowered over the course of the data collection period. Some individuals discontinued use of the programme, leading to a reduction in the number of survey responses. Additionally, some participants did not complete all Week 3, 6, and 12 surveys, but still used MUTU® System. Efforts were made to encourage survey uptake, such as through pop-up boxes on the webpage and sending reminders, however there were few survey responses. This meant that there were participants who did not complete some or all surveys, resulting in a loss of data. Such

missing data could have provided a more comprehensive understanding of MUTU® System's impact over time.

Within the GP practice cohort, answers to the following questions were unable to be used in the analysis due to errors when the survey was uploaded to the MUTU® System platform:

- How much urine do you usually leak (whether you wear protection or not)? [Week 3 survey only]
- Overall, how much does leaking urine interfere with your everyday life? [Week 3 survey only]
- When does urine leak? [Week 3 survey only]
- Which aspects of MUTU do you consider to be unhelpful? [Week 3, 6, and 12 surveys]
- Why did you consider the [aspects of MUTU® System] to be unhelpful? [Week 3, 6, and 12 surveys]

This meant that insights surrounding these areas from the GP practice cohort were unable to be obtained, limiting the insights gained from the analysis.

4.2. Quantitative insights

There was a small sample size within the GP practice and physiotherapy cohorts, which limited the generalisability and robustness of the results. The self-pay cohort was used to mitigate this limitation, which meant that findings could be compared against this cohort to determine whether results would be similar should more NHS patients complete MUTU® System. Here, it is suggested that such cohorts shared similarities so it is likely that their improvement over time would remain similar.

Assumptions were made regarding the comparability of the self-pay cohort with the GP practice and physiotherapy cohorts in terms of the expected level of improvement. It must be acknowledged that this assumption may not hold true, as variations in patient characteristics and other factors could impact outcomes differently in these cohorts. To enhance the accuracy of these comparisons, obtaining specific data for each cohort would be preferable. The findings from the current evaluation identified improvements in NHS patient symptoms despite the small sample, so it is assumed that these cohorts would follow the same trend as self-pay patient group outcomes.

4.3. Health economic modelling

Treatment cost estimates

A key limitation in modelling the benefits of MUTU® System was obtaining accurate treatment costs for pelvic health symptoms. This is likely due to women's pelvic health being a typically underserved and underreported area (Royal College of Obstetricians and Gynaecologists, 2023). For example, the treatment cost figure for UI had to be estimated based on total annual treatment costs due to the lack of costing figures available. This posed limitations to the accuracy of the treatment costs utilised in the model; however, to address the lack of standardised treatment guidance and costing figures, a high optimism bias was applied.

Uptake and engagement assumptions

A further limitation to the modelling was that the insights obtained from the evaluation population were based on a small number of NHS patients in their post-partum period using MUTU® System. As a result, uptake and engagement rates were based on a small sample size. These figures may not be realistic if larger patient volumes engage with MUTU® System. Defining engagement as adherence for at least three weeks may overestimate the benefits of MUTU® System, as benefits may only be realised after longer utilisation periods. Additionally, the usage data provided by MUTU® System did not indicate the hours spent utilising the programme, instead indicating only the number of days from the first log-in date to the most recent log-in date. Consequently, the engagement rates utilised in the modelling may be an optimistic estimate, which could be expected to be lower if the programme were to be rolled out on a wider scale. Again, optimism bias was applied to account for the potentially optimistic estimates.

The proportion of NHS patients in their post-partum period using MUTU® System may be underestimated; the highest symptom prevalence of modelled conditions (namely, dyspareunia prevalence) was used as the proportion of programme user rate. Approximately half of women initially presenting with either UI or POP, ultimately exhibit symptoms of both conditions upon examination (Buchsbaum, 2006). Due to the uncertainty of the symptom overlap incidence, the utilised approach is prudent; however, represents a limitation to the model accuracy.

Patient treatment assumptions

The cost-benefit analysis assumed if a patient reported symptom improvement due to MUTU® System, they would not require further treatment within the subsequent year. Despite this, Olsen et al. (1997) suggested that there may be a high recurrence rate for POP due to weakened tissue in the area. It is unclear the degree of improvement required to indicate a '*curative*' effect due to MUTU® System, but this assumption does indicate that some modelled benefits may be overestimated.

Scenarios 2 and 3 model patients up to 12 months post-partum responding to text messages from GPs inviting them to use MUTU® System, as well as those invited through the six-week GP check-up. This may underestimate the higher cost associated with women who delay seeking help and '*learn to live*' with their symptoms. Many parous women who were not treated for pelvic health symptoms may require invasive and expensive surgery many years after giving birth. This was not possible to model due to the difficulty of disentangling the correlation between menopause on symptoms of POP, dyspareunia, and UI (Ansari et al., 2022; Mitchell et al., 2017; Moossdorff-Steinhauser et al., 2021).

Scenario modelling

Scenario 1 revolves around the number of women engaged during the 10-month evaluation period, with the understanding that the benefits and costs attributed to these individuals extend into the subsequent year. This extension stems from the assumption that all benefit streams reflect a cash-releasing saving equivalent to one year of baseline treatment, contingent upon reported improvement resulting from MUTU® System utilisation. Likewise, the cost structure is anchored in an annual license fee triggered by a user's initial programme usage. While acknowledging these temporal nuances, it is crucial to note that they do not compromise the robustness of the model. This is because benefits may materialise as early as three weeks into programme engagement, while costs are consistently incurred after the first use across all scenarios.

5. Discussion

5.1. Effectiveness

This section answers evaluation questions:

1) Does MUTU® System lead to a reduction in symptom prevalence for NHS physiotherapy patients, NHS GP practice patients, and self-pay users?
2) Does MUTU® System help to increase patient knowledge of pelvic health in the NHS?

Does MUTU® System lead to a reduction in symptom prevalence for NHS physiotherapy patients, NHS GP practice patients, and self-pay users?

Within the GP practice cohort, POP-SS and ICIQ scores were obtained before and after using MUTU® System, where a lower score meant lower symptom severity. POP-SS scores improved from an average of eight to five after using MUTU® System (Figure 22). In the

ICIQ, scores improved from an average of six to an average of three after using MUTU® System (Figure 23). This highlights an improvement in symptom severity related to POP and UI in the GP practice cohort from using MUTU® System.

The self-pay cohort was used to predict the POP-SS and ICIQ symptom score after using MUTU® System from NHS patient baseline scores. Here, it was suggested that a baseline POP-SS score of eight would lower to five after 12 weeks of using MUTU® System. Further, an ICIQ score of six would lower to four after 12 weeks of using MUTU® System. This shows similarities to the GP practice cohort findings, suggesting the cohorts are likely to show similar findings in terms of symptom improvement. MUTU® System, therefore, is suggested to lead to a reduction in the prevalence of POP and UI symptom severity after 12 weeks.

Future evaluations could examine reasons behind baseline scores. For example, some patients may have low baseline scores due to trying other programmes that are not as user friendly or a lack of adherence to other programmes. This could further highlight the reasons why MUTU® System may be beneficial to NHS patients in encouraging adherence and improving symptom severity scores.

A small sample size in the physiotherapy and GP practice cohorts meant uncovering the true impact of MUTU® System within the NHS cohorts was limited. Despite this, a significant improvement in symptoms related to UI, dyspareunia, PFD, mental health, and quality of life was identified in the physiotherapy cohort. Although an improvement was identified for POP and back pain in the physiotherapy cohort, there was no significant improvement identified. The small sample size available could suggest these findings may not be representative of the wider NHS patient population; a significant improvement may be identified in a larger sample. A larger sample size would allow a more accurate representation of symptom improvement to be identified, hence the importance of the self-pay cohort findings.

The self-pay cohort showed similar demographic proportions to the physiotherapy and GP practice cohorts (Figure 3; Figure 4). A statistically significant improvement in POP, UI, diastasis recti, back pain, dyspareunia, body fat, and mental health related to symptoms was identified after using MUTU® System in the self-pay cohort. Therefore, it is assumed that a statistically significant improvement for the aforementioned symptoms would be identified in a larger sample size of NHS physiotherapy and NHS GP practice cohorts.

Overall, MUTU® System may lead to a reduction in symptom prevalence for NHS physiotherapy, NHS GP practice patients, and self-pay patients. This means that MUTU® System is effective in reducing the prevalence of pelvic health symptoms for NHS patients. It can be concluded that, should MUTU® System be implemented in a larger NHS cohort, it is likely that similar reductions in symptom prevalence would be identified. Future research could explore symptom prevalence due to MUTU® System in a larger NHS patient population over a longer time period to determine whether similar findings are replicated and assess whether improvements are sustained over a longer period.

Does MUTU® System help to increase patient knowledge of pelvic health in the NHS?

MUTU® System appeared to increase NHS patient knowledge of pelvic health. This was identified through 67% of NHS physiotherapy patients reporting they knew which symptoms were normal after using MUTU® System, compared to the baseline of 25% (Figure 8). In the GP practice cohort, all patients knew which symptoms were normal after using MUTU® System (Figure 12). This suggests that MUTU® System leads to an increased understanding of pelvic health within NHS patients after 12 weeks of use.

The physiotherapy cohort identified a 43% increase in the proportion of patients who felt confident in locating their pelvic floor muscles after using MUTU® System (Figure 7). Further, all patients in the GP practice cohort felt confident in locating their pelvic floor muscles after using MUTU® System (Figure 11). This increased confidence may stem from patients having an increased knowledge base surrounding pelvic health (Figure 8; Figure 12). This is echoed by 67% of GP practice patients and physiotherapy patients respectively reporting they knew when to see a doctor because of their pregnancy-related symptoms after using MUTU® System (Figure 6; Figure 10), suggesting their knowledge of pelvic health has increased.

MUTU® System appears to provide NHS patients with the knowledge they require to locate their own pelvic floor muscles (Figure 7; Figure 11) and know which symptoms of pelvic health are normal (Figure 8; Figure 12). Ignoring symptoms of pelvic health can result in patient deterioration, as patients may consider symptoms to be normal or untreatable. Through MUTU® System, patients are provided with the resources they require to identify and manage their symptoms remotely. Should their symptoms worsen, patients know when they need to discuss these symptoms with their doctor (Figure 6; Figure 10), potentially reducing the number of unnecessary appointments. MUTU® System provides the tools for patients to manage their symptoms remotely, whilst also ensuring they contact the NHS should they experience severe symptoms that cannot be treated by MUTU® System alone.

Overall, it can be concluded that MUTU® System helps to increase patient knowledge of pelvic health in the NHS, making MUTU® System effective in its purpose. This could result in decreased patient deterioration as patients know they can use MUTU® System to manage their symptoms or contact the NHS should their symptoms become more severe. As a result, patients could be more likely to have meaningful conversations with NHS staff due to the shared level of knowledge between patient and staff member, resulting in timely treatment suitable for the patient. Future research could explore feedback around patient-staff interactions during pelvic health-related appointments to understand how level of knowledge can impact these conversations.

5.2. Programme improvement

This section answers evaluation question:

3) How can MUTU® System be improved for NHS patients?

Although identified as a helpful element of MUTU® System, seven respondents in the physiotherapy cohort suggested improvements surrounding the physical exercises. Improvements included adding stretching videos, further instruction during workouts, slowing down the workouts, and lowering the price of the workout kit (Section 3.1). Making these improvements to the exercise element of MUTU® System could facilitate a reduction in symptom prevalence further by increasing user satisfaction; patients are likely to continue completing the exercises.

One respondent highlighted difficulty with having the time to complete MUTU® System. This was echoed in staff surveys, emphasising the importance of ensuring patients are referred to MUTU® System when they can feasibly have the time to complete the programme. Finding the correct time for patients to be referred appears a key element when implementing MUTU® System in an NHS setting. This could be integrated with Accurx, which allows text messages to be scheduled to patients (Accurx, 2024), or similar messaging services. From this, text messages could be sent towards the end of pregnancy and beyond, introducing and reminding women in their post-partum period they can treat their pelvic health symptoms using MUTU® System and allowing them to refer at a time that suits them. This has already been trialled in some GP practices, with positive feedback, suggesting that further implementation may be beneficial for other GP practices who do not currently send text messages regarding MUTU® System.

Respondents in the GP practice cohort noted that MUTU® System could be easier to navigate, with the suggestion of an app-based version due to a one report of an issue with the website. Due to the limited number of responses, it is unknown whether more GP practice patients have similar experiences with navigating MUTU® System. Nevertheless, MUTU® System should be easy to navigate to allow accessibility for all NHS patients.

Overall, considering the most appropriate time to refer NHS patients to MUTU® System would help ensure women have the time to dedicate towards MUTU® System, allowing for feasible adherence. This requires flexibility surrounding when women are referred to MUTU® System; uptake is partly dependent on whether women have the time to complete the exercises.

5.3. Enablers and barriers to engagement

This section answers evaluation question:

4) How do various factors contribute to or impede the engagement of NHS patients with MUTU® System?

Staff surveys highlighted the importance of creating awareness and encouraging uptake of MUTU® System at the correct time; women were often busy after giving birth, which may impede their engagement. This means that women should be made aware of MUTU® System during their pregnancy so they know they could be referred to MUTU® System should they experience concerns around pelvic health symptoms during or after their pregnancy at any time. This would contribute to increasing uptake of MUTU® System; women are aware of the treatment they require before they experience concerning symptoms, overcoming barriers such as the potential embarrassment factor of asking for help with pelvic health symptoms.

