NICE National Institute for Health and Care Excellence

Health Tech Programme

Diagnostics Advisory Committee

HTE10069 Digital platforms to support rehabilitation before or after primary elective hip or knee replacement surgery

committee 1 discussion

Wednesday 8 April 2026

Technical analyst:	Toby Sands (previously Peter Smolej)
Technical adviser:	Charlotte Pelekanou
Committee lead:	Sam Creavin
EAG leads: PenTAG	Ed Wilson Alexander Allen
Link to SCM/Experts register for topic:	https://www.nice.org.uk/guidance/indevelopment/gid-hte10069/documents

The following documents are made available to the Committee:

1. Cover sheet
2. Patient Expert Questionnaires submitted by all appointed professional Experts for this topic
3. Patient organisation submission (Arthritis UK)
4. External assessment report overview (ARO including patient survey summary)
5. External assessment report (EAR)
6. Company comments and draft EAG responses on the economic model and EAR
7. Register of interests [no ACIC] – as of 27 March

View results

Respondent		
13	Anonymous	1979:48 Time to complete

This questionnaire is only to be completed and submitted by Health and care practitioners

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○ Occupational therapist with a special interest in knee and hip replacement

○ Clinical Psychologist or Behaviour Change Specialist with a special interest in adherence and engagement with digital tools and/or psychological readiness for surgery and recovery

○ Other

Your information

2. Name: *

Adrian Chudyk

3. Job title *

Dr

4. Organisation *

Keele University

5. Email Address *

6. Professional organisation or society membership/affiliation

RCGP

7. Nominated/ratified by (if applicable)

No answer provided.

8. Registration number (e.g. GMC, NMC, HCPC) *

GMC 6121269

Consent to publish response and contact information

How NICE will use this information: The information that you provide on this form may be used to develop guidance on this topic.

Your advice and views represent your individual opinion and not that of your employer, professional society or a consensus view. Where relevant your name, job title, organisation and your responses, along with your declared interests may be published online on the NICE website as part of public consultation on the draft guidance, except in circumstances but not limited to, where comments are considered voluminous, or publication would be unlawful or inappropriate.

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9. I give my consent for the information in this questionnaire to be used and may be published on the NICE website as outlined above. If consent is NOT given, please state reasons below: *

● Yes

○ No (if consent is not given, you will not be eligible for the role of professional expert on this assessment)

10. Please state your reasons for not giving consent below

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(The EAG is an independent academic group who assess clinical and economic evidence and produce a report which is presented to the committee) *

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Please answer the following questions as fully as possible to provide further information about the technologies and/or your experience

13. Please describe your level of experience with the technologies, for example:

- Are you familiar with the technologies?
- Have you used any of them, or are you currently using any of them? If so, please indicate your experience with this.
- Do you know how widely these technologies are used within the NHS? Are these technologies used by clinicians in specialities other than your own?

As an academic, I am actively involved in research and implementation of digital tools utilised in primary care management of musculoskeletal conditions (STarTBack, STarTMSK, Orthopathway Trial, DMAPP trial etc) . I am also using these tools in everyday clinical practice. I have no direct experience in digital rehabilitation tools post joint replacement

14. Please indicate your research experience relating to these technologies (please choose one or more if relevant): (Please tick all that apply)

☐ I have done bibliographic research on this procedure or technologies

☐ I have done research on this procedure or technologies in laboratory settings (e.g. device-related research).

☐ I have done clinical research on this procedure or a technologies involving patients or healthy volunteers.

☐ I have published this research.

☑ I have had no involvement in research on this procedure or technologies.

☐ Other

Current management

15. Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would these technologies be used in (primary care, general hospitals, specialist centres for example).

The current standard care comprises post-operative physiotherapy organised either directly by the orthopaedic team or, particularly in cases where the patient resides away from the surgical centre, indirectly through the general practitioner surgery at the request of the surgical team. I am unaware of any digital technology employed in routine NHS care for post-TKR/THR rehabilitation. Given limited access to physiotherapy, I foresee a significant demand for digital solutions that could be utilised by patients at home, thereby reducing the need for excessive waiting times, which could be detrimental to clinical outcomes. I would foresee the initiation and onboarding of these tools taking place in secondary care prior to discharge and follow-up (if needed), monitored by community physiotherapy

16. Do these technologies have the potential to replace current standard care or would they be used as an addition to existing standard care? Where would the technologies fit in the care pathway?

In my opinion, these technologies at the current stage do not possess the potential to replace traditional methods; however, they can undoubtedly aid and enhance direct contact with physiotherapy in accordance with current standards of care.

17. What are the main aims of these technologies? How innovative are they? Can you name any technologies which are available in the UK and have this function/mode of action?

The primary objective of these technologies is to enhance engagement and ensure greater compliance and fidelity throughout the post-surgical rehabilitation process. I am familiar with the Myrecovery application employed by Oswestry Orthopaedic Centre (RJAH) to support recovery following THR. To the best of my knowledge, it resembles many non-medical applications available on the market that provide information, support, and monitor the progress of physical activities. In this regard, it may not be particularly innovative; however, if it effectively fulfils its intended purpose, innovation may not necessarily be a requirement.

18. Are there any competing or alternative technologies available to the NHS which have a similar function/mode of action to this?If so, how do these differ from the technologies indicated here?

I am aware of the Gaitsmart application, which is intended for fall prevention as well as post-operative rehabilitation following THR/TKR. As far as I am aware, tt is currently being utilised clinically in Bedfordshire, Luton, and Milton ICB. However, beyond these instances, I believe that the application remains predominantly in the research or pilot phase.
Furthermore, I am aware of digital tools based on motion capture technology (that have been developed for video games and films), which are presently in the trial phase for rehabilitation purposes with professional athletes and dancers internationally. These tools still necessitate the wearing of special markers and require significant involvement from healthcare professionals to analyse data and provide feedback to users.

19. Approximately how many people each year would be eligible for an intervention with these technologies? (give either as an estimated number, or a proportion of the target population)

Given that more than 250,000 total hip and total knee replacements are performed annually in the UK, this figure represents the potential eligible population. However, because the cohort is predominantly older adults, a proportion will be at risk of digital exclusion due to limited access, skills, or support, which will reduce the realistically eligible population.

Potential patient benefits and impact on the health system

20. What do you consider to be the potential benefits to patients from using these technologies?

reduction in waiting time to see a physiotherapist, accelerating the rehabilitation process and improving compliance with physiotherapy

21. Are there any groups of patients who would particularly benefit from these technologies? Are there any groups in which these technologies would be less effective or would be less likely to benefit? Are there any potential equality issues that should be considered for this condition and technologies?

Those who are committed to recovery but lack information and or directions. Digital exclusion is a real risk, particularly as both TKR/THR predominantly take place in the elderly population.

22. What do you consider to be the potential benefits to the system from using these technologies? Could they lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

Reduction of face-to-face appointments while maintaining the intensity of rehabilitation is a potential benefit of using these applications. Potentially, apps that offer feedback sent to health professionals could allow for a more time-efficient review of rehabilitation process fidelity and compliance.

23. What (if any) clinical facilities (or changes to existing facilities) are needed to implement these technologies safely?

All these applications will be classified as medical devices, necessitating associated digital governance, tech and clinical support, and MHRA registration beyond the scope of research or pilot projects. This issue presently poses a significant concern, as IT governance is characterised by considerable unwarranted variability across and within Trusts. Developers in the commercial sector are unlikely to accept the time delays currently associated with implementing processes into NHS IT systems resulting in disengagement with NHs and offering thei products on the general market without necessary following the evidence base approach

24. Is any specific training needed in order to use these technologies with respect to efficacy or safety?

I anticipate that minimal additional training will be necessary beyond the standard instruction in using the application. This requirement should be managed through the graphical user interface supplied by the application to ensure ease of use, coupled with initial pre-training during the onboarding process in surgical units post-operatively.

Safety and efficacy of the procedure/technologies

25. What are the potential harms of the technologies? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:

- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

Theoretical adverse event: failure to follow up

26. Please list the key efficacy and safety outcomes for these technologies. Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

- shorter waiting times for the commencement of intervention, better compliance with intervention due to more intensive prompting/monitoring- monitoring via built-in app features
reduction in clinical staffing pressure- health economic analysis

27. Please list any uncertainties or concerns about the efficacy and safety of these technologies?

My assumptions of any features of these digital solutions are based on observations in analogous but not identical clinical settings of apps desiged to assist in the management of non-specific low back pain. Several of them made statements about their clinical and cost efficiency without robust evidence supporting them

28. Are you aware of any additional issues which would prevent (or have prevented) these technologies being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

digital govenrnance withing NHS associated with variances in the IT govenencance requirements, extrementy slow (in comparison to commerical settings) adoption rate, digits

29. Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic. Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

https://www.rjah.nhs.uk/patients-visitors/patient-apps-and-systems/myrecovery-app/
Pritwani S, Girotra S, Shrivastava P, Kumar A, Swamy AM, Batra S, Sharma N, John R, Praveen D, Gara S, Malhotra R, Maddison R, Devasenapathy N. Design and development of a mobile health intervention for rehabilitation support after knee arthroplasty: TeleRehabilitation after knee ArThroplasty (TReAT) project. BMC Musculoskelet Disord. 2024 Nov 7;25(1):890. doi: 10.1186/s12891-024-08003-x. PMID: 39511552; PMCID: PMC11542399.

30. Is there any research that you feel would be needed to address uncertainties in the evidence base?

It may be beneficial to consider a bench-marking exercise against which all potential digital solutions to post TKR/THR rehabilitation should be measured to enable a meaningful comparison

Further Comments

31. Please add any further comments on your particular experiences or knowledge of the technologies.

No answer provided.

32. Date of questionnaire completion *

10/20/2025

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a confidentiality and undertaking form, a declaration of interests form, and a process declaration form as part of the application process.
Your contributions will be reviewed by the NICE team.

View results

Respondent

7 Anonymous

168:01
Time to complete

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○ Occupational therapist with a special interest in knee and hip replacement

○ Clinical Psychologist or Behaviour Change Specialist with a special interest in adherence and engagement with digital tools and/or psychological readiness for surgery and recovery

● Rehabilitation Medicine Specialist with special interest in Sports Medicine

Your information

2. Name: *

Abayomi Salawu

3. Job title *

Consultant in Rehabilitation Medicine

4. Organisation *

Hull University Teaching Hospital NHS Trust

5. Email Address *

6. Professional organisation or society membership/affiliation

British Society of Physical and Rehabilitation Medicine

7. Nominated/ratified by (if applicable)

No answer provided.

8. Registration number (e.g. GMC, NMC, HCPC) *

5166945

Consent to publish response and contact information

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- Do you know how widely these technologies are used within the NHS? Are these technologies used by clinicians in specialities other than your own?