Although staff surveys suggested the online element of MUTU® System was beneficial to most NHS patients, staff highlighted that complex patients may require more face-to-face care. This suggests MUTU® System may limit engagement for complex patients due to their own personal requirements. The *NIHR-INCLUDE* framework (National Institute for Health and Care Research, 2020) offers a roadmap, acknowledging the significance of digital technologies; digital exclusion poses barriers to under-served groups, compounding existing challenges. Efforts to enhance digital inclusion of MUTU® System must be integrated to ensure accessibility and relevance for diverse populations. With regard to MUTU® System, ways of accommodating complex patients to allow them to complete the programme in a face-to-face setting could help facilitate engagement in this cohort. For example, MUTU® System could be used to support the recovery process following pelvic surgery to reduce the chance of symptom relapse. Funders and reviewers can then acknowledge whether MUTU® System demonstrates comprehensive strategies for engaging under-served populations digitally.

All respondents in patient surveys identified elements of MUTU® System they considered to be helpful (Figure 13). The most helpful element of MUTU® System in the physiotherapy cohort were the core workout videos, followed by learning about pelvic health. Here, patients noted that the exercise videos were easy to follow. In the GP practice cohort, all three respondents found the core workout videos helpful; the exercise instructions were clear and engaging. The workout and education components aimed to lower symptom prevalence and increase education may facilitate engagement with MUTU® System in a physiotherapy and GP practice cohort as this helps NHS patients understand and manage their symptoms.

Although patient feedback surrounding MUTU® System was largely positive, some physiotherapy patients noted the MUTU food guide and ‘MUTU mamas community’ to be unhelpful (Figure 14). Despite this, the MUTU food guide would not be a component of MUTU® System that would be included for future NHS implementation sites. Further evaluations should explore engagement metrics with each element of MUTU® System to suggest evidence-based improvements and enable further engagement. Understanding user

engagement metrics such as usage rates of each element, login frequency, timing, and content preferences provides insights into feature utilisation and its impact on patient outcomes. Integrating these data points offers a holistic view for informed decision-making and enhancing system effectiveness.

Overall, it is likely that the more the exercise videos are watched, the greater the patient outcomes and therefore patient engagement of MUTU® System. Finding ways to make the community more active could increase patient engagement with MUTU® System. Ways to encourage activity in the 'MUTU mamas' community could help provide women with the motivation to continue with the programme, increasing the level of engagement.

5.4. Economic and social value

This section answers evaluation questions:

5) Does MUTU® System result in a cost reduction to the NHS due to a reduction in symptom prevalence?

6) Does MUTU® System lead to an increase in quality of life due to a reduction in symptom prevalence?

Does MUTU® System result in a cost reduction to the NHS due to a reduction in symptom prevalence?

The economic value of implementing MUTU® System in Kent and Medway ICS was forecasted over five years through a cost-benefit analysis. Scenario 1, based on uptake in GP practice and physiotherapy NHS patients in the current 10-month evaluation and impacts over the subsequent year, yielded a net benefit of £2k including QALYs (Table 4). This means there was an average return of £1.40 for each £1 spent. When excluding QALYs, there was a negative net benefit of -£1k, with a BCR of 0.7 (Table 4). This means that for every £1 spent, there is an average return of £0.70.

When examining scenario 2, the impact of MUTU® System in seven GP practices in Kent and Medway ICS over five years including QALYs, an NPV of £14k (BCR = 1.5) was obtained (Table 5). Further, the NPV excluding QALYs was -£6k (BCR = 0.8; Table 5). Compared to scenario 1, scenario 2 resulted in a greater NPV when including QALYs, and a lower NPV when excluding QALYs. The same is identified for scenario 3, examining the impact of MUTU® System across Kent and Medway ICS as a whole over five years, where an NPV of £388k (BCR = 1.5) including QALYs and an NPV of -£169k (BCR = 0.8) excluding QALYs was yielded (Table 6).

To understand whether MUTU® System results in a net benefit to the NHS due to a reduction in symptom prevalence, the cost-benefit analysis modelled a reduction in treatment costs for UI, POP, and dyspareunia in benefit stream 1, 2, and 3, respectively. By

monetising the expected benefit for a proportion of women in their post-partum period who may report symptom improvement after using MUTU® System for three weeks, scenario 1 indicated that the benefits realised for UI and POP individually generated a benefit of £1k each over one year (Table 4).

Scenarios 2 and 3 indicated benefits for UI and POP. Here, there was a benefit of £7k and £205k over five years due to a reduction in UI treatment costs, respectively (Table 5; Table 6). A slightly greater benefit was realised for a reduction in POP treatment costs, as scenario 2 and 3 suggested a benefit of £13k and £349k over five years (Table 5; Table 6). This indicates that MUTU® System lowers symptom prevalence, yielding benefits to the NHS when implemented in Kent and Medway ICS due to a reduction in treatment costs for UI and POP.

The reduction in symptom prevalence for dyspareunia was less than that identified for POP and UI (Table 4; Table 5; Table 6). Scenario 1 indicated a benefit associated with a reduction in treatment costs for dyspareunia of £157 over one year (Table 4). Further, scenario 2 resulted in a benefit of £1k over five years, whilst scenario 3 led to a benefit of £40k over five years (Table 5; Table 6). This suggests that although implementing MUTU® System in Kent and Medway ICS results in a reduction in treatment cost for dyspareunia, the benefits realised for this condition are lower compared to POP and UI. Based on this, MUTU® System may yield cost reductions for the NHS if offered to patients with UI or POP symptoms only, however not for those with only dyspareunia symptoms.

A possible reason for the smaller cost reduction to the NHS for dyspareunia compared to UI and POP may be due to fewer patients presenting to the NHS with dyspareunia symptoms. According to Mitchell et al. (2017), dyspareunia is a common but neglected female health problem; of which the underlying conditions and factors that may lead to its development may not be correctly understood. As a result, symptoms of dyspareunia are generally '*overlooked or badly managed'* (Mitchell et al., 2017). This is also apparent in the difference in publicised available treatments; NHS England has landing pages for UI and POP treatment options (NHS England, 2017a, 2017c), but not for dyspareunia. The lack of a clear treatment pathway for dyspareunia indicates that offering MUTU® System for those with dyspareunia symptoms only may not yield cost savings for the NHS, however may help to meet a previously unmet healthcare need. Hence, it is suggested that patients presenting with dyspareunia can be referred to MUTU® System, as long as most patients who are referred to MUTU® System are presenting with POP or UI symptoms to yield a positive ROI whilst improving patient outcomes.

Sensitivity analysis revealed that the most influential factors impacting the ROI of MUTU® System across Kent and Medway ICS were condition prevalence and programme engagement (Figure 26). Notably, the modelled prevalence figures may underestimate actual rates due to underreporting of pelvic health symptoms (Kenne et al., 2022), suggesting MUTU® System implementation could result in higher NPV and greater NHS cost reductions than initially projected. Conversely, an increase in dyspareunia prevalence could decrease the NPV; MUTU® System costs were based on maximum symptom prevalence. MUTU® System appears beneficial for women in their post-partum period with POP, UI, or a combination of the above, but may incur net costs for those with dyspareunia alone.

Overall, MUTU® System contributes to NHS cost reduction by improving symptoms for various conditions among NHS patient in their post-partum period using MUTU® System. Despite positive NPV with social benefits, cash releasing benefits alone result in negative ROI when the programme is priced at £50 per year. Considering that commissioners value cash-saving benefits more than social benefits when assessing the feasibility of implementing a new programme, it is important to position the cost-saving benefits of MUTU® System appropriately. Sensitivity analysis suggests NPV may improve with higher symptom prevalence, which is likely underestimated due to underreporting (Kenne et al., 2022). Setting MUTU® System at £25 ensures a positive ROI, benefiting each NHS patient in their post-partum period using MUTU® System by £44, equivalent to £5.89 per birth annually (Table 7). MUTU® System aims to address unmet needs, potentially reducing NHS costs (excluding QALYs) if symptom prevalence is higher and programme price is below £44 per patient.

Does MUTU® System lead to an increase in quality of life due to a reduction in symptom prevalence?

Although significant improvements were identified (Table 2; Table 3), it is challenging to determine whether the usage of MUTU® System itself facilitated an improvement in symptoms, or whether this was due to external factors, such as other methods NHS patients were using to help improve their symptoms. Future evaluations could explore whether this is the case through qualitative surveys or interviews with a large group of NHS patients across Kent and Medway ICS to improve robustness of results and generate further insight. This is because other factors, as well as MUTU® System, may influence quality of life such as family and work life; identifying whether quality of life improvement was due to MUTU® System is difficult.

Future evaluations should explore the relationship between quality of life and symptom improvement in a larger NHS patient sample, allowing statistical testing to be completed to understand whether a significant positive relationship could be identified. This may involve EQ5D data collection to collect self-reported current health measures across five dimensions (mobility, self-care, usual activities, pain/discomfort and anxiety/depression; Gusi et al., 2010), which would enable further insight into the quality of life benefits specifically due to MUTU® System implementation. As the self-pay cohort shared similarities in terms of demographics, the statistical testing findings are generalisable to the NHS cohorts. This means that it is likely that, should the NHS sample size increase, a statistically significant improvement in POP, UI, diastasis recti, back pain, dyspareunia, body fat concerns, and mental health concerns before and after using MUTU® System would be identified in the NHS cohorts.

The modelling of quality of life improvements was based on research by Hagen et al. (2017) and Sjöström et al. (2015); suggesting that there is a 0.01 QALY gain associated with utilising pelvic floor muscle training as treatment both POP and UI symptoms, compared to no treatment. Monetising this QALY gain as £20,000 (NICE, 2012) yielded a non-cash releasing benefit of £200 per NHS patient reporting POP and UI improvements. Scenario 1 realised a QALY gain of £1k over one year (Table 4). Scenario 2 and 3 yielded a QALY gain

of £8k and £224k over five years respectively (Table 5; Table 6). A slightly greater QALY gain was realised for improvement of POP; scenario 2 and 3 indicated a benefit of £12k and £333k over five years (Table 5; Table 6). This indicates that MUTU® System results in social benefits, therefore an improvement in quality of life, when implemented in Kent and Medway ICS due to an improvement of UI and POP symptoms.

Overall, MUTU® System leads to an increase in quality of life and social benefits in the form of QALY gains amounting to £244k and £333k over five years, respectively. This is likely due to a significant improvement in pelvic health symptoms following MUTU® System, which uses workouts to strengthen the pelvic floor muscles. MUTU® System is likely to have resulted in an increase in quality of life due to improving pelvic health symptoms, as the link between pelvic floor muscle training and improvements in quality of life has been validated through research (Gagnon et al., 2016; Hagen et al., 2017; Sjöström et al., 2015).

5.5. Implementation

This section answers the evaluation questions:

7) What are the enablers and barriers of implementing MUTU® System in the NHS?

8) What setting is MUTU® System best implemented within?

When implementing MUTU® System in a physiotherapy setting, referrals appeared slow initially. Hence, a GP practice setting was introduced in attempt to increase the referral rate of NHS patients using MUTU® System. There was a total of 24 physiotherapy patients and 44 GP practice patients who signed up to MUTU® System. The GP practice pathway identifies more women who could benefit from MUTU® System as patients need to have a GP appointment before being referred for physiotherapy. This means that referring mothers to MUTU® System during GP appointments would encompass both those who need specialised physiotherapy and those who do not, allowing efficient access to the programme for those who require such care.

Referring patients to MUTU® System in a physiotherapy setting would mean that patients would need to attend a GP appointment, wait for a physiotherapy referral, receive a physiotherapy appointment, and then be referred to MUTU® System during the appointment. Introducing MUTU® System in GP practice settings would allow patients to be referred during their initial GP appointment or self-refer, reducing their level of deterioration, and increasing their quality of care. This would also help to identify patients who were unaware when they should see a doctor due to their pelvic health symptoms; the GP practitioner must lead this conversation to encourage uptake and determine symptom severity and whether the patient is eligible for MUTU® System, even if the patient may not have known they were eligible themselves. This would help identify pelvic health symptoms before their severity increases, allowing for faster patient treatment and a reduction in pelvic health treatment costs for the NHS. Despite this, it should also be noted that there are limitations in the six

week check; not all patients are likely to receive this or are not proactively asked about their pelvic health.

The importance of identifying the correct patients at the correct time was suggested by staff, where it was noted that patients should be made aware of MUTU® System during their pregnancy and referred to MUTU® System after birth once they had become accustomed to their lifestyle change. This would allow women to have the time available to complete MUTU® System.

One staff member suggested they were willing to participate in future implementation opportunities and encouraged more coupon codes to become available to women. Making MUTU® System freely available to patients was also suggested. This highlights the appetite for staff members wanting to refer patients to MUTU® System; staff are likely to encourage patients to use MUTU® System if they believe the programme will benefit them.

Some staff mentioned that it could take time to explain MUTU® System to patients during appointments, which may be a barrier to implementation due to time restraints during the appointment. Despite this, referring patients to MUTU® System would allow patients to treat their symptoms by themselves, resulting in symptom improvements and fewer patients seeking treatment as a result. This could help address issues with the patient backlog.

One staff member suggested the need for more information, such as case studies, to help introduce patients to MUTU® System. Posters were also suggested to be placed, alongside sending text messages through Accurx. This would help patients understand MUTU® System outside of their appointment. Staff would not need to explain MUTU® System to all patients if they can provide a leaflet or send a text message for patients to read in their own time. Further, posters could be placed in GP practices or hospitals. This is likely to cover a greater number of suitable patients; this would cover more women in their post-partum period than only those who actively present to the NHS with symptoms. This is particularly suitable as some women in the patient surveys did not know which symptoms of pelvic health were normal before using MUTU® System (Figure 8; Figure 12), therefore they may not have known they should be concerned about certain symptoms, or that there was a treatment available.

The online nature of MUTU® System was noted by staff to be useful; patients could access the programme online and complete the exercises in their own time. Despite this, MUTU® System was not recommended for more complex patients who required in person treatment. This highlights the importance of ensuring the correct criteria for patient selection is established. If feasible, ways to allow complex patients to use MUTU® System could be included in further programme developments.

Health economic modelling suggested that there is a positive ROI realised when patients utilise MUTU® System for their symptoms related to POP and UI. Conversely, referring patients to MUTU® System due to symptoms related to dyspareunia alone would result in a negative ROI. Therefore, the NHS may realise larger cost savings due to the implementation of MUTU® System if users report symptoms of POP, UI, dyspareunia, or a combination of the three symptoms. Further research could explore whether MUTU® System leads to a

reduction in treatment cost for other symptoms, such as diastasis recti, mental health, and body fat concerns, as this could result in a greater ROI.

When implementing MUTU® System into Kent and Medway ICS, MUTU® System should be priced at £25 per patient to yield the most feasible and positive NPV of £207k over five years. To ensure the ROI is at least 1, MUTU® System should cost at most £44 if implementing MUTU® System across Kent and Medway ICS. Pricing MUTU® System lower than £44 is likely to yield a positive ROI.

Overall, MUTU® System would be best implemented within GP practice settings in Kent and Medway ICS due to the higher level of uptake within this cohort compared to physiotherapy settings. Patients must attend a GP appointment to obtain a physiotherapy referral, so this allows patients to receive care faster and reduce potential patient deterioration. There may be scope to determine whether MUTU® System could be implemented in other settings, such as maternity, health visiting, community pharmacy, or non-specialist physiotherapy settings. Raising awareness is key to ensuring patient uptake; women often have busy lifestyles so ensuring they know what treatment is available to them is crucial to avoid worsening pelvic health symptoms. Placing posters, handing out information leaflets, and sending text messages to patients could help raise awareness of MUTU® System outside of GP appointments and facilitate the implementation process as staff would not need to explain MUTU® System to patients within GP appointments.

6. Recommendations

6.1. Implementing MUTU® System

Implement MUTU® System in a GP practice setting

MUTU® System may be best suited for implementation in a GP practice setting, rather than a physiotherapy setting; patients commonly seek guidance from their GP before being referred to a physiotherapist. By integrating MUTU® System into GP practices, the patient pathway would be more streamlined, reducing delays and enhancing accessibility to pelvic health treatment, particularly for POP and UI. Understanding the impact of MUTU® System in other potential settings such as maternity or community pharmacy could also determine whether MUTU® System yields the same or greater symptom improvements or referral levels. MUTU® System may also reduce the need to refer patients on to community physiotherapy teams. Capturing referral pathway data should be considered for future evaluations to understand the impact of MUTU® System in other pathways.

To optimise the impact MUTU® System on patients and the NHS, GP and physiotherapy staff suggested that MUTU® System should be introduced during pregnancy, possibly

through inclusion in prenatal or post-birth information packs. This early introduction could help ensure that individuals experiencing symptoms of pelvic health are aware of the support available through MUTU® System. Additionally, targeted efforts should be made to encourage programme uptake after birth, acknowledging that this period is crucial for addressing symptoms effectively. This approach aims to empower women to take a proactive stance in managing pelvic health concerns through MUTU® System.

Target the offering of MUTU® System

Health economic modelling indicated that patient referrals to MUTU® System specifically for symptoms related to POP and UI resulted in a positive ROI, while referrals based solely on symptoms related to dyspareunia resulted in a negative ROI. Given that the majority of patients are likely to present with concerns related to POP and UI rather than dyspareunia, it is proposed that the NHS should target the MUTU® System offering for women in their post-partum period if they display symptoms of at least either POP or UI. Many women may have more than one symptom, or a combination of symptoms, thereby this targeted offering will likely provide secondary benefits. This approach ensures a targeted and cost-effective utilisation of MUTU® System resources, aligning with the economic modelling outcomes and maximising the positive impact on both patient outcomes and healthcare expenditure.

Ensure patient awareness of MUTU® System

There are challenges in informing all GPs about MUTU® System due to infrequent discussions on pelvic health issues and primary care constraints. To enhance programme visibility, a multi-pronged approach is suggested, using posters, leaflets, and text messages in various settings such as GP practices, hospitals, community pharmacies, leisure centres, and early years centres. Leveraging the effectiveness of proactive outreach, particularly through SMS to new mothers within the first 12 months of birth, can efficiently identify individuals suitable for and receptive to MUTU® System. This approach aligns with limitations of the six-week checkup, which is often focused more on the baby, resulting in missed opportunities to identify pelvic health issues. This targeted, proactive approach ensures that MUTU® System reaches those who may be suffering in silence, fostering a positive response to the offer of pelvic health treatment.

Simplify the onboarding process for new MUTU® System users

Of the NHS patients who were provided with a code to use MUTU® System, approximately half initially logged onto MUTU® System. This indicated a drop-off of uptake between their NHS appointment and signing up for MUTU® System. It was noted that more patients signed up to MUTU® System after a text message rather than an appointment referral. This means that ways of onboarding patients could be explored further to ensure as many patients who require MUTU® System can be onboarded easily. Although qualitative responses did not highlight onboarding difficulties, this could suggest that the onboarding process for new NHS patients in their post-partum period using MUTU® System may need to be simplified. This

would allow more NHS patients to log onto and use MUTU® System to receive its benefits. Practitioners could take patients through the sign-up process within their appointment to encourage uptake. Although this may take up time within an appointment, this could likely increase engagement and thus symptom improvement due to the convenience.

Consider a value-based price point for MUTU® System

Given that commissioners typically allocate one-off annual funding rather than being tied to the expected number of NHS patients in their post-partum period using MUTU® System, a value-based approach is suggested. The health economic analysis indicated that, for the NHS to realise net benefits from implementing MUTU® System, the price should be set below the cost-neutral threshold of £5.89 per birth or per woman who conceives within one year. Furthermore, it is advised to assess costs in terms of the total population while recognising that the benefits, such as symptom improvement, may be experienced by a subset of NHS patients in their post-partum period using MUTU® System. To be cost neutral within Kent and Medway ICS, MUTU® System should be priced at £44 per symptomatic patient. This nuanced approach acknowledges that MUTU® System may not suit all women in their post-partum period with presenting symptoms, emphasising the importance of aligning costs with the potential benefits realised by NHS patients.

6.2. Updates to MUTU® System

Adjustments to MUTU® System elements

Based on user feedback from the physiotherapy cohort, it is recommended that MUTU® System should incorporate specific improvements to its exercise component. Respondents suggested including stretching videos, offering more detailed instructions during workouts, and emphasizing the importance of slowing down exercises within the programme. These elements are already available, and so it may be that improvements in navigation and signposting within MUTU® System would help address these points. Additionally, considering a reduction in the price of the workout kit could enhance user satisfaction and engagement. These enhancements aim to facilitate a more comprehensive and user-friendly exercise experience, ultimately contributing to increased adherence and a potential reduction in symptom prevalence. Ensuring user satisfaction is crucial for the sustained effectiveness of the MUTU® System exercise regimen.

Explore use of MUTU® System after specialist physiotherapy

To optimise the inclusivity of MUTU® System, it is recommended to explore ways of accommodating complex patients by offering face-to-face options, ensuring their specific needs are met and facilitating their active participation in the programme. MUTU® System

may be more applicable for complex patients to aid in their recovery from surgery, for example, rather than instead of more intense treatment options. Although the current impact of MUTU® System on complex patients was not explored in this evaluation, data collection to understand the potential extent of this would allow for more understanding and how to increase accessibility. Establishing tailored criteria for patient selection, with a focus on accommodating complexity, will be pivotal in promoting the engagement and effectiveness of MUTU® System for a broader spectrum of individuals. Further programme developments should actively consider strategies to integrate complex patients into MUTU® System while maintaining the flexibility of online access for those who benefit from it.

6.3. Future evaluations

Increased NHS sample size

Future evaluations of MUTU® System should aim to increase the sample size of NHS patients to enhance the understanding of symptom severity, such as within POP-SS and ICIQ scores, and the programme's impact on diverse populations. By increasing the sample size, evaluators may attain statistically significant findings that offer a more comprehensive understanding of MUTU® System's impact on symptom severity, ensuring results are not skewed by small sample variations. A larger sample size could also increase statistical power, enabling more reliable generalisations regarding MUTU® System's impact on symptom severity.

Examine uptake of MUTU® System

It is recommended that future evaluations of MUTU® System explore the uptake of the programme among its participants. Assessing the uptake of MUTU® System is essential to gain insights into the programme's acceptance and utilisation among NHS patients. By closely monitoring the enrolment rates and adherence levels, the effectiveness of outreach efforts could be understood, potential barriers to participation identified, and strategies to enhance overall engagement refined.

Comparing the uptake of MUTU® System with participant ICIQ and POP-SS scores can offer valuable insights into the impact of programme utilisation on symptom severity. This comparative analysis would help determine whether higher levels of uptake correlate with more significant improvements in pelvic health outcomes. Understanding the relationship between programme engagement and symptom severity is pivotal for refining MUTU® System strategies and tailoring MUTU® System to address the specific needs of NHS patients. Consequently, a comprehensive evaluation focusing on uptake and its correlation with clinical outcomes will provide actionable insights for optimising the effectiveness of MUTU® System and advancing its impact on pelvic health.

Explore the longitudinal impact of MUTU® System

The long-term impact of MUTU® System should be explored to understand symptom severity over time and the dynamics of programme uptake. Further, health-related quality of life could be examined longitudinally through the EQ-5D instrument. Tracking changes in pelvic health outcomes longitudinally will provide valuable insights into the sustained effectiveness of MUTU® System and whether increased engagement correlates with lasting improvements. This approach identifies trends, adaptations, and potential areas for enhancement, ensuring MUTU® System remains responsive to the evolving needs of participants. A comprehensive longitudinal examination is essential for refining strategies, optimising long-term programme effectiveness, and advancing understanding regarding how MUTU® System can positively influence pelvic health outcomes over an extended period.

Update modelling based on new treatment costs and prevalence figures

Obtaining figures surrounding treatment cost and prevalence of pelvic health conditions was limited. Similarly, evidence regarding the potential QALY benefits derived from improving symptoms and the likelihood of women in their post-partum period experiencing more than one symptom was limited. Should more accurate figures become available, the cost-benefit analysis should be updated to increase the accuracy of the model as a whole and reduce the level of optimism bias applied. Considering that the Department of Health and Social Care published their '*Women's Health Strategy for England'* which outlines the ambition to improve healthcare for women over the next ten years (GOV.UK, 2022), there is likely to be more research surrounding female health in the future. For example, using more accurate UK based prevalence figures may reduce optimism biases from 40% to 10% benefit streams. Using more recent publications would generate a model that is more likely to uncover the true potential NPV and BCR of MUTU® System in Kent and Medway ICS over five years. From this, commissioners could make more accurate decisions based on whether to implement MUTU® System within the NHS.

7. Conclusion

To conclude, the current evaluation demonstrated the impact, value, and limitations of MUTU® System based on real-world implementation within existing NHS maternity pathways in Kent and Medway ICS. MUTU® System was shown to yield a significant improvement in pelvic health symptoms in a self-pay cohort, where it is likely that the same improvement would be identified in a larger NHS patient cohort, thereby demonstrating its impact on patients. From a value perspective, the programme enabled a realisation of a positive NPV when social benefits were included and may be implemented below the breakeven pricing point of £5.89 per annual number of births to provide cash-releasing benefits and a positive NPV for the NHS. Further, MUTU® System should be utilised for patients in their post-partum

period presenting with POP, UI, dyspareunia, or a combination of these symptoms to ensure a positive NPV.

Considering pelvic health issues represent an unmet need, creating awareness of MUTU® System within the NHS is crucial to ensure successful implementation and facilitate uptake by women who require treatment of their symptoms. This could be completed through information posters within the GP practice, alongside sending text messages to perinatal patients to introduce them to MUTU® System. Should women in their post-partum period experience pelvic health symptoms, their GP could refer the patient to MUTU® System without having to explain the programme, saving time within their appointment.

Future evaluations could examine whether a reduction in treatment cost for other symptoms, such as back pain or mental health, is identified when implementing MUTU® System within the NHS. This could add to the existing evidence base for the value of MUTU® System in the NHS. It is further recommended that future evaluations should examine the impact of MUTU® System within a larger NHS patient sample, where MUTU® System could be implemented exclusively within a GP practice setting to ensure more efficient uptake compared to other pathways that require an initial GP appointment.

Overall, MUTU® System delivers positive benefits for patients and can be considered a cost-effective method, when including social benefits, for patients with mild and moderate UI and POP symptoms who require treatment. The programme could, therefore, be utilised to ultimately achieve the goal of providing support for women when recovering from birth through improving access to post-partum physiotherapy, as laid out in the NHS *Long Term Plan* (NHS England, 2023).