I have a special interest in rehabilitation technology and its use in telerehabilitation. I am actively involved in the use of digital technology and I have created Virtual reality apps for remote rehabilitation delivery. I have also created commercial virtual reality rehabilitation apps. I have also been involved in feasibility projects and assessments with use of digital technology for rehabilitation. I actively use various digital technology tools in clinical practice. I am also a recipient of NIHR Research Capabilities grant in 2023 that facilitated the acquisition of the HUNOVA robotic rehabilitation tool for our service. I pioneered on the use of the Cyberith Multidirectional Virtual Reality Treadmill in rehabilitation in the UK.

14. Please indicate your research experience relating to these technologies (please choose one or more if relevant): (Please tick all that apply)

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☑ I have done clinical research on this procedure or a technologies involving patients or healthy volunteers.

☐ I have published this research.

☐ I have had no involvement in research on this procedure or technologies.

☐ Other

Current management

15. Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would these technologies be used in (primary care, general hospitals, specialist centres for example).

Digital technology can be used across the whole care continuum from primary care to specialist centres.

16. Do these technologies have the potential to replace current standard care or would they be used as an addition to existing standard care? Where would the technologies fit in the care pathway?

In some areas, the technologies can replace standard care especially in those who are able to engage in self-directed exercises. It would also contribute to increased efficiency of current care pathway as it will facilitate remote delivery of rehabilitation.

17. What are the main aims of these technologies? How innovative are they? Can you name any technologies which are available in the UK and have this function/mode of action?

Main aim of these technologies is to facilitate the delivery of the appropriate dose of therapy to patients. Current delivery is limited by staffing and facilities. These technologies incorporate computer vision with ability to analyse far more data points than average human. They can facilitate real time guidance using artificial intelligence, performance monitoring and create custom physical therapy sessions based on the patient's needs. I am involved in the clinical evaluation of one of such products called Kemtai. This is a motion-tracking exercise platform that uses computer vision and AI to provide real-time feedback to the user.

18. Are there any competing or alternative technologies available to the NHS which have a similar function/mode of action to this?If so, how do these differ from the technologies indicated here?

The NHS is not invested in using digital technology to its full potential. Many of these digital tools offer the opportunity of gamification which also increases engagement. Simple devices like the mobile can be used to deliver therapy programmes.

19. Approximately how many people each year would be eligible for an intervention with these technologies? (give either as an estimated number, or a proportion of the target population)

Majority of patients undergoing elective surgical procedures would be eligible to use many of these technologies. This will include orthopaedic and non-orthopaedic cases.

Potential patient benefits and impact on the health system

20. What do you consider to be the potential benefits to patients from using these technologies?

Autonomy, improved access and convenience, reduced travel, flexible scheduling, engagement and adherence to treatment, monitoring, better insights and personalised treatment, objective monitoring, predictive analysis, prognostication, cognitive rehabilitation and psychological support.

21. Are there any groups of patients who would particularly benefit from these technologies? Are there any groups in which these technologies would be less effective or would be less likely to benefit? Are there any potential equality issues that should be considered for this condition and technologies?

Majority of patients will benefit from the use of these technologies. However, patients with severe cognitive impairment will not be able to use it. In addition, patients with severe physical impairments will also not be able to use the technologies with assistance or support. The technologies will require internet access and that may have financial implications for patients thereby excluding them from access.

22. What do you consider to be the potential benefits to the system from using these technologies? Could they lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

Yes, the potential benefits of digital technologies include improved efficiency and care pathway management.

23. What (if any) clinical facilities (or changes to existing facilities) are needed to implement these technologies safely?

Depends on the type of technology being considered. Some have hardware with an estate footprint so dedicated facilities will need to be developed for them which many others are mobile and can be used within existing facilities.

24. Is any specific training needed in order to use these technologies with respect to efficacy or safety?

Yes. Each device will require training with regards to its use.

Safety and efficacy of the procedure/technologies

25. What are the potential harms of the technologies? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:

    - Adverse events reported in the literature (if possible, please cite literature)
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    Most of the devices are well tolerated and theoretical adverse events are often related to the physical activity rather than the device.

26. Please list the key efficacy and safety outcomes for these technologies. Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

    Promising efficacy data in the field of musculoskeletal rehabilitation, neurorehabilitation and cardiac rehabilitation. Very low adverse events rate. digital technologies facilitate therapy delivery in controlled environment thereby increasing safety. Digital technology especially wearables facilitate patient monitoring thereby increasing safety.

27. Please list any uncertainties or concerns about the efficacy and safety of these technologies?

    The dose, frequency and timing of using many of these technologies are often anecdotal.

28. Are you aware of any additional issues which would prevent (or have prevented) these technologies being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

    Cost and resource (space) are the biggest constraints
    There is also a massive aversion to technology by many therapy staff (Fear of being replaced by technology).

29. Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic. Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

    No answer provided.

30. Is there any research that you feel would be needed to address uncertainties in the evidence base?

    We have just completed a systematic review of the use of a specified digital technology in cognitive rehabilitation.
    Ensuring standardisation of the methodology and outcome reporting of rehabilitation technology clinical trials.

Further Comments

31. Please add any further comments on your particular experiences or knowledge of the technologies.

    No answer provided.

32. Date of questionnaire completion *

    10/10/2025

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Respondent

12 Anonymous

29:04

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○ Other

Your information

2. Name: *

David Isaac

3. Job title *

Consultant Orthopaedic Surgeon

4. Organisation *

Torbay Hospital

5. Email Address *

6. Professional organisation or society membership/affiliation

BOA, BASK, RCS Edinburgh

7. Nominated/ratified by (if applicable)

No answer provided.

8. Registration number (e.g. GMC, NMC, HCPC) *

4320784

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10. Please state your reasons for not giving consent below

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- Have you used any of them, or are you currently using any of them? If so, please indicate your experience with this.
- Do you know how widely these technologies are used within the NHS? Are these technologies used by clinicians in specialities other than your own?

Currently use the Myrecovery app, for a few weeks, so early experience

14. Please indicate your research experience relating to these technologies (please choose one or more if relevant): (Please tick all that apply)

☐ I have done bibliographic research on this procedure or technologies

☐ I have done research on this procedure or technologies in laboratory settings (e.g. device-related research).

☐ I have done clinical research on this procedure or a technologies involving patients or healthy volunteers.

☐ I have published this research.

☑ I have had no involvement in research on this procedure or technologies.

☐ Other

Current management

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Provide written information and face to face education prior to joint replacement surgery, routine follow up with face to face review after surgery with either surgeon/physio/nursing staff

16. Do these technologies have the potential to replace current standard care or would they be used as an addition to existing standard care? Where would the technologies fit in the care pathway?

Replace and add. Can potentially reduce face to face reviews via remote monitoring of post op progress, add to information gained by treating team, aid provision of information to patient, improve patient access to treating team

17. What are the main aims of these technologies? How innovative are they? Can you name any technologies which are available in the UK and have this function/mode of action?

Enable enhanced or facilitated information provision to patients, allow remote follow up avoiding need to return to hospital following surgery. Examples of such apps are MyRecovery, Mymobility, CorinRPM

18. Are there any competing or alternative technologies available to the NHS which have a similar function/mode of action to this?If so, how do these differ from the technologies indicated here?

see app examples above. Some EPR systems allow patients to communicate with treating teams (such as Epic) but do not have the ease of data collection offered by the apps

19. Approximately how many people each year would be eligible for an intervention with these technologies? (give either as an estimated number, or a proportion of the target population)

200,000 joint replacements in the UK each year, but could also apply, with modification, to any branch of orthopaedic surgery and other specialties

Potential patient benefits and impact on the health system

20. What do you consider to be the potential benefits to patients from using these technologies?

Avoid unnecessary hospital visits, reassurance of ease of communication, ready access to information

21. Are there any groups of patients who would particularly benefit from these technologies? Are there any groups in which these technologies would be less effective or would be less likely to benefit? Are there any potential equality issues that should be considered for this condition and technologies?

Need to be able to own/operate a smartphone, elderly patients are disadvantaged in this regard

22. What do you consider to be the potential benefits to the system from using these technologies? Could they lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

Can reserve appointments for patients identified as needing clinical review, thus increasing clinic availability for other patients. Can information share with treating team/patient more rapidly, saving time.

23. What (if any) clinical facilities (or changes to existing facilities) are needed to implement these technologies safely?

Nil

24. Is any specific training needed in order to use these technologies with respect to efficacy or safety?

Some staff training required, and provision of staff time to interact with patients via the app is required

Safety and efficacy of the procedure/technologies

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- Anecdotal adverse events (known from experience)
- Theoretical adverse events

Theoretical risk of failing to diagnose a postoperative complication or poor progress if patient not assessed face to face

26. Please list the key efficacy and safety outcomes for these technologies. Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

Post operative face to face follow up appointment numbers can be measured, would expect a reduction per patient. Reduction in short notice operation cancellations as patients are better prepared for surgery.
May be difficult to collect data on patients who were not identified as requiring face to face review but have had adverse outcomes.

27. Please list any uncertainties or concerns about the efficacy and safety of these technologies?

Patient engagement is typically around 50%. Those who don't use the app will continue to receive the current standard of face to face care.

28. Are you aware of any additional issues which would prevent (or have prevented) these technologies being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

The apps will incur an annual charge in most circumstances. They also require individual Trusts to assess the information governance implications which is a time consuming and labour intensive process; if the use of the apps could be centrally authorised this would aid their implementation.

29. Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic. Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

No answer provided.

30. Is there any research that you feel would be needed to address uncertainties in the evidence base?

No answer provided.

Further Comments

31. Please add any further comments on your particular experiences or knowledge of the technologies.

I regard these apps as potentially very helpful and effective. There is some resistance amongst treating clinicians to entrusting perioperative care to an app. I anticipate that this concern will reduce with experience

32. Date of questionnaire completion *

10/20/2025

Thank you for completing the professional expert questionnaire.

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Your contributions will be reviewed by the NICE team.

View results

Respondent

9 Anonymous

58:38

Time to complete

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○ Nurse with a specialist interest in knee and hip replacement

○ Occupational therapist with a special interest in knee and hip replacement

○ Clinical Psychologist or Behaviour Change Specialist with a special interest in adherence and engagement with digital tools and/or psychological readiness for surgery and recovery

○ Other

Your information

2. Name: *

Nicola Underdown

3. Job title *

Orthopaedic Clinical Specialist Physiotherapist

4. Organisation *

Kings College Hospital NHS Trust

5. Email Address *

6. Professional organisation or society membership/affiliation

CSP - Chartered Society Of Physiotherapy

7. Nominated/ratified by (if applicable)

Colleague - Consultant Spinal Specialist Suzie McIlroy

8. Registration number (e.g. GMC, NMC, HCPC) *

HPC - PH43641

Consent to publish response and contact information

How NICE will use this information: The information that you provide on this form may be used to develop guidance on this topic.