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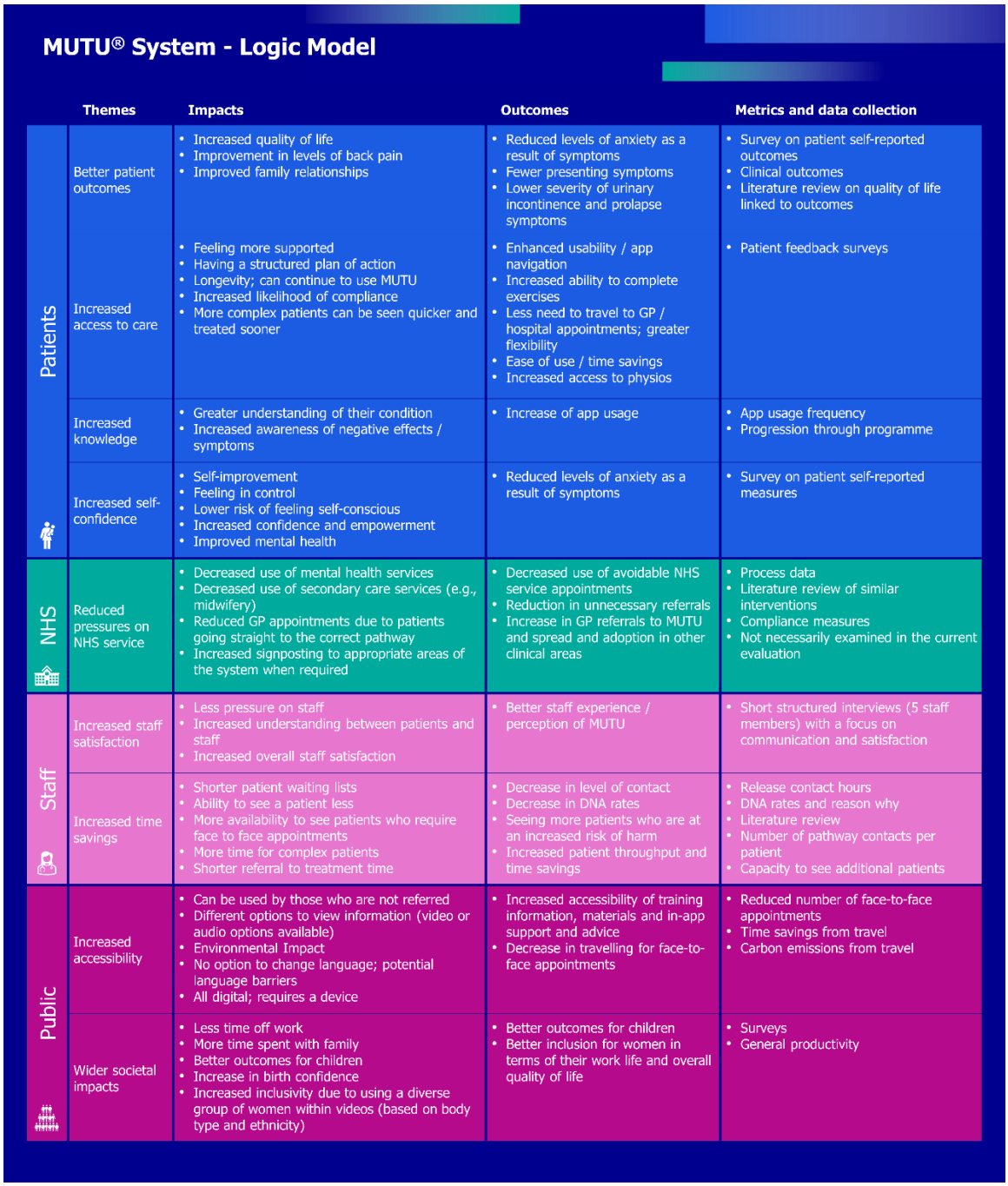
9. Appendices

9.1. Appendix A: Logic model workshop

Figure 31 depicts the findings from the logic model workshop.



MUTU® System - Logic Model

	Themes	Impacts	Outcomes	Metrics and data collection
Patients	Better patient outcomes	• Increased quality of life • Improvement in levels of back pain • Improved family relationships	• Reduced levels of anxiety as a result of symptoms • Fewer presenting symptoms • Lower severity of urinary incontinence and prolapse symptoms	• Survey on patient self-reported outcomes • Clinical outcomes • Literature review on quality of life linked to outcomes
	Increased access to care	• Feeling more supported • Having a structured plan of action • Longevity; can continue to use MUTU • Increased likelihood of compliance • More complex patients can be seen quicker and treated sooner	• Enhanced usability / app navigation • Increased ability to complete exercises • Less need to travel to GP / hospital appointments; greater flexibility • Ease of use / time savings • Increased access to physios	• Patient feedback surveys
	Increased knowledge	• Greater understanding of their condition • Increased awareness of negative effects / symptoms	• Increase of app usage	• App usage frequency • Progression through programme
	Increased self-confidence	• Self-improvement • Feeling in control • Lower risk of feeling self-conscious • Increased confidence and empowerment • Improved mental health	• Reduced levels of anxiety as a result of symptoms	• Survey on patient self-reported measures
NHS	Reduced pressures on NHS service	• Decreased use of mental health services • Decreased use of secondary care services (e.g., midwifery) • Reduced GP appointments due to patients going straight to the correct pathway • Increased signposting to appropriate areas of the system when required	• Decreased use of avoidable NHS service appointments • Reduction in unnecessary referrals • Increase in GP referrals to MUTU and spread and adoption in other clinical areas	• Process data • Literature review of similar interventions • Compliance measures • Not necessarily examined in the current evaluation
Staff	Increased staff satisfaction	• Less pressure on staff • Increased understanding between patients and staff • Increased overall staff satisfaction	• Better staff experience / perception of MUTU	• Short structured interviews (5 staff members) with a focus on communication and satisfaction
	Increased time savings	• Shorter patient waiting lists • Ability to see a patient less • More availability to see patients who require face to face appointments • More time for complex patients • Shorter referral to treatment time	• Decrease in level of contact • Decrease in DNA rates • Seeing more patients who are at an increased risk of harm • Increased patient throughput and time savings	• Release contact hours • DNA rates and reason why • Literature review • Number of pathway contacts per patient • Capacity to see additional patients
Public	Increased accessibility	• Can be used by those who are not referred • Different options to view information (video or audio options available) • Environmental Impact • No option to change language; potential language barriers • All digital; requires a device	• Increased accessibility of training information, materials and in-app support and advice • Decrease in travelling for face-to-face appointments	• Reduced number of face-to-face appointments • Time savings from travel • Carbon emissions from travel
	Wider societal impacts	• Less time off work • More time spent with family • Better outcomes for children • Increase in birth confidence • Increased inclusivity due to using a diverse group of women within videos (based on body type and ethnicity)	• Better outcomes for children • Better inclusion for women in terms of their work life and overall quality of life	• Surveys • General productivity

Figure 31: Findings from the logic model workshop.

9.2. Appendix B: GP practice enrolment

Table 8 depicts the frequencies of SMS messages and enrolments in each GP practice.

Table 8: The number of patients who were sent an SMS and the number of patients who enrolled onto MUTU® System in each GP practice.

GP pilot site	County	Number of patients who were sent an SMS	Number of patients who enrolled onto MUTU® System
Farnham Dene Medical Practice	Surrey	162 patients	26
Woodley Centre Surgery	Berkshire	92 patients	8
Medway South PCN	Kent	-	1
Amherst Medical Practice	Kent	94 patients	7
St Lawrence Practice	West Sussex	-	1
Hythe Medical Centre	Surrey	-	0
Shepperton Medical Practice	Surrey	-	0

9.3. Appendix C: POP-SS and ICIQ questionnaire and scoring

POP-SS

The POP-SS questionnaire asks the questions depicted in Table 9.

Table 9: The POP-SS questionnaire.

Question	Scoring
How often during the last four weeks have you had the following symptoms?	
A feeling of something coming down from or in your vagina?	0 = Never 1 = Occasionally 2 = Sometimes 3 = Most of the time 4 = All of the time
An uncomfortable feeling or pain in your vagina which is worse when standing?	0 = Never 1 = Occasionally 2 = Sometimes 3 = Most of the time 4 = All of the time
A heaviness or dragging feeling in your lower abdomen / tummy?	0 = Never 1 = Occasionally 2 = Sometimes 3 = Most of the time 4 = All of the time
A heaviness or dragging feeling in your lower back?	0 = Never 1 = Occasionally 2 = Sometimes

	3 = Most of the time 4 = All of the time
A need to strain / push to empty your bladder?	0 = Never 1 = Occasionally 2 = Sometimes 3 = Most of the time 4 = All of the time
A feeling that your bladder has not completely emptied?	0 = Never 1 = Occasionally 2 = Sometimes 3 = Most of the time 4 = All of the time
A feeling that your bowel has not completely emptied?	0 = Never 1 = Occasionally 2 = Sometimes 3 = Most of the time 4 = All of the time

The seven questions within the POP-SS questionnaire are summed to obtain the POP-SS score. Here, possible scores range from 0 (no symptoms present) to 28 (extremely severe symptoms present).

ICIQ

The ICIQ questionnaire asks the questions depicted in Table 10.

Table 10: The ICIQ questionnaire.

Question	Scoring
1) How often do you leak urine? (tick one box)	0 = Never 1 = About once a week or less often

	2 = Two or three times a week 3 = About once a day 4 = Several times a day 5 = All the time
2) We would like to know how much urine you think leaks. How much urine do you usually leak (whether you wear protection or not)? (tick one box)	0 = None 1 = A small amount 2 = A moderate amount 3 = A large amount
3) Overall, how much does leaking urine interfere with your everyday life? (please ring one number between 0 (not at all) and 10 (a great deal)	0 (not at all) to 10 (a great deal)
4) When does urine leak? (Please tick all that apply to you)	Never – urine does not leak Leaks before you can get to the toilet Leaks when you cough or sneeze Leaks when you are asleep Leaks when you are physically active / exercising Leaks when you have finished urinating and are dressed Leaks for no obvious reason Leaks all the time

Questions one, two, and three are summed to generate the ICIQ score. Here, possible scores ranged from 0 (no symptoms present) to 22 (extremely severe symptoms present).

9.4. Appendix D: Measuring symptom improvement

General approach to symptom improvement

Table 11 depicts the coding applied to qualitative responses to allow conversion of this data into quantitative data.

Table 11: The coding applied to qualitative survey responses to convert to quantitative data.

Survey	Question	Responses	Coding
Baseline	"*How much of a concern are [symptom] for you?*"	No response	-
		Not applicable to me	0
		Slightly concerned	-1
		Somewhat concerned	-2
		Moderately concerned	-3
		Extremely concerned	-4
Week 3 Week 6 Week 12	"*Since using MUTU, my symptoms related to [symptom] are:*"	Very much improved	3
		Much improved	2
		Minimally improved	1
		No change	0
		Not applicable to me	0
		No response	0
Week 3 Week 6 Week 12	"*How often do you feel anxious, depressed, unhappy, or embarrassed because of these issues?*"	No response	-
		Not applicable to me	0
		Hardly ever	-1
		Yes, sometimes	-2

		Yes, very often	-3

Table 12 highlights how qualitative responses regarding mental health were coded into quantitative data from the GP practice cohort survey.

Table 12: Coding responses for mental health questions within the GP practice cohort survey.

Response	Coding
Always	4
Often	3
Sometimes	2
Rarely	1
Never	0

Individuals with no response to any week 3, 6, or 12 survey were excluded from analysis. The latest response was used across all surveys as the final improvement rating (Table 13).

Table 13: Example of the coding used.

Participant number	Baseline [coded]	Week 3 [coded]	Week 6 [coded]	Week 12 [coded]	Include or exclude
1	No response [-]	No response [-]	No response [-]	No response [-]	Exclude
2	Slightly concerned [-1]	No response [-]	No response [-]	No response [-]	Exclude
3	No response [-]	Much improved [2]	No response [-]	No response [-]	Include

4	Moderately concerned [-3]	Minimally improved [1]	Minimally improved [1]	Much improved [2]	Include

To understand symptom improvement across time, the maximum level of improvement across weeks 3 to 12 was identified. An example of this can be seen in Table 14.

Table 14: Example of how the coding was amended.

Participant number	New baseline code [original code]	New week 3 code [original code]	New week 6 code [original code]	New week 12 code [original code]	Maximum improvement
3	-2 [-]	0 [2]	0 [2]	0 [2]	2
4	-3 [-3]	0 [1]	0 [1]	-1 [2]	2

Improvement in symptom scores over time

Table 15 depicts the level of concern and improvement in symptoms related to pelvic health from the self-pay cohort before and after using MUTU® System.

Table 15: The percentage of concern (baseline survey) and the percentage of improvement (week 3, week 6, and week 12 surveys) within the self-pay cohort.

Symptom	Baseline	Week 3	Week 6	Week 12	Overall improvement
Pelvic organ prolapse	0%	19%	31%	37%	**37%**
Urinary incontinence	0%	17%	28%	34%	**34%**

Diastasis Recti	0%	16%	26%	32%	**32%**
Back pain	0%	16%	26%	31%	**31%**
Dyspareunia	0%	9%	16%	21%	**21%**
Body fat concerns	0%	13%	21%	26%	**26%**
Perinatal mental health	0%	16%	25%	31%	**31%**

Improvement in POP-SS scores over time

Table 16 shows how scores may change following 12 weeks of using MUTU® System.

Table 16: POP-SS scores and how the score may improve following 12 weeks of using MUTU® System.

POP-SS score	Percentage severity	Following MUTU® System, new percentage severity	Following MUTU® System, new POP-SS score
0	0%	0%	0
1	3%	2%	1
2	7%	4%	1
3	10%	7%	2
4	14%	9%	3
5	17%	11%	3
6	21%	13%	4
7	24%	15%	4
8	28%	17%	5
9	31%	20%	6
10	34%	22%	6

11	38%	24%	7
12	41%	26%	8
13	45%	28%	8
14	48%	30%	9
15	52%	33%	9
16	55%	35%	10
17	59%	37%	11
18	62%	39%	11
19	66%	41%	12
20	69%	43%	13
21	72%	46%	13
22	76%	48%	14
23	79%	50%	15
24	83%	52%	15
25	86%	54%	16
26	90%	57%	16
27	93%	59%	17
28	97%	61%	18

Improvement in ICIQ scores over time

Table 17 shows how scores may change following 12 weeks of using MUTU® System.

Table 17: ICIQ scores and how the score may improve following 12 weeks of using MUTU® System.