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Please answer the following questions as fully as possible to provide further information about the technologies and/or your experience

13. Please describe your level of experience with the technologies, for example:

- Are you familiar with the technologies?
- Have you used any of them, or are you currently using any of them? If so, please indicate your experience with this.
- Do you know how widely these technologies are used within the NHS? Are these technologies used by clinicians in specialities other than your own?

I'm aware of use of technologies within an out-patient MSK Physiotherapy/ Orthopaedic setting. I haven't been involved in the set-up, but have helped patients to access the relevant platforms. There is an NHS agenda/plan to use more technologies to provide better health care access, better treatment and patient experience. Also to improve general health of the nation

14. Please indicate your research experience relating to these technologies (please choose one or more if relevant): (Please tick all that apply)

☐ I have done bibliographic research on this procedure or technologies

☐ I have done research on this procedure or technologies in laboratory settings (e.g. device-related research).

☐ I have done clinical research on this procedure or a technologies involving patients or healthy volunteers.

☐ I have published this research.

☑ I have had no involvement in research on this procedure or technologies.

☐ Other

Current management

15. Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would these technologies be used in (primary care, general hospitals, specialist centres for example).

At King's the aim is to follow /implement the National GIRFT Pathway or hip and knee arthroplasty patients. Since COVID, there has been no formal pre-op education class for these patients - this is being explored and technologies would be v useful here. Also they would be useful for post op / support rehab after surgery and an adjunt to my clinics. They could be used in Primary care and hospital.

16. Do these technologies have the potential to replace current standard care or would they be used as an addition to existing standard care? Where would the technologies fit in the care pathway?

see above. Also reduce the burden on out-patient MSK waiting lists for pre-post op Physiotherapy

17. What are the main aims of these technologies? How innovative are they? Can you name any technologies which are available in the UK and have this function/mode of action?

Aims - empower/educate patients, improve patient experience for those having TKR/THR surgery, improve surgical outcomes (better educated, prepared patients), improve hospital efficiency - ie decrease length of patient stay, increased surgical volume.

I have used getUbetter App and Good Boost platforms

18. Are there any competing or alternative technologies available to the NHS which have a similar function/mode of action to this?If so, how do these differ from the technologies indicated here?

Unsure

19. Approximately how many people each year would be eligible for an intervention with these technologies? (give either as an estimated number, or a proportion of the target population)

It would depend on how/when implemented. Would they be accessed in Primary Care - from GP who refers the patient for hip/knee arthroplasty, or once patients are on surgical waiting list?

Potential patient benefits and impact on the health system

20. What do you consider to be the potential benefits to patients from using these technologies?

Better knowledge/ education, empowerment, reassurance, reduced anxiety, compliance, motivation and long term management of their health

21. Are there any groups of patients who would particularly benefit from these technologies? Are there any groups in which these technologies would be less effective or would be less likely to benefit? Are there any potential equality issues that should be considered for this condition and technologies?

Younger, English speaking, affluent and those technology confidence/access would definitely benefit.
Elderly, non- English speakers, poorer patients with limited access and no/minimal technology experience less likely to benefit.

This could have a significant impact on equality of the service at King's, which has v diverse population

22. What do you consider to be the potential benefits to the system from using these technologies? Could they lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

As previously mentioned - all of the above. Less burden throughout the GIRFT pathway if implemented well and fairly

23. What (if any) clinical facilities (or changes to existing facilities) are needed to implement these technologies safely?

Proper/thorough preparation of all clinicians/staff promoting use of technologies before implementation. This will take time and 'buy -in' from those involved. Without this - patients will not be appropriately directed, and technologies ultimately not used effectively. They also need to be available in multiple languages, formats, etc so access is equitable.
Also should there be equipment/space available for those patients without IT access?

24. Is any specific training needed in order to use these technologies with respect to efficacy or safety?

Yes - the clinicians need to be fully versed in the technology - so patients can be safely advised on it's use

Safety and efficacy of the procedure/technologies

25. What are the potential harms of the technologies? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:

    - Adverse events reported in the literature (if possible, please cite literature)
    - Anecdotal adverse events (known from experience)
    - Theoretical adverse events

Anecdotal - no patient IT access or experience - ie don't own computer, appropriate phone, feel unconfident with technology. Lack of face to face clinic appointments when needed, patient's not safety netted properly if left to manage alsone

26. Please list the key efficacy and safety outcomes for these technologies. Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

Unsure of the efficacy, but safety is that the technology is always evidence based in it's advice, treatment etc. That it is accessible for diverse patient cohort, and that there are always alternatives for those who can't/don't want to access this.
Patient involvement / co-production is essential. patient experience/feedback with focus groups and use of PDSA cycle over 12 months.

27. Please list any uncertainties or concerns about the efficacy and safety of these technologies?

As above

28. Are you aware of any additional issues which would prevent (or have prevented) these technologies being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

Cost, staffing

29. Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic. Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

None

30. Is there any research that you feel would be needed to address uncertainties in the evidence base?

Previous use of Technologies in diverse, older patients

Further Comments

31. Please add any further comments on your particular experiences or knowledge of the technologies.

Thanks for approaching me - My role is working primarily with post op hip and knee arthroplasty patients in out-patient clinic setting.

32. Date of questionnaire completion *

10/14/2025

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View results

Respondent

4 Anonymous

33:39

Time to complete

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○ Occupational therapist with a special interest in knee and hip replacement

○ Clinical Psychologist or Behaviour Change Specialist with a special interest in adherence and engagement with digital tools and/or psychological readiness for surgery and recovery

○ Other

Your information

2. Name: *

Prof Paui Baker

3. Job title *

Consultant Orthopaedic Surgeon

4. Organisation *

South Tees NHS Foundation Trust

5. Email Address *

6. Professional organisation or society membership/affiliation

British Orthopaedic Association

7. Nominated/ratified by (if applicable)

NA

8. Registration number (e.g. GMC, NMC, HCPC) *

6028163

Consent to publish response and contact information

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No answer provided.

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13. Please describe your level of experience with the technologies, for example:

- Are you familiar with the technologies?
- Have you used any of them, or are you currently using any of them? If so, please indicate your experience with this.
- Do you know how widely these technologies are used within the NHS? Are these technologies used by clinicians in specialities other than your own?

I have been involved in the development 3 digital pathways supporting patients undergoing hip and knee replacement surgery.
1) GoWellHealth digital platform - publications from the team
Baker PN, Clark NL. Delivery of patient education and support using an online digital platform for patients undergoing primary hip and knee replacement: The patient's perspectives. Patient Experience Journal. 2021; 8(1):99-107. doi: 10.35680/2372-0247.1537.
Martin R, Clark N, Baker P (2022) Impact of age, sex and surgery type on engagement with an online patient education and support platform developed for total hip and knee replacement patients. PLoS ONE 17(7): e0269771
Joanne Gray, Stephen McCarthy, Esther Carr, Gerard Danjoux, Rhiannon Hackett, Andrew McCarthy, Peter McMeekin, Natalie Clark & Paul Baker. The impact of a digital joint school educational programme on post-operative outcomes following lower limb arthroplasty: a retrospective comparative cohort study. BMC Health Services Research Volume 22, article number 580, (2022)
2) Prepwell rehabilitation programme - https://prepwell.co.uk
3) OPAL (Occupational Advice for patients undergoing arthroplasty of the lower limb) - This programme involves a digital offering to support patients returning to work after hip and knee replacement. https://www.opalreturntowork.nhs.uk. I am the Chief Investigator and Grant holder for 2 NIHR HTA grants relating to this work.

14. Please indicate your research experience relating to these technologies (please choose one or more if relevant): (Please tick all that apply)

☐ I have done bibliographic research on this procedure or technologies

☐ I have done research on this procedure or technologies in laboratory settings (e.g. device-related research).

☑ I have done clinical research on this procedure or a technologies involving patients or healthy volunteers.

☑ I have published this research.

☐ I have had no involvement in research on this procedure or technologies.

☐ Other

Current management

15. Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would these technologies be used in (primary care, general hospitals, specialist centres for example).

Standard of care is varied
There are three main aspects of care
1) Education - Focus on patient education - many digital offerings used often supplied by implant manufacturers as part of their package
2) Prehabilitation - Focus on patient optimisation prior to surgery - more anaesthetically focussed. Some integrate existing commercial 'wellness' digital offerings
3) Rehabilitation - Focus on recovery after surgery - many digital offerings that track recovery
Uptake is variable due to cost.
Content of programmes is variable and poorly evidenced. No one knows what is 'essential' and what is 'supplementary' in terms of the content and information provided.

16. Do these technologies have the potential to replace current standard care or would they be used as an addition to existing standard care? Where would the technologies fit in the care pathway?

They have the potential to supplement/replace existing care dependent upon the current standard of care in individual Trusts. For example, a digital offering may reduce the need for F2F contact at a number of points in the pathway (pre and post op) saving money. It may also help to optimise patients for surgery and improved outcomes (patients better prepared).

When we developed GoWellHealth patients were 'onboarded' when they were listed for surgery and given specific modules in the lead up to surgery and after surgery. These covered education, health, wellness, physio, occupational therapy etc etc. This reduced the need for F2F contact and allowed patients to view information and access content at a time and pace that suited them.

17. What are the main aims of these technologies? How innovative are they? Can you name any technologies which are available in the UK and have this function/mode of action?

See previous answers

18. Are there any competing or alternative technologies available to the NHS which have a similar function/mode of action to this?If so, how do these differ from the technologies indicated here?

There is a multitude of these technologies available.

19. Approximately how many people each year would be eligible for an intervention with these technologies? (give either as an estimated number, or a proportion of the target population)

All patients undergoing hip and knee replacement would be eligible (>250,000). They have the opportunity to benefit all patients undergoing surgery.

Potential patient benefits and impact on the health system

20. What do you consider to be the potential benefits to patients from using these technologies?

Pre-op optimisation - healthier patients for surgery and therefore reduced complications
Better patient education
More realistic expectations (knowing what to expect)
More 'self directed' recovery after surgery (in line with NICE NG157) reducing need for F2F physio.

21. Are there any groups of patients who would particularly benefit from these technologies? Are there any groups in which these technologies would be less effective or would be less likely to benefit? Are there any potential equality issues that should be considered for this condition and technologies?

Digital literacy is always and issue

22. What do you consider to be the potential benefits to the system from using these technologies? Could they lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

I think there is a big opportunity for reducing LOS, reducing physio appts, reducing GP contacts after surgery with these technologies

23. What (if any) clinical facilities (or changes to existing facilities) are needed to implement these technologies safely?

No major changes. You would need contracts with the providers and assurance around the fidelity, delivery and completion of the digital interventions.

24. Is any specific training needed in order to use these technologies with respect to efficacy or safety?

No

Safety and efficacy of the procedure/technologies

25. What are the potential harms of the technologies? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:

- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

No major harms anticipated

26. Please list the key efficacy and safety outcomes for these technologies. Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

No major safety outcomes (over and above having a TKR/THR). We recruited 760 patients in the OPAL trial to an intervention to support return to work and have no safety issues / AEs / SAEs that were linked to the intervention. I suspect this would be similar. They are low risk / low cost interventions.