ICIQ score	Percentage severity	Following MUTU® System, new percentage severity	Following MUTU® System, new ICIQ score
0	0%	0%	0
1	5%	3%	1
2	9%	6%	1
3	14%	9%	2

4	18%	12%	3
5	23%	15%	3
6	27%	18%	4
7	32%	21%	5
8	36%	24%	5
9	41%	27%	6
10	45%	30%	7
11	50%	33%	7
12	55%	36%	8
13	59%	39%	9
14	64%	42%	9
15	68%	45%	10
16	73%	48%	11
17	77%	51%	11
18	82%	54%	12
19	86%	57%	13
20	91%	60%	13
21	95%	63%	14

9.5. Appendix E: Quantitative insights detailed

Mental health scores

The GP practice cohort showed improvements in mental health scores for two patients, with mental health remaining the same for one patient and a decrease in mental health for another patient (Figure 32). It is important to note that the small sample of responses mean that making inferences from the below data is likely inaccurate.

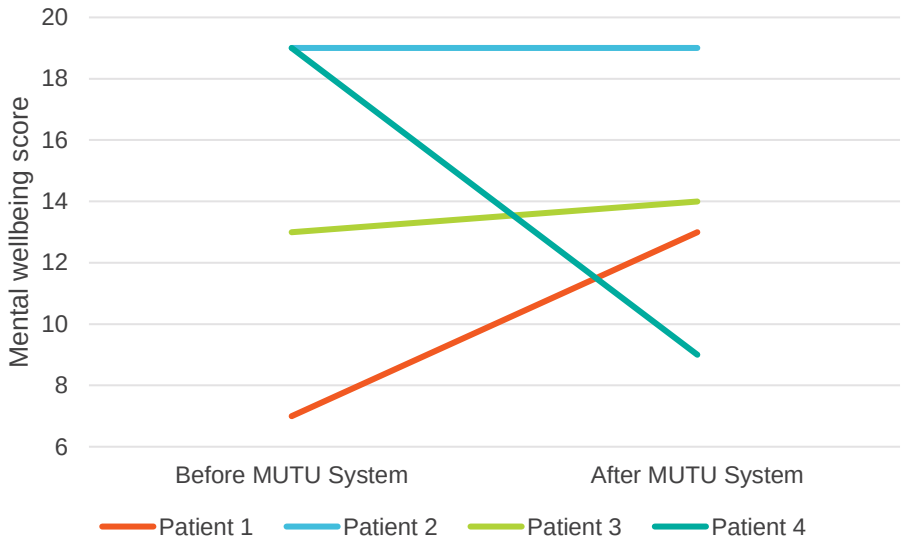


Figure 32: GP practice patient mental wellbeing scores before and after using MUTU® System.

9.6. Appendix F: Health economic modelling methodology

Scenario analysis assumptions

Table 18 depicts the figures for the scenario analysis as part of the health economic modelling.

Table 18: Scenario analysis methodology figures.

Assumption	Figure	Source
Annual number of live and still births in England and Wales	627,425	(Office for National Statistics, 2022a)
Total population in England and Wales	60,200,000	(Office for National Statistics, 2022b)
Pregnancy rate	1%	Calculated
Kent and Medway ICS population	2,013,471	(NHS England, 2024b)
Number of GP practices in Kent and Medway ICS	192	(Kent & Medway ICS, 2024)
Typical GP patient population in Kent and Medway ICS	10,487	Calculated
7 GP practices' patient population in Kent and Medway ICS	73,408	Calculated
Scenario 2 population	765	Calculated
Scenario 3 population	20,985	Calculated

Table 19 highlights the patient cohort figures for the GP practice and physiotherapy cohorts as part of the health economic modelling component.

Table 19: GP practice and physiotherapy patient cohort figures.

Cohort	Assumption	Value
GP practice cohort	Uptake of GP practice cohort	34.09% (*n* = 15; *N* = 44)
	Engagement of GP practice cohort	66.67% (*n* = 10; *N* = 15)
	Prevalence of UI (GP practice cohort baseline survey)	84% (*n* = 37; *N* = 44)
	Prevalence of POP (GP practice cohort baseline survey)	98% (*n* = 43; *N* = 44)
	Prevalence of dyspareunia (self-pay patient cohort baseline survey)	55% (*n* = 3,310; *N* = 7,340)
	Improvement of UI (self-pay patient cohort surveys)	34% (*N* = 966)
	Improvement of POP (self-pay patient cohort surveys)	37% (*N* = 966)
	Improvement of dyspareunia (self-pay patient cohort surveys)	21% (*N* = 966)
Physiotherapy cohort	Uptake of physiotherapy patients	95.83% (*n* = 23; *N* = 24)
	Engagement of physiotherapy patients	82.61% (*n* = 19: *N* = 23)
	Prevalence of UI (physiotherapy cohort ICIQ scores before using MUTU® System)	93.75% (*n* = 15; *N* = 16)
	Prevalence of POP (physiotherapy cohort POP-SS	56.25% (*n* = 9; *N* = 16)

	scores before using MUTU® System)	
	Prevalence of dyspareunia (physiotherapy cohort baseline survey)	75% (*n* = 9; *N* = 12)
	Improvement of UI (physiotherapy cohort surveys)	19% (*N* = 9)
	Improvement of POP (physiotherapy cohort surveys)	8% (*N* = 9)
	Improvement of dyspareunia (physiotherapy cohort surveys)	25% (*N* = 9)

General modelling assumptions

- For modelling purposes, it was assumed that those patients who may have otherwise sought treatment for their symptoms in the baseline, would be captured by the modelled proportion of patients that are invited and willing to use MUTU® System. As a result, benefits are monetised according to typical annual treatment costs per health seeking patient.
- Although most NHS patients in their post-partum period using MUTU® System observe some level of improvement through utilising the programme, the proportion of engaged users (those that utilised MUTU® System for a minimum of 21 days) that report that the programme was effectiveness in improving their symptoms in the follow-up surveys are assumed to not require treatment again within the year.
- In scenario 1, it was assumed that where GP patient cohort data was not available (namely, for prevalence of dyspareunia and improvement rates), private paying users of the programme could be substituted to estimate the expected figures for this patient group. Hence, self-pay MUTU® System data was utilised to fill data gaps for modelling purposes.
- The populations utilised in scenarios 2 and 3 were estimated based on the assumption that there is a ratio of one-to-one for birth-to-mother.
- It is assumed that the uptake and engagement rates exhibited by the GP patient cohort in the evaluation period represents the expected uptake and engagement rates for women in their post-partum period who attend their GP six-week checks in scenario 2 and 3.

- Most women in their post-partum period who utilise MUTU® System will have symptoms of at least one of the modelled conditions (Buchsbaum, 2006). Therefore, the proportion of NHS patients in their post-partum period using MUTU® System is assumed to be equivalent to the highest symptom prevalence of modelled conditions (namely, dyspareunia prevalence).

Optimism bias

Unity Insights' approach is an adaptation of the model created by the Greater Manchester Combined Authority (GMCA) Research Team (HM Treasury et al., 2014). The GMCA model is featured in the supplementary guidance of The Green Book and offers a robust and prudent approach to economic analysis (HM Treasury, 2022). The results outlined in this document include results in which an assumption-specific OB has been applied to each benefit stream. The OB used utilises the following matrix displayed in Figure 33.

			Data source									
	Confidence grade		Formal service delivery contract costs		Practitioner monitored costs		Costs developed from ready reckoners		Costs from similar interventions elsewhere		Cost from uncorroborated expert judgement	
			Figures derived from local stats / RCT trials		Figures based on national analysis in similar areas		Figures based on generic national analysis		Figures based on international analysis			
			1		2		3		4		5	
Age of data	< 2 Years	1	1.1	0%	2.1	10%	3.1	15%	4.1	25%	5.1	40%
	2 - 3 Years	2	1.2	5%	2.2	10%	3.2	15%	4.2	25%	5.2	45%
	3 - 5 Years	3	1.3	10%	2.3	15%	3.3	20%	4.3	30%	5.3	50%
	5 - 10 Years	4	1.4	15%	2.4	25%	3.4	30%	4.4	40%	5.4	55%
	> 10 Years	5	1.5	25%	2.5	30%	3.5	40%	4.5	50%	5.5	60%

Figure 33: Unity Insights optimism bias confidence grades.

Benefit and cost streams

Benefit stream 1: Reduction in UI treatment costs due to MUTU® System

MUTU® System was expected to reduce the prevalence of UI for women in their post-partum period who engage and adhere to the programme for at least three weeks, that may have otherwise required one year of treatment for the condition in the baseline. Benefit stream 1 was calculated as follows (Figure 34):

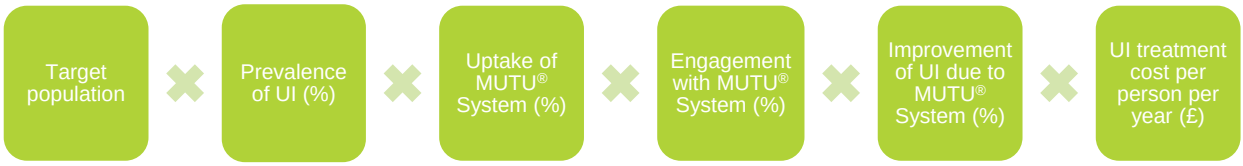


Figure 34: The calculation for benefit stream 1.

The target population (Section 2.5) was multiplied by the prevalence of UI to obtain the applicable post-partum population.

- In scenario 1, the weighted average prevalence of UI based on the GP and physiotherapy cohort engaged in the evaluation was calculated.
- For extrapolation across regions in scenario 2 and 3, the target population was multiplied by the 29.6% reported post-partum prevalence of UI to obtain the estimated number of women in their post-partum period the condition may affect (Gartland et al, 2016).

The estimated number of women in their post-partum period with the condition was then multiplied by:

- The expected uptake rate based on the proportion of patients from the applicable cohort during the evaluation who enrolled to the programme.
- The expected engagement rate based on the proportion of patients from the applicable cohort during the evaluation that adhered to the programme for at least three weeks.
- The expected improvement of UI due to utilising MUTU® System reported by patients during the evaluation and private paying MUTU® System users, for scenario 1 and scenario 2 and 3, respectively.

To monetise this cash releasing benefit, the expected number of women in their post-partum period who may have otherwise required one year of treatment for UI was multiplied by the treatment cost, calculated as follows:

- The annual cost of UI for the NHS (£233 million; Mansfield and Ashfield Clinical Commissioning Group, 2019) was divided by the estimated number of people in the UK with the condition (4.5 million; Urology Foundation, 2021) that were health-seeking (33%; Gurol-Urganci et al., 2020), which yielded a cost of £156.90 per woman with UI symptoms.

Lastly, to account for uncertainty of figures utilised for the estimated annual cost of urinary incontinence to the NHS, an optimism bias of 20% was applied in scenario 1, due to a source grading of 3.3 and the source age between 3 and 5 years (Figure 33). Similarly, in scenarios 2 and 3, the prevalence of urinary incontinence was based on an international source (Gartland et al., 2016; source grading 4.4; Figure 33) and the source age was older than 5 years, which required an application of a 40% optimism bias.

Benefit stream 2: Reduction in POP costs due to MUTU® System

MUTU® System was expected to reduce the prevalence of POP for women in their post-partum period who engage and adhere to the programme for at least three weeks, that may have otherwise required one year of treatment for the condition in the baseline. Benefit stream 2 was calculated as follows (Figure 35):

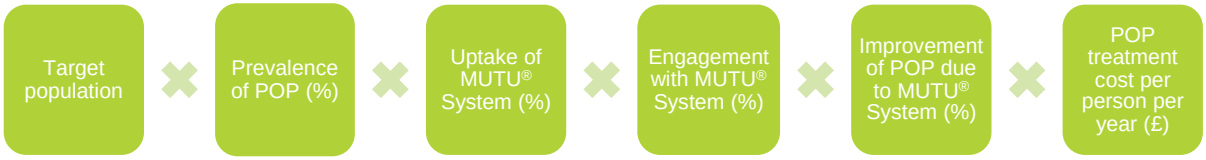


Figure 35: The calculation for benefit stream 2.

The target population (Section 2.5) was multiplied by the prevalence of POP to obtain the applicable post-partum population.

- In scenario 1, the weighted average prevalence of POP based on the GP and physiotherapy cohort engaged in the evaluation was calculated.
- For extrapolation across regions in scenario 2 and 3, an estimate from the literature was used to reported estimated number of post-partum individuals the condition may affect (30% to 40% of women exhibit symptoms; Hagen et al., 2023).

The estimated number of women with the condition was then multiplied by:

- The expected uptake rate based on the proportion of patients from the applicable cohort during the evaluation who enrolled to the programme.

- The expected engagement rate based on the proportion of patients from the applicable cohort during the evaluation that adhered to the programme for at least three weeks.
- The expected improvement of POP due to utilising MUTU® System reported by patients during the evaluation and private paying MUTU® System users, for scenario 1 and scenario 2 and 3, respectively.

To monetise this cash releasing benefit, the expected number of women in their post-partum period who may have otherwise required one year of treatment for POP was multiplied by the treatment cost, calculated as follows:

- The average cost for one year of NHS treatment based on a sample of health-seeking patients from Scotland, which yielded a cost of £151.73 per patient (Maxwell et al., 2020).

Lastly, to account for uncertainty of figures utilised for the treatment cost of pelvic organ prolapse to the NHS (Maxwell et al., 2020) and the improvement rates based on self-pay users, an optimism bias of 15% was applied in all scenarios, due to a source grading of 3.1 and the source age between less than 2 years (Figure 33).

Benefit stream 3: Reduction in dyspareunia costs due to MUTU® System

MUTU® System was expected to reduce the prevalence of dyspareunia for women in their post-partum period who engage and adhere to the programme for at least three weeks, that may have otherwise required one year of treatment for the condition in the baseline. Benefit stream 3 was calculated as follows (Figure 36):

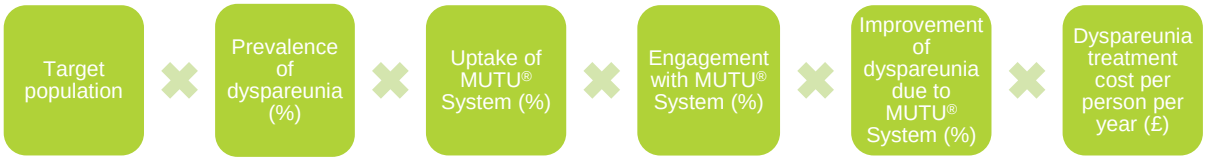


Figure 36: The calculation for benefit stream 3.

The target population (Section 2.5) was multiplied by the post-partum prevalence of dyspareunia to obtain the applicable post-partum population.

- In scenario 1, the weighted average prevalence of dyspareunia based on the self-pay and physiotherapy cohort engaged in the evaluation was calculated.

- For extrapolation across regions in scenario 2 and 3, an estimate from the literature was used to reported estimated number of post-partum individuals the condition may affect (39%; Tennfjord et al., 2014).

The estimated number of women with the condition is then multiplied by:

- The expected uptake rate based on the proportion of patients from the applicable cohort during the evaluation who enrolled to the programme.
- The expected engagement rate based on the proportion of patients from the applicable cohort during the evaluation that adhered to the programme for at least three weeks.
- The expected improvement of POP due to utilising MUTU® System reported by patients during the evaluation and private paying MUTU® System users, for scenario 1 and scenario 2 and 3, respectively.

To monetise this cash releasing benefit, the expected number of women in their post-partum period who may have otherwise required one year of treatment for dyspareunia was multiplied by the treatment cost, calculated as follows:

- The average cost for one GP appointment (£35; Jones & Burns, 2021).

Lastly, to account for uncertainty of the prevalence of dyspareunia an optimism bias of 25% and 30% was applied to scenario 1 and scenarios 2 and 3, respectively. In scenario 1, the prevalence was based on the self-pay prevalence for the GP patient cohort (source grading 2.4 and source age between 5 and 10 years; Figure 33), and in scenarios 2 and 3, this was based on an international literature source (source grading 3.4; source age between 5 and 10 years; Tennfjord et al., 2014).

Benefit stream 4: Improvement in quality of life due to utilising MUTU® System for POP

MUTU® System was expected to improve the quality of life for those post-partum individuals with POP who engage and adhere to the programme for at least three weeks, that may have otherwise had a compromised quality of life due to the condition in the baseline. Benefit stream 4 was calculated as follows (Figure 37):

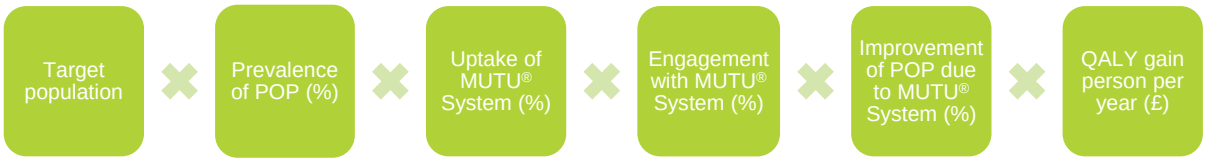


Figure 37: The calculation for benefit stream 4.

The target population (Section 2.5) was multiplied by the prevalence of UI to obtain the applicable post-partum population.

- In scenario 1, the weighted average prevalence of UI based on the GP and physiotherapy cohort engaged in the evaluation.
- For extrapolation across regions in scenario 2 and 3, an estimate from the literature was used to reported estimated number of post-partum individuals the condition may affect (30% to 40% of women exhibit symptoms; Hagen et al., 2023).

The estimated number of women with the condition was then multiplied by:

- The expected uptake rate based on the proportion of patients from the applicable cohort during the evaluation who enrolled to the programme.
- The expected engagement rate based on the proportion of patients from the applicable cohort during the evaluation that adhered to the programme for at least three weeks.
- The expected improvement of POP due to utilising MUTU® System reported by patients during the evaluation and private paying MUTU® System users, for scenario 1 and scenario 2 and 3, respectively.

To monetise this cash releasing benefit, the expected number of women in their post-partum period who may have otherwise had a compromised quality of life, instead had a QALY gain of 0.01 per patient per year (Hagen et al., 2017), equivalent to £200 (calculated based on cost of QALY of £20,000; NICE, 2012).

Lastly, to account for uncertainty of the monetisation of a QALY gain (NICE, 2012), an optimism bias of 30% was applied to all scenarios. The monetisation was based on a generic national document of a 3.5 source grading, and is older than 10 years (Figure 33).

Benefit stream 5: Improvement in quality of life due to utilising MUTU® System for UI

MUTU® System was expected to improve the quality of life for those post-partum individuals with UI symptoms who engage and adhere to the programme for at least three weeks, that may have otherwise had a compromised quality of life due to the condition in the baseline. Benefit stream 5 was calculated as follows (Figure 38):

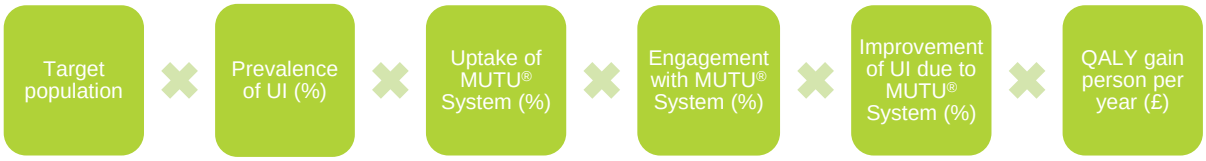


Figure 38: The calculation for benefit stream 5.

The target population (Section 2.5) was multiplied by the prevalence of UI to obtain the applicable post-partum population.

- In scenario 1, the weighted average prevalence of UI based on the GP and physiotherapy cohort engaged in the evaluation.
- For extrapolation across regions in scenario 2 and 3, an estimate from the literature of 29.6% reported post-partum prevalence of UI was multiplied to obtain the estimated number of women in their post-partum period the condition may affect (Gartland et al, 2016).

The estimated number of women with the condition was then multiplied by:

- The expected uptake rate based on the proportion of patients from the applicable cohort during the evaluation who enrolled to the programme.
- The expected engagement rate based on the proportion of patients from the applicable cohort during the evaluation that adhered to the programme for at least three weeks.
- The expected improvement of UI due to utilising MUTU® System reported by patients during the evaluation and private paying MUTU® System users, for scenario 1 and scenario 2 and 3, respectively.

To monetise this cash releasing benefit, the expected number of women in their post-partum period who may have otherwise had a compromised quality of life, instead had a QALY gain of 0.01 per patient per year (Hagen et al., 2017), equivalent to £200 (calculated based on cost of QALY of £20,000; NICE, 2012).

Lastly, to account for uncertainty of the monetisation of a QALY gain (NICE, 2012), an optimism bias of 30% was applied to scenario 1. The monetisation was based on a generic national document of a 3.5 source grading, and is older than 10 years (Figure 33). In scenarios 2 and 3, a higher optimism bias of 40% was applied, due to uncertainty regarding the prevalence of UI (source grading 4.4; source age between 5 and 10 years; Gartland et al., 2016).

Cost stream 1: Cost of programme

MUTU® System was expected to incur an assumed cost of £50, which may be adjusted in sensitivity analysis to determine how this may affect the benefit cost ratio (BCR; Figure 39).

Figure 39: The calculation for cost stream 1.

The target population (Section 2.5) was multiplied by the maximum prevalence of UI, POP, and dyspareunia symptoms to obtain the potential user population; for which the prevalence of dyspareunia was utilised (39%; Tennfjord et al., 2014).

The estimated number of women with the condition who may be willing to use the programme was then calculated by multiplying the expected uptake rate based on the proportion of patients from the applicable cohort during the evaluation who enrolled to the programme.

Due to the assumption that the programme may cost £50, a cost-specific optimism bias was not applied, but an overall optimism bias of 15% was applied to all scenarios to account for the uncertainty of the cost upon wider deployment.

9.7. Appendix G: Qualitative insights detailed

Demographics

Physiotherapy cohort

Figure 40 highlights which perinatal stage respondents were in within the baseline, week 3, 6, and 12 surveys.

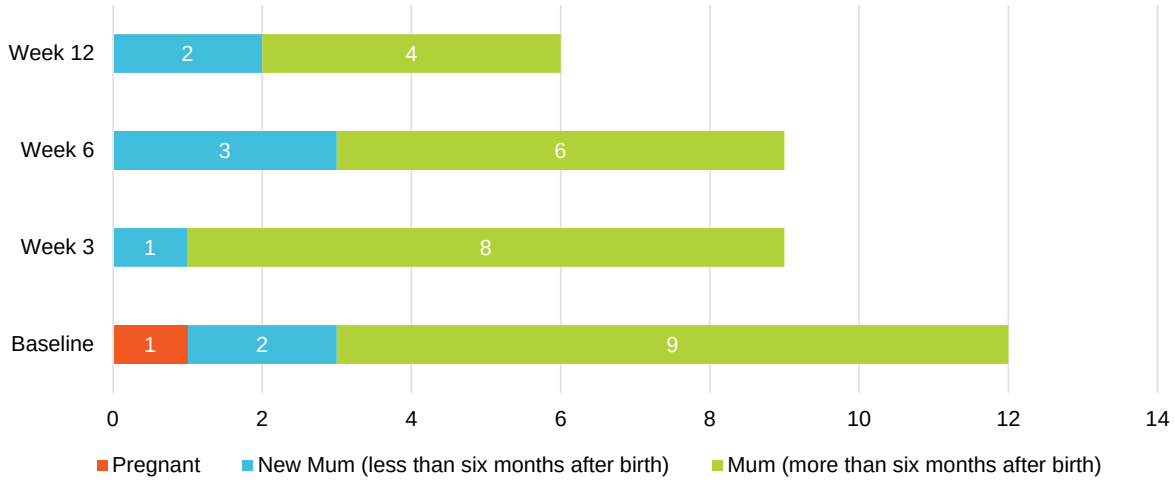


Figure 40: Breakdown of responses to '*which of the following best describes you?*' in the baseline, week 3, 6, and 12 surveys.

Ease of use

Physiotherapy cohort

Figure 41 depicts responses surrounding MUTU® System's ease of use. Here, most respondents appeared to find MUTU® System easy to use throughout the week 3, 6, and 12 surveys.

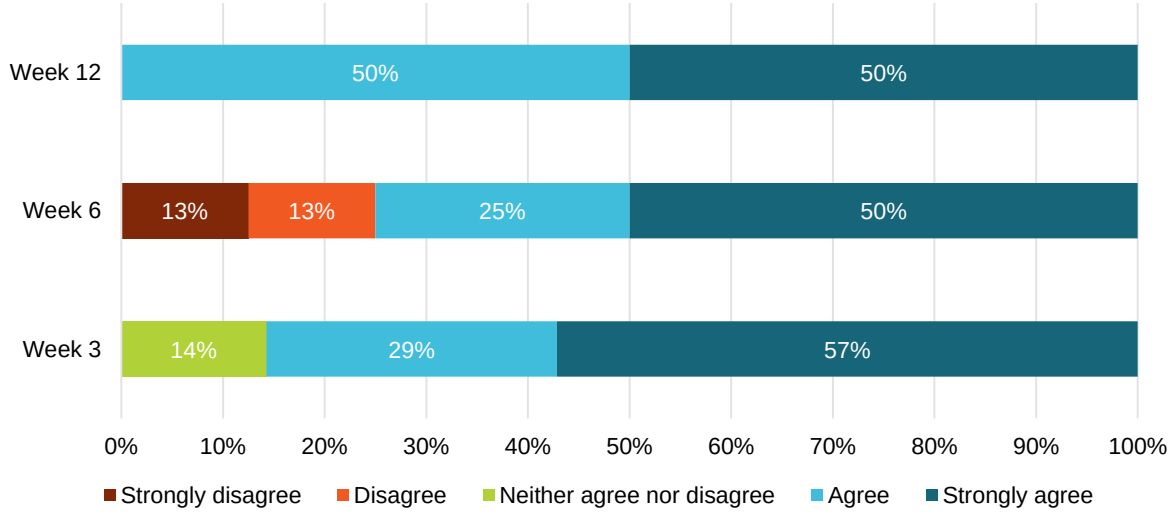


Figure 41: Responses to the statement '*MUTU is easy to use*' from the week 3, 6, and 12 surveys.

Use of MUTU

Physiotherapy cohort

Most survey respondents used MUTU® System in the week 3 and 6 surveys (Figure 42), with all respondents in the week 12 survey using MUTU® System. Half of users who stay on the programme after six weeks (50%; *n* = 3) use MUTU® System almost every day.