27. Please list any uncertainties or concerns about the efficacy and safety of these technologies?

Digital literacy and patient engagement are the key issues

28. Are you aware of any additional issues which would prevent (or have prevented) these technologies being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

Per patient cost. Staff time to monitor adherence.

29. Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic. Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

See papers already provided in earlier response

30. Is there any research that you feel would be needed to address uncertainties in the evidence base?

I'm unclear as to the optimal composition of a digital rehab /prehab pathways. So I guess the question is 'What are the essential components of a digital pathway to support recovery after hip and knee replacement surgery'

Further Comments

31. Please add any further comments on your particular experiences or knowledge of the technologies.

Nothing further to add

32. Date of questionnaire completion *

10/2/2025

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View results

Respondent

6 Anonymous

449:41

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○ Nurse with a specialist interest in knee and hip replacement

○ Occupational therapist with a special interest in knee and hip replacement

○ Clinical Psychologist or Behaviour Change Specialist with a special interest in adherence and engagement with digital tools and/or psychological readiness for surgery and recovery

● As a lead AHP for system MSK Transformation I have experience of leading on implementation of digital platforms to support MSK in end to end path

Your information

2. Name: *

Richard Fallows

3. Job title *

Shropshire Telford & Wrekin ICS, MSK Transformation Clinical Lead

4. Organisation *

I am agnostic and therefore use a ICB email, however are hosted by RJAH who are the strategic lead for MSK Transformation

5. Email Address *

6. Professional organisation or society membership/affiliation

HCPC registered, MCSP

7. Nominated/ratified by (if applicable)

No answer provided.

8. Registration number (e.g. GMC, NMC, HCPC) *

PH45047

Consent to publish response and contact information

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10. Please state your reasons for not giving consent below

No answer provided.

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- Do you know how widely these technologies are used within the NHS? Are these technologies used by clinicians in specialities other than your own?

I have lead the design and implementation of a system wide, clinically and fully customisable digital support app for the entire end to end MSK pathway including the pathways (down to specific operations) orthopaedics and rheumatology. There is 1 App for download (MyRecovery) but different editions depending on entry point and the part of the pathway that the patient is active in. There are Pre-op assessments, collection of PROM and PREM, signposting to population health support and contains a large prescriptible exercise library and exercise feedback & tracking. The clinician have dashboards. It is based on body part pathways (can be on multi pathways) until the Elective Care Edition which is arranged by sub-speciality, diagnosis and specific operation type. The Community edition can be focussed to diagnosis for Therapy and Interface.
I also have experience of clinically leading on other large scale digital innovation and implementation.

14. Please indicate your research experience relating to these technologies (please choose one or more if relevant): (Please tick all that apply)

☐ I have done bibliographic research on this procedure or technologies

☐ I have done research on this procedure or technologies in laboratory settings (e.g. device-related research).

☐ I have done clinical research on this procedure or a technologies involving patients or healthy volunteers.

☐ I have published this research.

☐ I have had no involvement in research on this procedure or technologies.

☑ See above

Current management

15. Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would these technologies be used in (primary care, general hospitals, specialist centres for example).

NHSE DTAC must be met along with National and NHS IG requirements. Inequality of access created by using such digital platforms/devices must be addressed. Our end to end app stretches across the pathway GP/FCP, Community care - Therapy and Interface and 2nd Care and back into Community care for rehab. Clinical and clinical safety sign off went through system clinical governance. Subspecialty clinical stakeholders (multi profession/organisation) directed the relevant clinical content.

16. Do these technologies have the potential to replace current standard care or would they be used as an addition to existing standard care? Where would the technologies fit in the care pathway?

They can be seen primarily as adjuncts to standard care improving efficiency and patient compliance to the agreed treatment, waiting well, feedback and communication channels, data collection tools. They can support a population health approach along side the reach out for MSK care. Some patients find the content /process a useful substitute for in person care and improve and self discharge via the app.

17. What are the main aims of these technologies? How innovative are they? Can you name any technologies which are available in the UK and have this function/mode of action?

As far as I know STW MyRecovery is the first full UK implementation of end to end MSK pathway support that is specific to a locale and the relevant non virtual Services.
My Recovery HopCo.com

18. Are there any competing or alternative technologies available to the NHS which have a similar function/mode of action to this?If so, how do these differ from the technologies indicated here?

The nearest is Get U better but this is not clinically configurable and not personised and only looks at a specific part of the MSK pathway

19. Approximately how many people each year would be eligible for an intervention with these technologies? (give either as an estimated number, or a proportion of the target population)

We make an invite offer to all MSK patients (not knee hip specific) i.e.: > 30000 people per annum

Potential patient benefits and impact on the health system

20. What do you consider to be the potential benefits to patients from using these technologies?

Improves compliance to agreed exercise/treatment prescription. No lost stick diagrams handouts, variability of exercise/protocol yet personally tailored from a acknowledged exercise and advice library. Can monitor exercise and wider exercise status (if consented eg steps). Gives record and feedback loops for the patient. Reassures by having self assessments, helps guard against poor communication if deteriorating. Support the wider health issues for optimum recovery and prevention

21. Are there any groups of patients who would particularly benefit from these technologies? Are there any groups in which these technologies would be less effective or would be less likely to benefit? Are there any potential equality issues that should be considered for this condition and technologies?

Our data shows poor uptake in the under 26 year group and the older than 75year group. The graph otherwise shows even uptake by age. The arthroplasty cohort largely overlap this distribution although arthroplasty takes place in the older than 75years cohort. Language can be a barrier however when used through a "big-tech" core services translation function this can be bypassed to a degree. We paid for some locally identified language translations. Some cohorts preferred the digital medium - eg some neuro-diverse people. We are still need more data on ethnic related inequalities (in progress)

22. What do you consider to be the potential benefits to the system from using these technologies? Could they lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

Benefits are as above and can reduce appointments and improve quality of care if used to compensate common failings of the standard approach.

23. What (if any) clinical facilities (or changes to existing facilities) are needed to implement these technologies safely?

As our data grows and marginalised groups become evident thought has been given to digital access eg soundproof pods with digital connection and assisted operation (AI, human etc)

24. Is any specific training needed in order to use these technologies with respect to efficacy or safety?

Yes specific for adapting to the digital literacy and reminding clinicians that the essential basics of care still apply

Safety and efficacy of the procedure/technologies

25. What are the potential harms of the technologies? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:

    - Adverse events reported in the literature (if possible, please cite literature)
    - Anecdotal adverse events (known from experience)
    - Theoretical adverse events

One potential harm comes from family / carers responding/interacting in the app on behalf of the patient and whilst this overwhelmingly benign in intention/legal right without the direct contact one cannot witness the obvious cases of misrepresentation of the patient. In the developmental stages we have had a number of patients confused as to the pathway or planned operation date. A helpline has been important. Further development has mitigated however changing one the EPR that is integrated has caused suspension of that part of the digital service for fear of data errors.

26. Please list the key efficacy and safety outcomes for these technologies. Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

The App software company monitor along with the clinical user groups/organisations. We meet monthly (or more often) to share and act on these informations.

27. Please list any uncertainties or concerns about the efficacy and safety of these technologies?

For the Primary Care and Community Care editions ensuring ourselves of clinical safety was a cause for anxiety, however we confident after working through the logic and no related adverse outcome or report has been encountered.

28. Are you aware of any additional issues which would prevent (or have prevented) these technologies being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

Changing the culture and enabling clinical staff to use the dashboard is the primary challenge.

29. Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic. Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

No answer provided.

30. Is there any research that you feel would be needed to address uncertainties in the evidence base?

No answer provided.

Further Comments

31. Please add any further comments on your particular experiences or knowledge of the technologies.

No answer provided.

32. Date of questionnaire completion *

10/9/2025

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a confidentiality and undertaking form, a declaration of interests form, and a process declaration form as part of the application process.
Your contributions will be reviewed by the NICE team.

View results

Respondent		
1	Anonymous	21:26 Time to complete

This questionnaire is only to be completed and submitted by Health and care practitioners

This questionnaire should be completed by those whose role is, or is directly related to, one of the specialisms below. For each assessment, we engage with professionals with expertise relevant to the topic under evaluation. By completing this questionnaire, you acknowledge and consent to being considered for the role of professional expert on this assessment.

Please indicate which option best describes your area of expertise. If there is no option which you feel relates to your role, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment.

For expressions of interest and/or to share your lived experience please email pip@nice.org.uk

1. Which option below best relates to your own role? You will be asked to supply your job title and organisation in the next section.

If your role is not listed but you feel it ought to be included, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment. *

○ Consultant orthopaedic surgeon

○ Consultant rheumatologist

○ GP with interest in joint pain or osteoarthritis

● Specialist exercise therapist or physiotherapist with a special interest in knee and hip replacement

○ Nurse with a specialist interest in knee and hip replacement

○ Occupational therapist with a special interest in knee and hip replacement

○ Clinical Psychologist or Behaviour Change Specialist with a special interest in adherence and engagement with digital tools and/or psychological readiness for surgery and recovery

○ Other

Your information

2. Name: *

Toby Smith

3. Job title *

Physiotherapist & Professor

4. Organisation *

Spire Norwich & University of Warwick

5. Email Address *

6. Professional organisation or society membership/affiliation

HCPC & CSP

7. Nominated/ratified by (if applicable)

No answer provided.

8. Registration number (e.g. GMC, NMC, HCPC) *

PH63174

Consent to publish response and contact information

How NICE will use this information: The information that you provide on this form may be used to develop guidance on this topic.

Your advice and views represent your individual opinion and not that of your employer, professional society or a consensus view. Where relevant your name, job title, organisation and your responses, along with your declared interests may be published online on the NICE website as part of public consultation on the draft guidance, except in circumstances but not limited to, where comments are considered voluminous, or publication would be unlawful or inappropriate.

Please note: if consent is not given, you will not be eligible for the role of professional expert on this assessment.

For more information about how we process your data please see our privacy notice here: https://www.nice.org.uk/privacy-notice

9. I give my consent for the information in this questionnaire to be used and may be published on the NICE website as outlined above. If consent is NOT given, please state reasons below: *

● Yes

○ No (if consent is not given, you will not be eligible for the role of professional expert on this assessment)

10. Please state your reasons for not giving consent below

No answer provided.

11. Please select what NICE may contact you about: *

● NICE can use my details to contact me for advice on this and future assessments.

○ NICE can use my details to contact me for advice on this topic only, but not for others.