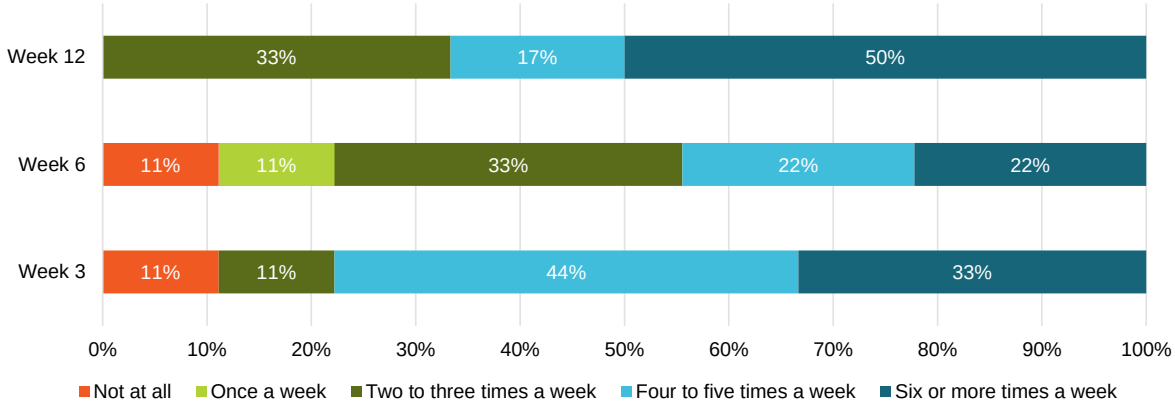


Figure 42: Breakdown of responses to the question '*how often do you use MUTU per week?*' in the week 3, 6, and 12 surveys.

It is important to be mindful of the number of survey respondents in each survey due to the drop off rates; there were six respondents in the week 12 survey, and nine respondents in the week 3 and 6 surveys. Having a greater number of responses would determine whether this would be the case for the overall population of women who are referred to MUTU® System within the NHS physiotherapy pathway.

When asked what would help patients to incorporate MUTU® System into their weeks, three responses were provided. Two respondents noted that they had not had the time to dedicate towards using MUTU® System and the other noted that they were still waiting for their kit bag to arrive.

Most survey respondents in the week 3 survey had completed a MUTU® System workout in the past three weeks, with half of respondents (50%; *n* = 4) completing a workout four or more times a week (Figure 43). This frequency lowered within the week 6 survey to 38% (*n* = 3). A greater proportion of respondents completed one workout a week compared to in week 3. All respondents in the week 12 survey completed workouts at least three times per week. Most respondents (67%; *n* = 4) completed workouts four or more times per week.

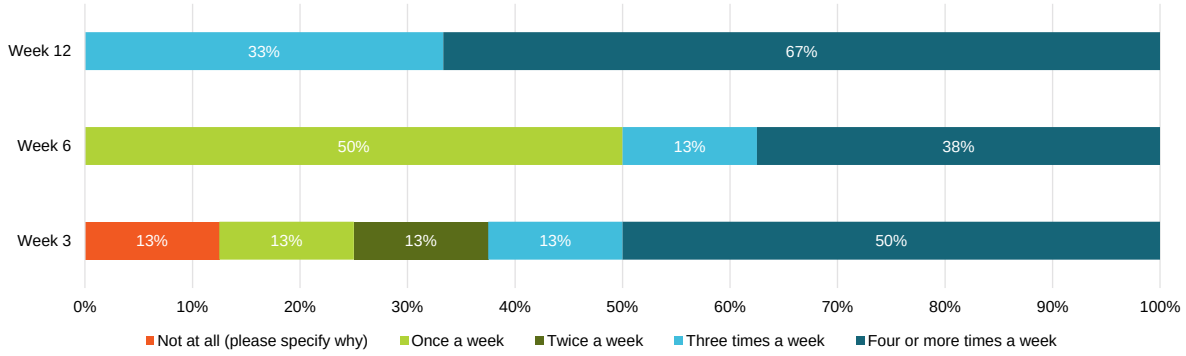


Figure 43: Responses to the question '*how often have you completed a MUTU core and ; or intensive workout during the past three weeks?*' in the week 3, 6, and 12 surveys.

GP practice cohort

Figure 44 highlights that most participants used MUTU® System at least twice a week across the week 3, 6, and 12 surveys.

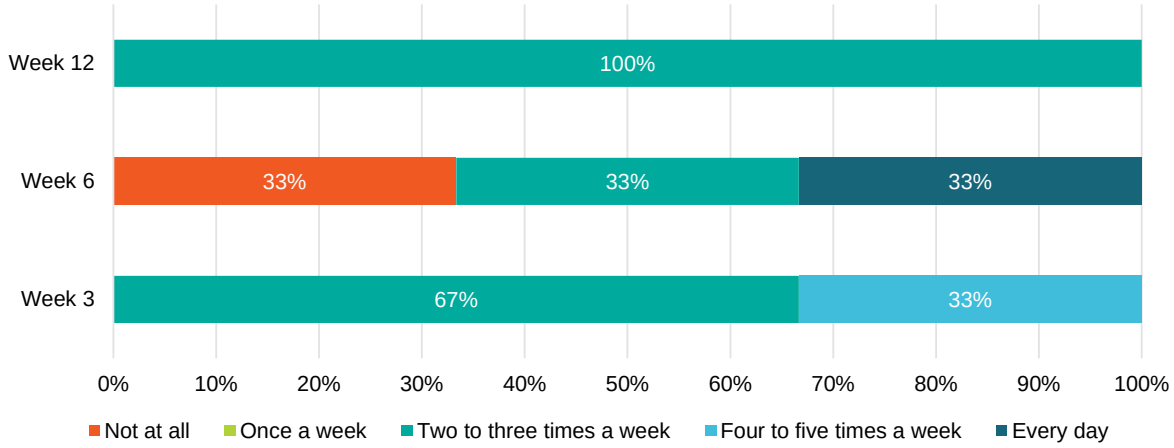


Figure 44: Responses to the question '*how often do you use MUTU per week?*' in the week 3, 6, and 12 surveys.

Knowledge of pelvic health

Physiotherapy cohort

Figure 45 suggests that most patients knew how to perform pelvic floor exercises throughout all surveys, with 100% of patients agreeing in the week 3 and 6 surveys.

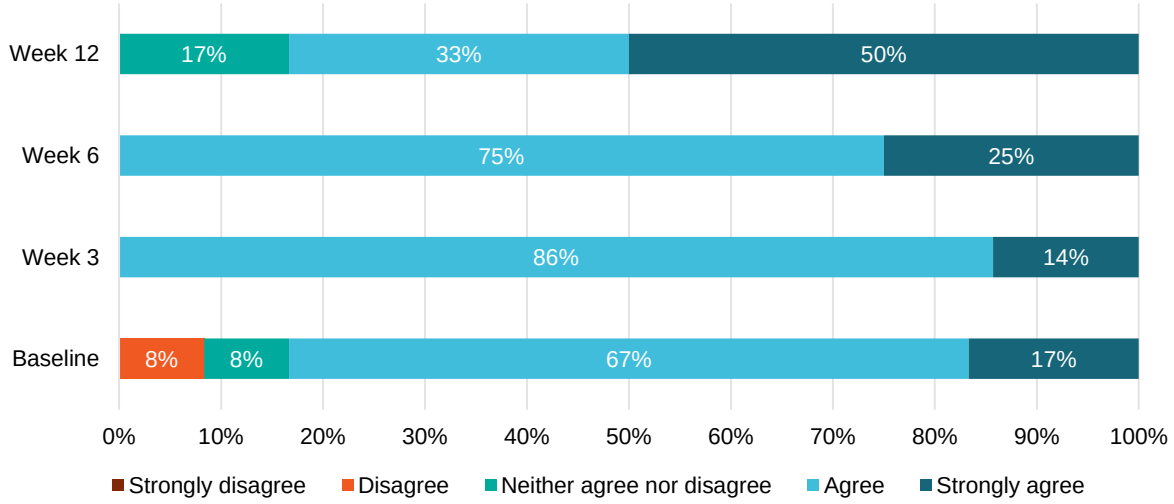


Figure 45: Responses to the statement '*I know how to perform pelvic floor exercises correctly*' in the baseline, week 3, 6, and 12 surveys.

Figure 46 notes that most people felt confident locating their pelvic floor muscles after using MUTU® System. Comparatively, fewer people felt confident locating their pelvic floor muscles before using MUTU® System.

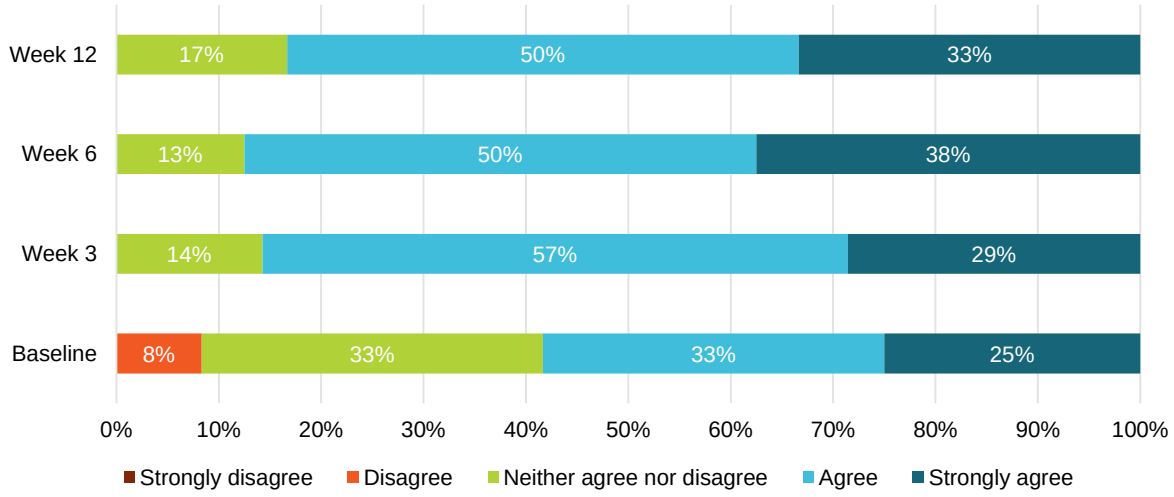


Figure 46: Responses to the statement '*I feel confident in locating my pelvic floor muscles*' in the baseline, week 3, 6, and 12 surveys.

Figure 47 suggests that there was an improvement in the proportion of patients who knew which pelvic health symptoms were normal after using MUTU® System compared to before.

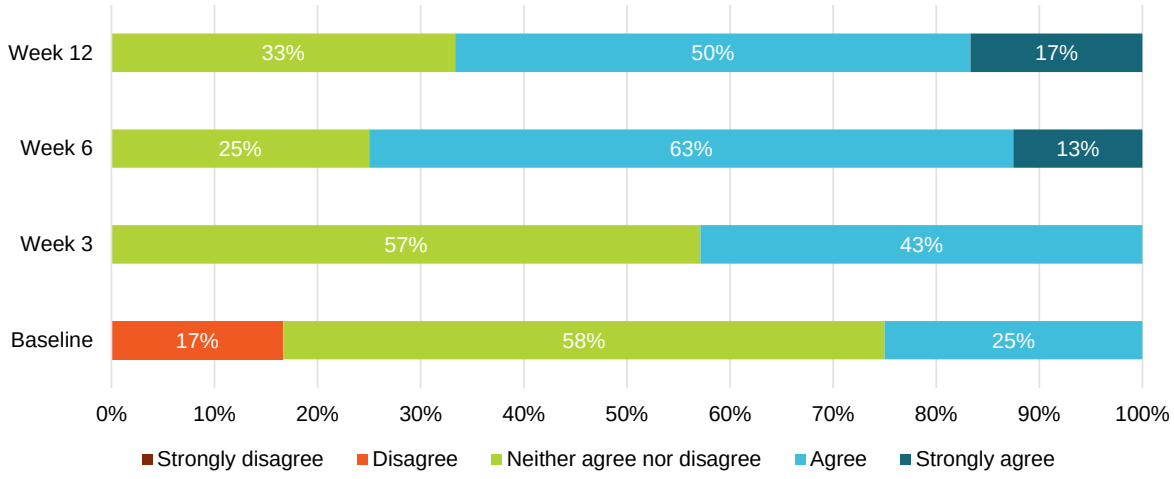
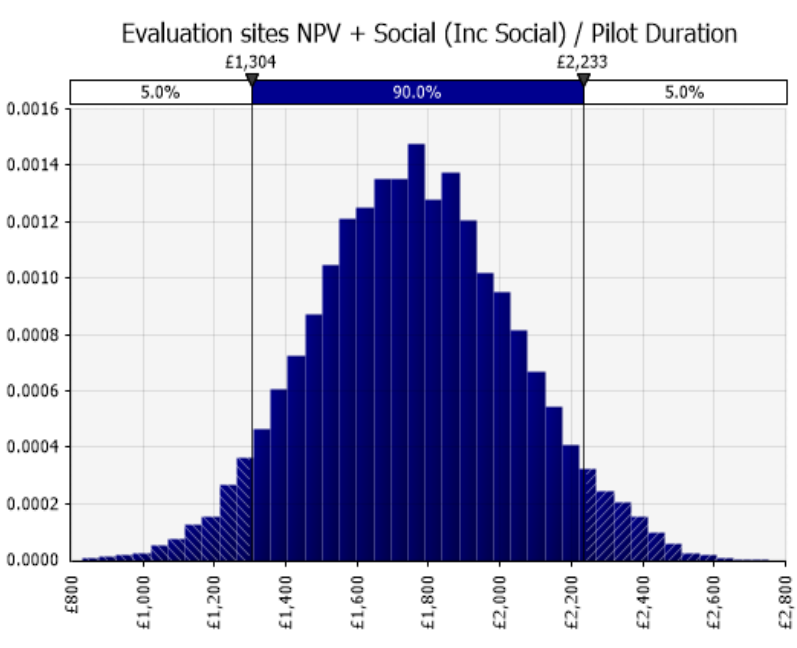


Figure 47: Responses to the statement '*I know which symptoms are normal after birth and how I can work on them*' from the baseline, week 3, 6, and 12 surveys.

9.8. Appendix H: Health economic modelling insights detailed

Scenario 1 sensitivity analysis

The sensitivity analysis (performed using @Risk; Figure 48; Figure 49) assessed how various sources of uncertainty within the model contribute to the model's overall uncertainty. Over a one-year period, the sensitivity analysis for scenario 1 indicated that the modelled net benefit including QALYs varied between £1k and £2k at the 90% confidence interval, with a mean expected outcome of £2k (Figure 48). On the other hand, excluding QALYs indicated that the modelled net benefit varied between -£1.3k and -£0.6k (Figure 49) The outcomes presented in Table 4, however, are the most likely outcome for this model.



Statistics

	Evaluation sites NP...
Cell	'14. Sensitivity Res...
Minimum	£829.05
Maximum	£2,750.97
Mean	£1,760.64
90% CI	± £4.62
Mode	£1,709.66
Median	£1,756.43
Std Dev	£280.90
Skewness	0.0668
Kurtosis	2.8442
Values	10000
Errors	0
Filtered	0
Left X	£1,304
Left P	5.0%
Right X	£2,233
Right P	95.0%
Dif. X	£928.89
Dif. P	90.0%

Figure 48: Scenario 1 (including QALYs) sensitivity analysis results.

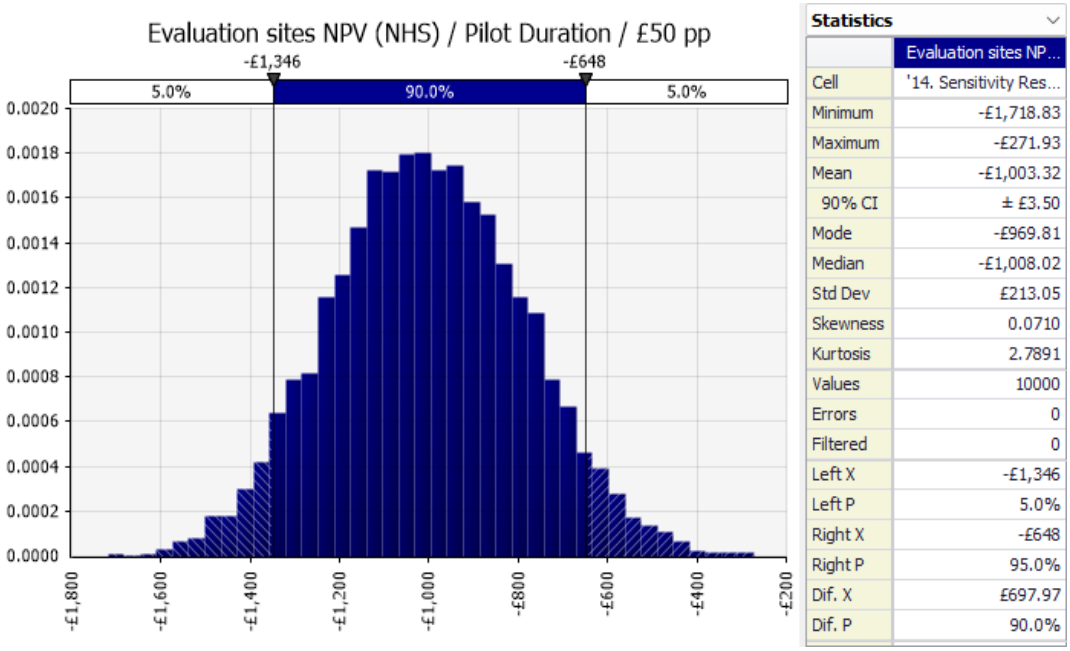


Figure 49: Scenario 1 (excluding QALYs) sensitivity analysis results.

Analysis using tornado charts (Figure 50) showed that a variation to the treatment cost of UI had the greatest effect on the mean net benefit. Engagement and improvement rates for the GP patient cohort were also influential factors, in addition to treatment cost for POP and physiotherapy patient engagement.

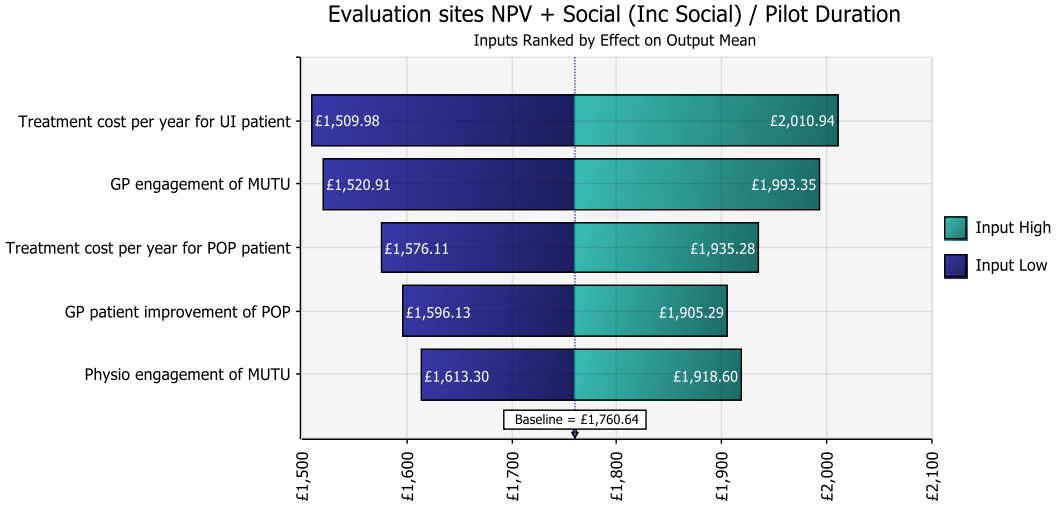
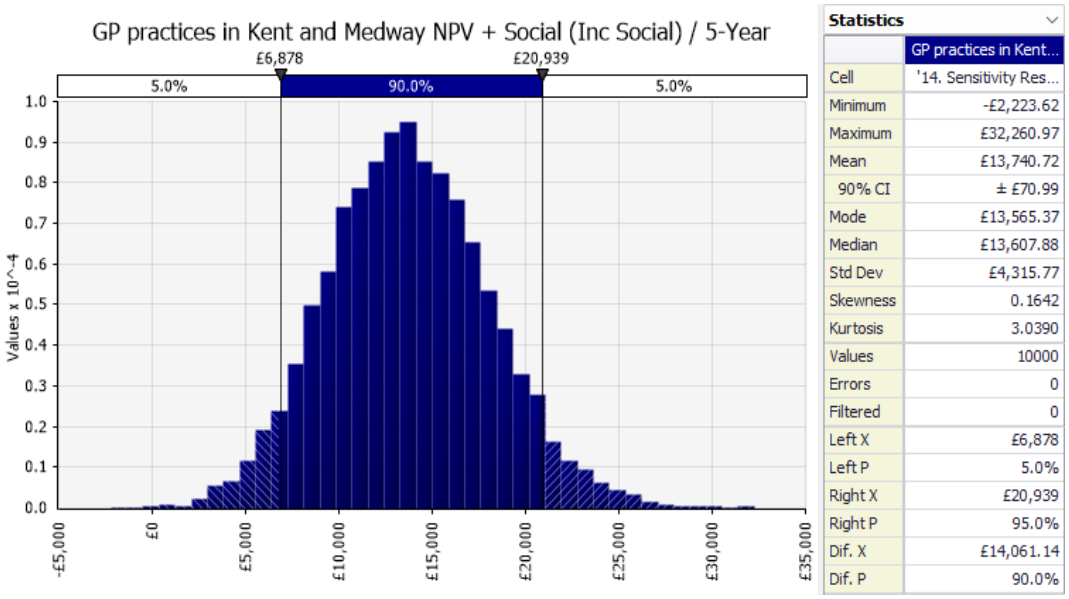


Figure 50: Tornado chart showing factors ranked by their effect on the output mean impact for scenario 1. The key indicates the expected change in outcomes when each factor is changed according to the minimum and maximum within the stipulated sensitivity range. The baseline figure is representative of the output mean. Blue represents the impacts to the mean net benefit when the maximum sensitivity input in considered. Teal represents the impacts to the mean net benefit when the minimum sensitivity input in considered.

Scenario 2 sensitivity analysis

The sensitivity analysis (performed using @Risk; Figure 51; Figure 52) assessed how various sources of uncertainty within the model contribute to the model's overall uncertainty. Over a one-year period, the sensitivity analysis for scenario 2 indicated that the modelled NPV varied between £6k and £21k at the 90% confidence interval, with a mean expected outcome of £14k (Figure 51). Excluding QALYs indicated a modelled NPV between -£12.0k and -£1.8k (Figure 52). The outcomes presented in Table 5, however, were the most likely outcome for this model.



Statistics

	GP practices in Kent...
Cell	'14. Sensitivity Res...
Minimum	-£2,223.62
Maximum	£32,260.97
Mean	£13,740.72
90% CI	± £70.99
Mode	£13,565.37
Median	£13,607.88
Std Dev	£4,315.77
Skewness	0.1642
Kurtosis	3.0390
Values	10000
Errors	0
Filtered	0
Left X	£6,878
Left P	5.0%
Right X	£20,939
Right P	95.0%
Dif. X	£14,061.14
Dif. P	90.0%

Figure 51: Scenario 2 (including QALYs) sensitivity analysis results, if the current seven sites were to continue with MUTU® System.

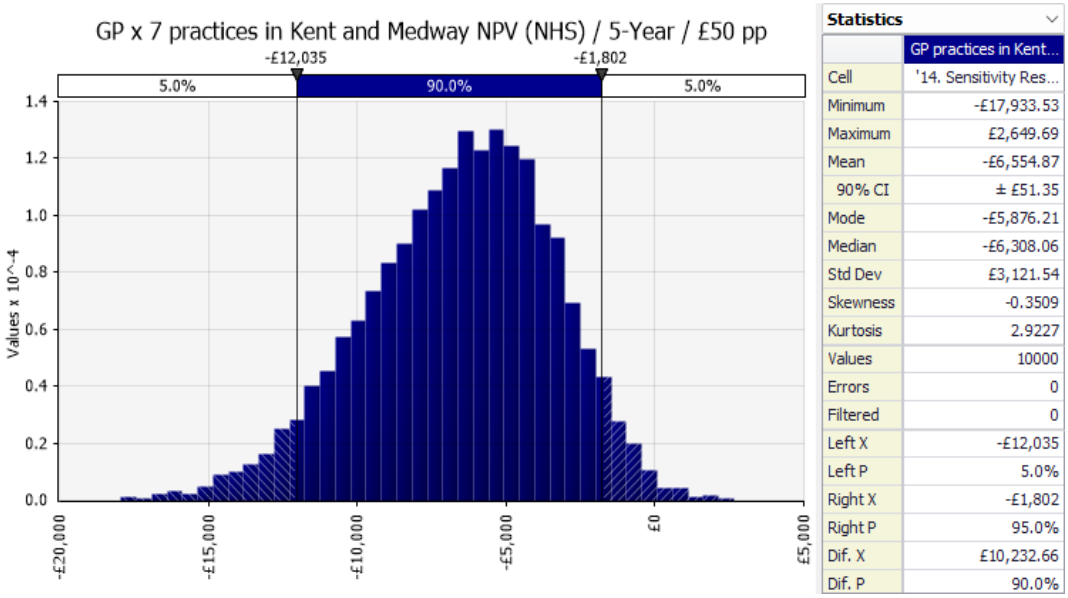


Figure 52: Scenario 2 (excluding QALYs) sensitivity analysis results, if the current seven sites were to continue with MUTU® System.

Analysis using tornado charts (Figure 53) showed that a variation to prevalence of dyspareunia had the greatest negative effect on the mean NPV, whereas the most influential positive effects were the prevalence of UI and POP, and GP patient engagement.

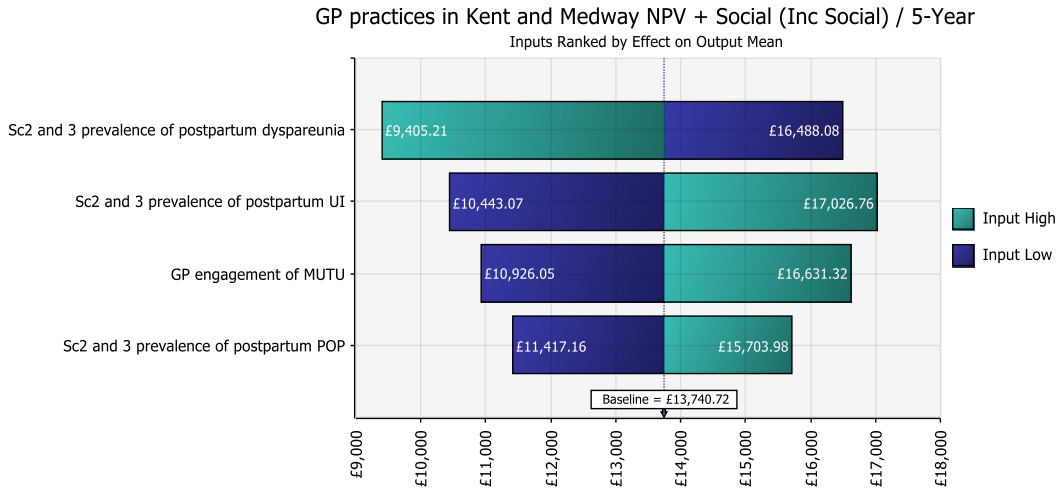


Figure 53: Tornado chart showing factors ranked by their effect on the output mean impact for scenario 2, if the current seven sites were to continue with MUTU® System.. The key indicates the expected change in outcomes when each factor is changed according to the minimum and maximum within the stipulated sensitivity range. The baseline figure is representative of the output mean. Blue represents the impacts to the mean NPV when the maximum sensitivity input is considered. Teal represents the impacts to the mean NPV when the minimum sensitivity input is considered.