12. Please select what the External Assessment Group (EAG) for this assessment may contact you about: (The EAG is an independent academic group who assess clinical and economic evidence and produce a report which is presented to the committee) *

● The EAG on this assessment can contact me for further information and advice on this assessment

○ The EAG on this assessment cannot contact me for further information and advice

Please answer the following questions as fully as possible to provide further information about the technologies and/or your experience

13. Please describe your level of experience with the technologies, for example:

- Are you familiar with the technologies?
- Have you used any of them, or are you currently using any of them? If so, please indicate your experience with this.
- Do you know how widely these technologies are used within the NHS? Are these technologies used by clinicians in specialities other than your own?

Digital technologies such as digital resources and virtual appointments are being used in the NHS and by our services including myself. There is limited evidence available currently on implementation more widely in the NHS.

14. Please indicate your research experience relating to these technologies (please choose one or more if relevant): (Please tick all that apply)

☐ I have done bibliographic research on this procedure or technologies

☐ I have done research on this procedure or technologies in laboratory settings (e.g. device-related research).

☑ I have done clinical research on this procedure or a technologies involving patients or healthy volunteers.

☑ I have published this research.

☐ I have had no involvement in research on this procedure or technologies.

☐ Other

Current management

15. Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would these technologies be used in (primary care, general hospitals, specialist centres for example).

Variable. The majority of care is none tech but there is enthusiasm for exploring different models in NHS providers (not NHS and non-NHS services). These would largely be used in general hospitals and specialist centres but maybe used in primary care if rehabilitation post-discharged is better decentralised (as currently is in some settings).

16. Do these technologies have the potential to replace current standard care or would they be used as an addition to existing standard care? Where would the technologies fit in the care pathway?

Potential to replace current care for many people but there probably needs to be non-technological approaches for some patients who are at risk of poor outcome (thereby reflecting the current NICE guidelines and hip, knee and shoulder replacement).

17. What are the main aims of these technologies? How innovative are they? Can you name any technologies which are available in the UK and have this function/mode of action?

The main aimes are in communication provisions i.e. virtual appointments. There are some experiences of series providing information on preoperative care but these are more interactive. Less technology available on chatbots or more responsive technologies.

18. Are there any competing or alternative technologies available to the NHS which have a similar function/mode of action to this?If so, how do these differ from the technologies indicated here?

Unsure. There is currently limited information on what is provided nationally.

19. Approximately how many people each year would be eligible for an intervention with these technologies? (give either as an estimated number, or a proportion of the target population)

100,000 based on primary hip and knee replacement numbers and potentially eligible people

Potential patient benefits and impact on the health system

20. What do you consider to be the potential benefits to patients from using these technologies?

Consistent messaging, reduced reliance on health services and more flexibility on time to connect.

21. Are there any groups of patients who would particularly benefit from these technologies? Are there any groups in which these technologies would be less effective or would be less likely to benefit? Are there any potential equality issues that should be considered for this condition and technologies?

Beneficial for those in work and those who live in more remote places. Less effective for those who have low digital literacy or access to technology for whatever reasons.

22. What do you consider to be the potential benefits to the system from using these technologies? Could they lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

Reduced appointments and less contact from patients in phoning for advice and guidance

23. What (if any) clinical facilities (or changes to existing facilities) are needed to implement these technologies safely?

Depends on what is recommended

24. Is any specific training needed in order to use these technologies with respect to efficacy or safety?

See response to question 23

Safety and efficacy of the procedure/technologies

25. What are the potential harms of the technologies? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:

- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

Digital exclusion
Missing patients who needed face to face support

26. Please list the key efficacy and safety outcomes for these technologies. Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

Knee stiffness
Dislocation
Not returning to work
Fear avoidance
Wound healing challenges
Less or delay to independence

27. Please list any uncertainties or concerns about the efficacy and safety of these technologies?

What is used,when and for whom

28. Are you aware of any additional issues which would prevent (or have prevented) these technologies being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

Nothing additional

29. Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic. Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

Anna Andersen's PhD - https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-021-04160-5 for example

The NIHR OPAL trial may also have some relevance on return to work advice.

30. Is there any research that you feel would be needed to address uncertainties in the evidence base?

Implementation of digital technologies in rehabilitation

Research on digital technologies for underrepresented populations

Further Comments

31. Please add any further comments on your particular experiences or knowledge of the technologies.

Nothing further

32. Date of questionnaire completion *

10/1/2025

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a confidentiality and undertaking form, a declaration of interests form, and a process declaration form as part of the application process.
Your contributions will be reviewed by the NICE team.

HealthTech Programme

HTE10069 Digital platforms to support preparation before and rehabilitation after primary elective hip or knee replacement surgery: early-use assessment

Patient organisation submission

Information about your organisation	
Organisation name	Arthritis UK
Contact person's name	[redacted]
Role or job title	[redacted]
Email	[redacted]
Telephone	[redacted]
Brief description of the organisation, such as: - **Who funds it?**	

- **How many members does it have?**
- **What region your organisation represents**

We are a charitable organisation with over 250K contactable people across all 4 nations. How we are funded is visible on the Charity Commission website: VERSUS ARTHRITIS - 207711

Declarations

Do you have any conflicts of interest? Please let us know if you have a question on the NICE policy on declaring and managing interests.

No conflicts of interest.

How did you gather information about the experiences of patients and carers to include in your submission?

We used anecdotal discussions from our online community, Arthritis Connect. The platform is access by over 5,00 adult over the age of 18. Conditions vary but we have a distinct discussion area for before and after surgery where we categorise discussions regarding the hip or knee.

Are you willing for this submission to be shared on our website?	Yes ☐ ~~No~~ ☐
Does the organisation have any direct or indirect links with, or funding from, the tobacco industry?	~~Yes~~ ☐ No ☐

Impact of the symptoms, condition or disease on patients and / or family and carers

1. What is it like to live with the condition? What do carers experience when caring for someone with the condition?

People who are awaiting surgery are uncertain of what to expect, requiring advice from others on procedures, pre and post care, and the understanding how the impact of other co-morbidities are managed by others. Key themes include a willingness to use exercise or diet to avoid surgery. People require the confidence to undergo surgery and rely on peer support to gain this. Advice given on recovery extends beyond rehabilitation and into tips for ensuring meals are prepped, or simple aids and adaptations that support easier personal care or general living.

Arthritis Connect has people who are in their first week post-surgery and beyond. Those who have recently undergone surgery are uncertain of feelings and whether localised pain is normal as well as when to start post-surgery exercise and what to expect. There is a strong emphasis on ‘is this normal?‘ and gaining confidence in raising questions with their healthcare professional or asking if others have had similar advice on the issue with their consultant. When discussing exercises, advice is sought in reducing pain (or anticipated pain) and gaining tips from those who are further into their post-surgery journey on positioning, use of aids / mats / furniture to support.

People who are further into their post-surgery journey use the platform to maintain motivation, generally through sharing achievements (around mobility, exercises or fitness goals) and gaining inspiration from others where exercising isn‘t working or habits are not forming. Some people are still nervous or uncertain of how their knee/hip replacement should feel and this can impact on their ability to undertake exercise or increase mobility, similar to those on the early part of the post-surgery journey there are ‘is this normal?‘ questions and these generally centre around clicking feelings and reduced but persistent localised pain. Those who have self-efficacy are able to be mentors for others and often share their journey.

Experiences and availability of current health technologies

2. How do the existing health technologies play a role in managing the condition, and what are their advantages and disadvantages? What new technologies do you know of that you could tell NICE about?

Anecdotally, we have heard positive feedback about Sword Health, Phio and Good Boost but this has not been gained in any formally requested context. We are advocates for symptom tracking for self-managing conditions and our own Arthritis Tracker App enables people to record daily pains via an interactive body map and quality of life measures. We will be developing our functionality onto Ampersand Health’s My Arthritis App in Q1 2026. This will additionally enable people to track medication, communicate with health professionals, manage their appointments and access courses and Arthritis UK’s support, services and health information. Where licensed, the App works as a remote monitoring tool for health professionals. We have found that people with arthritis require data to be able to self-manage and understand what normal feels like, particularly where new localised pain occurs and for discussing and evidencing how they have been feeling with their consultant and the impact this has had on daily living or their ability to exercise.

About the health technology being assessed

3. What are the potential benefits of the health technology/technologies being assessed compared with what currently exists?

There is huge benefits in supporting people to exercise well and with confidence. Two way communication is key and the ability to prompt clinician intervention has huge advantages. Our community insight suggests addressing barriers around confidence in exercising would be welcomed by those in the early stages post-surgery.

4. What are the potential disadvantages of the health technology/technologies being assessed compared with what is currently available?

I think the disadvantage comes in when they are introduced and the potential for a person not to have had experience of pre-surgery exercise. This could likely cause uncertainty around what it should feel like and whether pain or discomfort is normal. It is also worth being mindful of language, levels of digital literacy and levels of health literacy. We produce PIF accredited health information that is tested by a lay audience to ensure it is understandable. Additionally, our digital interventions are co-designed with people with lived experience and this must be evident as a living process in all technologies, not just a one-off for getting through DTAC. Partnerships with relevant patient organisations would support this and it is a grey area for some of the technologies listed.

Equality issues

5. Are there any groups of people who might benefit more or less from the technology than others?

Those that are digitally literate and are self-motivated to exercise alone (this isn't a given and many require others to motivate them).

6. Are there any groups of people that might need further consideration in using the technologies (for example, because they have higher levels of ill health, poorer outcomes, problems accessing or using treatments or procedures)?

All you mentioned in the question but also those who face digital exclusion will struggle if access to data, devices and digital capacity building are omitted in the journey.

7. Are there any potential equality or health inequality issues that should be taken into account when considering this condition and the technology?

As mentioned earlier, the level in which people with lived experience are truely at the heart of these technologies ultimately determines how the address inequalities.

Additional information

8. Please include any additional information you believe would be helpful in assessing the value of the technologies.

Key messages

In up to 5 bullet points, please summarise the key messages of your submission.

- People at the heart for the entirety
- Access to peer support is key for addressing issues beyond exercise.
- Solutions must meet different stages of pre and post surgery

Early-use assessment

HTE10069 Digital platforms to support rehabilitation before and after primary elective hip or knee replacement surgery

Assessment report overview

This overview summarises key information from the assessment and sets out points for discussion in the committee meeting. It should be read together with the final scope and the external assessment report (EAR). A list of abbreviations used in this overview is in appendix A.

1. The technologies

The technologies are designed to be used alongside route NHS rehabilitation care. They provide structured support before and after surgery through a single digital pathway offering personalised exercise programmes, symptom check-ins, reminders and educational materials that can be delivered consistently regardless of geography or local appointment availability. Most technologies are intended to be accessed following clinical referral, but some have features that allow self-referral.

Sixteen technologies were included in this assessment. Of these, 15 companies provided information to NICE. Information on Physitrack is based on publicly available information only. Technologies were included if they:

- are intended to support rehabilitation before and after primary elective hip or knee replacement
- include structured exercise programmes and education both before and after surgery
- provide tools for people to record symptoms and progress, with escalation processes if symptoms worsen or recovery is not progressing as expected

- include prompts, reminders or other features designed to support engagement and encourage people to continue with rehabilitation activities
- have a CE or UKCA mark where required. Products may also be considered if they are actively working towards required CE or UKCA mark
- are currently available (or are planned to be made available) for procurement in the NHS

Many digital platforms have additional features, a summary of which is shown in Table 1. Full descriptions of the technologies are available in Table 1 of the EAR.

Table 1 - Summary of digital platform features and NHS use

Digital platform	Company physiotherapist provision	Healthcare professional communication	Additional features	Programme adjustment	Red flag alert system	Intended duration of use	NHS use
BPMpathway	No	2-way	Motion sensor	Clinician	Automatic	2 weeks preoperative to 3 months postoperative	In pilot programmes
ForPatientApp	No	1-way	Optional motion sensor	Clinician	Automatic	6 weeks preoperative to 12 months postoperative	In a clinical trial
getUBetter	No	None	No	User	User-initiated	Waiting list to 12 months postoperative	Several trusts
Good Boost	Yes	2-way	No	Automatic and clinician	User-initiated	Not specified	Several trusts
GoWellHealth	Yes	1 or 2-way	No	Clinician and user	User-initiated	Waiting list to 6 months postoperative	None (previously used in NHS trial)
Huma	No	1 or 2-way	Motion tracking	None	Automatic	A few weeks prior to surgery to as determined by clinical protocols postoperatively	Previous, but not current
Joint Academy	Optional	2-way	No	Automatic and clinician	Clinician-initiated	12 weeks preoperative to 12 weeks postoperative	None
moveUP	Optional	2-way	No	Automatic	User-initiated	8 weeks preoperative to 12 weeks postoperative	None
mymobility	No	2-way	Motion tracking	Automatic	Clinician-initiated	1-year preoperative to 6 months postoperative	Several trusts

myrecovery	No	2-way	No	Clinician	Clinician-initiated	Weeks to months preoperative to 8 to 16 weeks postoperative	Several trusts
Phio	Optional	2-way	No	Clinician and user	User-initiated	12 weeks total	Several trusts
Physitrack	Unknown	2-way	No	Clinician	Unknown	Unknown	Several trusts
PreActiv	Yes	2-way	No	Automatic and clinician	Automatic	12 weeks preoperative to 6 weeks postoperative	Several trusts
QuestPrehab	Optional	2-way	No	Automatic and clinician	Automatic	2 to 6 weeks preoperative to as long as required postoperative	Several trusts
Slider	Yes	2-way	Exercise device	Clinician	Automatic	2 to 8 weeks preoperative to 6 to12 or more weeks postoperative	None (previously used in NHS pilot studies)
Sword Thrive	Yes	2-way	Motion tracking tablet	Clinician	Clinician-initiated	8 weeks preoperative to 8 weeks postoperative	Several trusts

User-initiated refers to red flag systems that prompt the user to contact a healthcare professional. Clinician-initiated refers to red flag systems that require a healthcare professional to identify red flags, as opposed to automatic systems which flag concerns to the healthcare professional.

2. The condition

Hip and knee joint replacements are among the most common orthopaedic operations performed in the UK and demand for total replacements is predicted to rise by nearly 40% between 2018 and 2060 as the population ages and as the prevalence of osteoarthritis rises (Matharu et al. 2022). In 2024, more than 250,000 primary knee and hip replacements were recorded in the National Joint Registry. Of these joint replacements, osteoarthritis is the most common indication, accounting for 92% of primary hip replacements and 98% of primary knee replacements. The demand for knee and hip replacements places a substantial burden on NHS services, including surgical capacity, inpatient beds, physiotherapy and community support.

3. Current practice

In the NHS, current practice is informed by NICE's guideline on primary joint replacements (2020) and Getting It Right First Time's Orthopaedic Elective Surgery guide (2023).

Rehabilitation before surgery

The NICE guideline recommends that people should be given advice on:

- Exercises to do before and after surgery that will aid recovery
- Lifestyle, including weight management, diet and smoking cessation
- Maximising functional independence and quality of life before and after surgery.

Rehabilitation after surgery

Before being discharged from hospital, the NICE guideline recommends that a physiotherapist or occupational therapist should give advice on self-directed rehabilitation. It also recommends that people clearly understand the importance of rehabilitation and that they have a point of contact for advice and support. Supervised outpatient rehabilitation is only recommended for people who:

- Have difficulties managing activities of daily living

- Have ongoing functional impairment leading to specific rehabilitation needs
- Find that self-directed rehabilitation is not meeting their rehabilitation goals

Type of support offered

The delivery of support for rehabilitation before and after surgery varies, but can include:

- Printed exercise programmes or digital leaflets linking to instructional videos
- Verbal advice and education from physiotherapists, occupational therapists and surgical teams
- Physiotherapy input, delivered in person or by telephone, where available and based on clinical need
- Information resources, such as leaflets and web-based education materials.

Clinical experts confirmed that people would receive a physiotherapy session prior to surgery. They also stated that a proportion of people given self-directed rehabilitation would additionally need physiotherapy support following a knee or hip replacement when self-directed rehabilitation is not working well enough for them. More physiotherapy support is needed following a total knee replacement than a total hip replacement as knee replacements have a more challenging recovery process. Clinical experts stated that partial knee replacement and hip resurfacing may need less physiotherapy support. This is because this population is generally younger with less severe osteoarthritis meaning recovery is faster. The EAG have included these assumptions as part of the economic model, discussed in section 6 of this overview.

4. Unmet need

Before surgery, people have variable access to rehabilitation and programmes. They often begin only 2 to 6 weeks before surgery which is often insufficient to optimise preparation for surgery.

Following surgery, many people are discharged with written exercise instructions or links to exercise videos but do not receive routine in person follow-up from physiotherapy services unless self-directed rehabilitation is not meeting their rehabilitation goals. These digital or paper-based instructions do not provide individualised support or track progress and rely on patient initiated follow up if they need more support. A lack of timely support may contribute to reduced confidence, difficulty maintaining motivation, and delays in returning to daily activities.

Digital platforms can provide personalised rehabilitation support and education that may help preparation for surgery and recovery following surgery. Platforms can track progress, give feedback and provide alerts to users if they need to seek additional clinical support. They can also be done remotely and when it is convenient for the user which can support people who may struggle to attend face-to-face services.

Further details, including descriptions of the interventions, comparator, care pathway and outcomes, are in the final scope.

5. Clinical effectiveness

The EAG did literature searches to identify relevant published clinical evidence. The search and selection methods are in section 4.1 of the EAR.

5.1 Overview of included studies

Table 3 of the EAR describes the 40 records from 29 studies that the EAG considered to be key in the evidence base.

The EAG prioritised numerical reporting for a number of outcomes: health-related quality of life, joint-specific function and pain, meaningful function and participation in daily life, user satisfaction and acceptability, and intervention adherence.

The results tables were primarily populated with comparative data from trials. Where comparative data was not available for a technology, non-comparative data was reported. However, all data, including single arm data, were reported in tables for user satisfaction and acceptability and intervention adherence. Where relevant data was missing from the assessment report, the evidence has been extrapolated into table 2 below.

Of the studies identified, there was:

- Randomised controlled trial (RCT) or quasi-RCT evidence for BPMpathway, GoWellHealth, mymobility, Physitrack and Sword Thrive. No RCT evidence was done in a UK setting.
- Nonrandomised, comparative studies done in the UK, or including UK sites, for GoWellHealth and myrecovery.
- Nonrandomised, comparative studies from non-UK settings for BPMpathway, Physitrack and Slider.
- Non comparative studies done in the UK, or including UK sites for BPMpathway, ForPatientApp, Good Boost, Joint Academy, Phio, PreActiv and Slider.
- Non comparative, non-UK evidence for moveUP and mymobility.

The evidence for myrecovery and Phio did not include outcomes for effectiveness. The EAG summarised effectiveness evidence for out-of-scope populations for these platforms in section 5.5.2 and Table 13 of the EAR. The EAG identified no relevant evidence for 4 digital platforms: getUBetter, Huma and QuestPrehab. getUBetter and QuestPrehab had evidence in out-of-scope populations, summarised in section 5.5.1 and Table 12 of the EAR. No evidence was identified for Huma.

5.2 Evidence quality

The evidence review included 40 records. Of these only 11 (27.5%), reporting on data from 9 studies, were done in the UK, with 1 additional international study including UK centres. No RCT evidence was done in a UK setting. The EAG noted that generalising the findings of non-UK research to current practice in the NHS requires caution. Non-UK health systems may have different rehabilitation pathways, resource structures, and patient expectations compared to the UK. It noted that these different rehabilitation pathways could have involved different frequencies and durations of face-to-face physiotherapy. The range of face-to-face physiotherapist interaction ranged from zero, with the only provision being information and support, to 24 1-hour sessions following surgery. In many studies the amount of physiotherapist interaction was not clearly reported.

Most included records (n=19, 48%) described the effect of rehabilitation only. The remaining records predominantly described the effect of prehabilitation and rehabilitation (n=17, 42%); only four records (10%) described the effect of prehabilitation only. As all of the digital platforms included in this assessment are intended for rehabilitation both before and after surgery, the use of the platforms for only 1 aspect further adds to uncertainty regarding the generalisability of the findings to the NHS.

The majority of included records (n=21, 53%) described evidence for total knee replacement (TKR). Most of the remaining records provided evidence for mixed populations undergoing total hip replacement (THR) or TKR (n=15, 37%). Four records (10%) described evidence for THR. Some studies included patients undergoing partial knee replacement (PKR). There is uncertainty in the generalisability of evidence in people having TKR to those having THR. There is limited evidence on PKR and no evidence on hip resurfacing.

5.3 Primary outcomes

Table 2 provides an overview of the study characteristics and primary outcomes. The primary outcomes considered in this assessment were:

- Health related quality of life
- Pain and joint-specific function
- Meaningful function and participation in daily life
- Confidence in recovery and self-management
- Healthcare use
- Escalation to face-to-face clinical review
- Mobility or functional performance tests

The EAG concluded that the evidence generally reported no significant difference between digital platforms and standard care. Some studies reported a benefit of digital platforms on health-related quality of life, joint-specific function, pain and meaningful function, participation in daily living and mobility and functional performance. No studies reported escalation to face-to-face clinical review. The EAG's summary and interpretation of the evidence for primary outcomes is available in section 5.6.1 of the EAR. Some information provided in table 2 is additional to that reported in section 5.6.1 of the EAR.

Table 2 - Study characteristics and primary outcome results

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
BPMpathway					
Cooper, 2022 and Sadozai, 2021 UK	Single arm observational study and linked conference poster TKR and PKR Intervention n=21	Both	NA	Mean 35.1 days	Primary outcome data reported, but not prioritised for extraction due to availability of comparative evidence for technology
Hong, 2024a China	Controlled study TKR Intervention n=21 Comparator n=21	Postoperative	Standardised health education manual	6 months	**HR-QoL:** No significant difference **Joint specific function:** Significant benefit of intervention
Hong, 2024b China	Quasi-RCT TKR Intervention n=54 Comparator n=56	Postoperative	Routine home-based rehabilitation (no details of the rehabilitation provided)	6 months	**HR-QoL:** Significant benefit of intervention **Joint specific function:** Significant benefit of intervention **Mobility and functional performance:** Significant benefit of intervention

Author, year **Country**	**Study design** **Indication** **Number of participants**	**Preoperative or postoperative rehabilitation**	**Comparator rehabilitation content**	**Follow-up**	**Statistical significance of primary outcomes**
Malhotra, unpublished India	Unpublished - prospective comparative cohort TKR Intervention n=28	Postoperative	Regular physiotherapy sessions (number of sessions not presented)	12 months	**HR-QoL:** No significant difference **Joint specific function:** Significant benefit on 1 of 3 outcomes measured **Pain:** No significant difference **Mobility and functional performance:** No significant difference
ForPatientApp					
Neumann-Langen, 2023 France, Germany and UK	Single-arm observational study TKR Intervention n=98	Postoperative	NA	3 months	**Pain:** Significant improvement from baseline **Meaningful function and participation in daily living:** Significant improvement from baseline **Mobility and functional performance:** Significance not reported
Good Boost					
Wilkins, 2025 UK	Single-arm retrospective cohort – subgroup data for in-scope population provided by Good Boost TKR:	Postoperative	NA	12 weeks	**TKR:** **HR-QoL:** Significance not reported, [redacted] **Joint specific function:** Significance not reported, [redacted] **Pain:** Significance not reported, [redacted] **THR:**

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
	Intervention n=[redacted] THR: Intervention n=[redacted]				**HR-QoL:** Significance not reported, [redacted] **Joint specific function:** Significance not reported, [redacted] **Pain:** Significance not reported, [redacted]
GoWellHealth					
Grey, 2022 and Clark, 2021 UK	Retrospective comparative cohort and linked conference abstract TKR: Intervention n=287 Comparator n=873 THR: Intervention n=308 Comparator n=938	Both	Written materials and face-to-face information by a specialist arthroplasty nurse or physiotherapist prior to surgery. Unclear what physiotherapy contact people received after hospital discharge	6 months	**TKR:** **HR-QoL:** Significant benefit of intervention **Joint specific function:** Significant benefit of intervention **THR:** **HR-QoL:** Significant benefit of intervention **Joint specific function:** Significant benefit of intervention
Saunders, 2020 and	RCT and linked conference abstract	Both	Standard practice package of care. Written	6 months	**HR-QoL:** No significant difference **Pain:** No significant difference

Author, year **Country**	**Study design** **Indication** **Number of participants**	**Preoperative or postoperative rehabilitation**	**Comparator rehabilitation content**	**Follow-up**	**Statistical significance of primary outcomes**
Ashford, 2019 Australia	THR Intervention n=50 Comparator n=49		materials and face-to-face information by a nurse, occupational therapist, pharmacist and physiotherapist prior to surgery. Post-discharge phone call with nurse.		**Meaningful function and participation in daily living:** No significant difference **Confidence in recovery and self-management:** No significant difference
Tsang, 2019 UK	Prospective single arm study Mix of TKR and THR Intervention n=771	Both	NA	NR	**Healthcare use:** Significance not reported, readmission rates lower in intervention group (compared to those who did not download the app)
Joint Academy					
Dahlberg, 2023 UK	Conference abstract -single arm observational study Mix of TKR, PKR and THR	Preoperative	NA	3 months	**Pain:** Significant improvement from baseline **Joint specific function:** Significance not reported, but improved from baseline

Author, year **Country**	**Study design** **Indication** **Number of participants**	**Preoperative or postoperative rehabilitation**	**Comparator rehabilitation content**	**Follow-up**	**Statistical significance of primary outcomes**
	Intervention n=110				
moveUP					
Lebleu, 2023 Belgium and France	Single arm cohort TKR Intervention n=87	Postoperative	NA	6 months	**HR-QoL**: Significance not reported, but improved from baseline **Joint specific function**: Significance not reported, but improved from baseline **Pain**: Significance not reported, but improved from baseline **Meaningful function and participation in daily living:** Significance not reported, but improved from baseline **Healthcare use:** Significance not reported, 2 people admitted for joint manipulation **Mobility and functional performance:** Significance not reported
Lebleu, 2021 and Lebleu, 2021 Belgium	Single arm cohort and linked online article Mix of TKR, PKR and THR Intervention n=132	Postoperative	NA	3 months	**HR-QoL**: Significant improvement from baseline **Joint specific function**: Significant improvement from baseline **Pain**: Significant improvement from baseline **Meaningful function and participation in daily living:** Significant improvement from baseline
Van Overschelde, 2023 Belgium	Retrospective single arm cohort	Postoperative	NA	3 months	**Healthcare use:** 10.3% had complications, readmissions or unplanned consultations **TKR and THR (reported separately):**

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
	Mix of TKR (n=82) and THR (n=100) Intervention total n=182				**HR-QoL**: Significance not reported, but improved from baseline **Pain**: Significance not reported, but worsened from baseline **Meaningful function and participation in daily living:** Significance not reported, but improved from baseline
Lebleu, 2024 Belgium, France and the Netherlands	Retrospective single arm observational study Mix of TKR, PKR and THR Intervention n=1144	Postoperative	NA	3 months	No primary outcomes reported
mymobility					
Crawford, 2021a USA, Italy, the Netherlands, Australia	RCT TKR and PKR Intervention n=208 Comparator n=244	Both	Each institution's standard post-operative rehabilitation protocol. Typically included formal in-person physiotherapy following	6 months	**Healthcare use:** No significant difference for non-standard care visits, urgent care and readmission but significant decrease in emergency department visits

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
			surgery (but no standardisation)		
Alexander, 2023 USA	RCT – follow-up of Crawford, 2021a TKR and PKR Intervention n=160 Comparator n=241	Both	Each institution's standard post-operative rehabilitation protocol. This typically included formal in-person physiotherapy three times per week for four weeks following surgery	12 months	**HR-QoL:** No significant difference **Joint specific function:** No significant difference
Tripuraneni, 2021 USA	RCT – sub study of Crawford, 2021a, comparing higher vs lower intervention compliance in people undergoing joint replacement due to	Both	Each institution's standard post-operative rehabilitation protocol. This typically included formal in-person physiotherapy three times per week for four	3 months	**Mobility and functional performance:** No significant difference

Author, year **Country**	**Study design** **Indication** **Number of participants**	**Preoperative or postoperative rehabilitation**	**Comparator rehabilitation content**	**Follow-up**	**Statistical significance of primary outcomes**
	degenerative joint disease TKR Intervention n=153 Comparator n=184		weeks following surgery		
DeMik, 2024 USA	RCT – sub study of Crawford, 2021a. Study investigating return to sexual activity TKR Intervention n=119 Comparator n=185	Both	Each institution's standard post-operative rehabilitation protocol. This typically included formal in-person physiotherapy three times per week for four weeks following surgery	90 days	Primary outcome data not extracted due to availability of data at longer follow-up in Tripuraneni, 2021 and Alexander, 2023
Parikh, 2024 Not reported	Conference abstract - single arm retrospective observational study	Postoperative	NA	1-year	No primary outcomes reported (reported on user satisfaction and healthcare professional interaction)

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
	TKR Intervention n=50				
Crawford, 2021b USA, Italy, the Netherlands, Australia	RCT THR Intervention n=167 Comparator n=198	Both	Each institution's standard post-operative rehabilitation protocol. This typically included formal in-person physiotherapy three times per week for four weeks following surgery	3 months	**HR-QoL:** No significant difference **Joint specific function:** Significant benefit of standard care **Healthcare use:** No significant difference **Mobility and functional performance:** No significant difference
Miller, 2024 USA	RCT – secondary analysis of Crawford, 2021a and Crawford 2021b Mix of TKR, PKR and THR Intervention n=384	Both	Each institution's standard post-operative rehabilitation protocol. Typically included formal in-person physiotherapy following	1-year	No primary outcomes reported (reported on compliance)

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
	Comparator n=451		surgery (but no standardization)		
Miner, 2024 USA	Single arm secondary analysis of Crawford, 2021a and Crawford, 2021b in people receiving surgery early or later during the COVID-19 pandemic Mix of TKR, PKR and THR Intervention n=1665	Both	NA	90 days	Primary outcome data reported, but not prioritised for extraction due to availability of comparative evidence
Booth, 2023 USA	Single arm retrospective cohort Mix of TKR, PKR and THR Intervention n=166	Both	NA	3 months	No primary outcomes reported, study reports on user acceptability

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
Rossi, 2024 Italy	Single-arm retrospective analysis TKR Intervention n=218	Both	NA	Average of 485 days post-intervention	No primary outcomes reported, study reports on user acceptability
myrecovery					
Starkey, 2025 UK	Conference abstract - retrospective comparative observational study Mix of TKR, PKR and THR Intervention n=1172	Both	Usual care. No additional details reported. But, no comparator group data reported – only those that registered with the digital platform (63%) were included.	NR	**Healthcare use:** Significance not reported, but higher rate of readmissions and emergency department attendance in comparator group
Phio					
Thacker, 2025 UK	Prospective single arm study Mix of TKR, PKR and THR Intervention n=53	Both	NA	12 weeks	No primary outcomes reported, study reports on user acceptability and intervention adherence

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
Physitrack					
Hardwick-Morris, 2022 Australia	Retrospective comparative observational study TKR Intervention n=124 Comparator n=62	Both	Pre-operative consultation with orthopaedic surgeon and face-to-face physiotherapy. After surgery, patients were given an exercise instruction sheet and potentially had face-to-face physiotherapy	12 months	**HR-QoL:** No significant difference **Joint specific function:** No significant difference **Pain:** No significant difference **Meaningful function and participation in daily living:** No significant difference
Duong, 2023a and Duong, 2023b Australia	RCT and linked conference abstract TKR Intervention n=51 Comparator n=51	Postoperative	Inpatient and outpatient rehabilitation. No details of how much physiotherapy people received.	12 months	**HR-QoL:** Significant benefit of intervention **Pain:** Significant benefit on 2 of 3 outcomes measured **Confidence in recovery and self-management:** No significant difference
PreActiv					

Author, year **Country**	**Study design** **Indication** **Number of participants**	**Preoperative or postoperative rehabilitation**	**Comparator rehabilitation content**	**Follow-up**	**Statistical significance of primary outcomes**
Snow, 2026 and Emery, 2026 UK	Single arm feasibility study Major elective surgery including TKR and THR Intervention [study completion] n=6 TKR and THR, n= 24 (mixed population)	Preoperative	NA	7 weeks	**HR-QoL**: Significance not reported, but improved from baseline (outcome reported as mixed population)
Slider					
Islam, 2023 UK	Single arm observational study TKR and PKR Intervention n=17	Preoperative	NA	2 weeks	No primary outcomes reported, study reports on user acceptability and adverse events
Sampath, 2024 Not reported	Conference abstract - single arm observational study TKR	Both	NA	NR	**Joint specific function:** Significance not reported, but improved from baseline (in non-infected knees, no difference in infected knees)

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
	Intervention n=18				
McDonald, 2026 Not reported	Conference proceedings - controlled study TKR Intervention n=9 Comparator n=9	Postoperative	Standard physiotherapy. No details presented.	6 weeks	**HR-QoL:** No significant difference **Joint specific function:** Significant benefit of intervention **Mobility and functional performance:** No significant difference
Sword Thrive					
Correia, 2019a and Correia, 2018 Portugal	Quasi-RCT and linked feasibility study TKR Intervention n=30 Comparator n=29	Postoperative	Home-based rehabilitation with physiotherapist sessions. Consisted of home-based supervised program provided by a physiotherapist, three times a week, for 1 hour.	6 months	**HR-QoL:** Significant benefit of intervention **Pain:** Significant benefit of intervention **Meaningful function and participation in daily living:** Significant benefit of intervention **Mobility and functional performance:** Significant benefit on 1 of 4 outcomes measured
Correia, 2019b Portugal	Quasi-RCT THR	Postoperative	Home-based rehabilitation with physiotherapist	6 months	**HR-QoL:** Significant benefit of intervention **Pain:** No significant difference

Author, year Country	Study design Indication Number of participants	Preoperative or postoperative rehabilitation	Comparator rehabilitation content	Follow-up	Statistical significance of primary outcomes
	Intervention n=30 Comparator n=29		sessions. Consisted of home-based supervised program provided by a physiotherapist, three times a week, for 1 hour.		**Meaningful function and participation in daily living:** No significant difference **Mobility and functional performance:** Significant benefit on 4 of 5 outcomes measured

Abbreviations: n, number; HR-QoL, health-related quality of life; RCT, randomised controlled trial; NR, not reported; NA, not applicable

5.4 Secondary outcomes

The secondary outcomes considered in this assessment were:

- Psychological outcomes
- User satisfaction and acceptability
- Return to usual activities
- Intervention adherence, completion of exercises or recommended activities
- Interaction with healthcare professionals
- Early identification of concerns
- Intervention-related adverse events

The EAG concluded that the evidence showed no consistent benefit of digital platforms on any secondary outcomes. Some statistically significant benefits of digital platforms were reported for psychological outcomes (stress and depression), user satisfaction and acceptability, return to usual activities (return to sexual activities and return to walking without assistive device) and intervention adherence. No statistically significant difference was reported for any digital platform for interaction with healthcare professionals, early identification of concerns or adverse events.

Full results are available in section 5.3 of the EAR.

6. Health economic evidence

The EAG did a review to identify suitable health economic models. It found 2 economic evaluations that reported an economic model. Both studies reported digital platforms to be cost-effective over standard care primarily due to a reduction in physiotherapy contact time. An overview of these models and their limitations are in section 6.1.2 of the EAR.

6.1 Health economic model

The EAG developed a decision tree with a 1-year time horizon, as depicted in Figure 1. The model starts when a person is assessed for total knee replacement (TKR) or total hip replacement (THR) and put on the waiting list.

The model then separates where a decision is made to allocate people to digital platforms or standard of care. Both branches then proceed to rehabilitation before surgery, surgery and rehabilitation after surgery. The model then splits into accelerated recovery or recovery. These represent the optimistic and pessimistic scenarios used, respectively, explained below in the under product specific analysis.

The EAG used a generic technology in the base case and sensitivity analyses followed by a product specific analysis for company costs and assumptions.

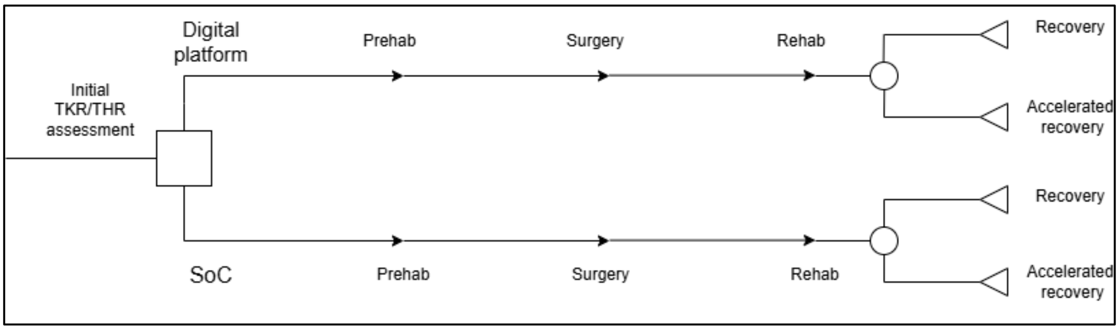

Figure 1 Diagram of EAG model structure. TKR, total knee replacement; THR, total hip replacement; SoC, standard of care

Further details of the economic modelling are in section 6.2 of the EAR.

Population

The population included in the model is people that are undergoing assessment and are eligible for elective TKR or THR.

Comparator

The comparator used in the model is based on current practice in the NHS, which is described in Section 3. The model assumed that a proportion of people receive face-to-face physiotherapist support, whilst others receive information to guide self-guided rehabilitation only.

Model inputs

Technology costs

- Per person technology costs were calculated using licencing and additional device costs (where used) based on 800 people per trust per year using the digital platform (based on average trust catchment size and number of TKR and THR procedures).

- Where a range of prices were provided (such as based on volume) and the cost could not be clearly adjusted to a per person cost, the highest cost was used.

- The EAG assumed that every person would require a tablet or mobile phone unless already included as part of the technology. This was calculated as £22.25 per person.

- Where there is the option for company physiotherapists, the EAG provided a cost with company provided physiotherapists and a cost with NHS physiotherapists. The lower of the 2 costs was then used in the optimistic product specific analysis and the higher in the pessimistic analysis.

A summary of the digital platform costs is shown in Table 3. The breakdown of the costs is available in Table 16 of the EAR.

Table 3 - Costs of the digital platforms

Technology	**Cost per person**
BPMpathway	£37.88
ForPatientApp	£62.25
getUBetter	£123.50
Good Boost	£51.41
GoWellHealth / Digital Joint School	£51.25
Huma	£403.85
Joint Academy	£172.25 (12-month programme with company physiotherapists) £57.85 (NHS physiotherapists)

moveUP	£53.50
Mymobility	£41.00
Myrecovery (core)	£59.75
Phio	£209.75
Physitrack	£27.45
PreActiv	£137.25
QuestPrehab	£172.25 (company physiotherapists) £97.25 (NHS physiotherapists)
Slider	£222.25
Sword Thrive	£275.00

Preoperative rehabilitation costs

People in the standard care arm are assumed to receive a 2-hour session with a physiotherapist 8 weeks before surgery, along with written educational materials. People in the digital platform arm were assumed to receive no face-to-face physiotherapist contact. Instead, 20% of physiotherapist time is assigned for providing support, based on expert opinion. For companies that provided physiotherapists, no NHS physiotherapist time is assumed to be required. No cost was assigned to written materials in the digital platform arm, as this was assumed to be delivered through the digital platform and included in the acquisition cost. This resulted in cost savings of £75.60 per person in the digital platforms arm for both THA and TKA.

Length of stay

Length of stay for standard care was assumed to be 2.71 days for both TKA and THA, based on Hospital Episode Statistics data. The EAG assumed a 0.5-day reduction in length of stay with digital platforms, resulting in a saving of £176.15 per person. This was a conservative estimate based on company claims and expert opinion. Due to the uncertainty in the accuracy of this estimate, the EAG included sensitivity analyses where the reduction in length of stay was varied between no reduction and a 1-day reduction.

Number and proportion of people receiving face-to-face physiotherapy sessions

Clinical experts stated that rehabilitation lasts an average of 8 weeks. People are given written materials to guide self-directed rehabilitation with the addition of face-to-face physiotherapy for those that need it.

Based on clinical expert opinion, the EAG assumed that 50% of people that had a TKR and 10% of people that had a THR receive face-to-face physiotherapy. Based on expert opinion, there was assumed to be no difference in these proportions between the standard care and digital platform arms. Due to uncertainty in the accuracy of these proportions, the EAG included sensitivity analyses that modelled higher and lower proportions receiving face-to-face physiotherapy.

For those that need physiotherapist support, it was assumed to be 6 1-hour sessions for people in the standard care arm. Digital platforms were assumed to reduce the number of sessions by 40%, resulting in 3.6 sessions per person. Of the 2.4 sessions saved by reductions in face-to-face physiotherapy time, 20% of the time would still be required for check ins for technologies which use NHS physiotherapists (and in the base case). For technologies with company physiotherapists, it was assumed the technology would cover the check in time as part of the technology cost (for the product specific analysis). Based on these assumptions, digital platforms were £39.36 less costly for TKR and £7.87 less costly for THR compared to standard care.

Other treatment and follow-up costs

Evidence from 2 RCTs reported no statistically significant difference in healthcare utilisation (within 90 days) for urgent care visits and hospital admissions. One of the RCTs found a significant reduction in emergency department visits for people having a knee replacement. Due to the limited evidence and simplicity of the early model, the EAG did not include any additional healthcare utilisation costs in the model.

A full breakdown of the costs included in the base case are available in the EAR in Table 24 for THR and Table 25 for TKR.

Health-related quality of life

In the base case and optimistic product specific analysis, the EAG used health-related quality of life data on TKR from a UK based study (Gray et al 2022). This study reported a significantly higher EuroQol- 5 Dimension (EQ-5D; 0.070) at 6 months follow-up with the GoWellHealth digital platform compared to NHS standard care. The EAG converted this into an incremental QALY gain of 0.035 with digital platforms over the 12-month time horizon based on expert opinion that there would be no difference in health-related quality of life between groups at 12-months. The EAG did sensitivity analysis and pessimistic product specific analysis where zero QALY gains were assumed because of the uncertainty in the health-related quality of life benefits of digital platforms in the clinical evidence review.

6.2 Model results

Base case

Due to a lack of technology specific evidence, the EAG did its base case analysis comparing a ‘generic’ digital platform to standard care. This approach excluded the acquisition cost of the digital platform. As a result, the incremental cost effectiveness ratio (ICER) is uninterpretable in the base case. Instead, the incremental net monetary benefit (INMB) presents the maximum acquisition cost for a digital platform to have an ICER below the £20,000 per QALY willingness to pay (WTP) threshold. The deterministic results showed an INMB of £959.63 for THR, and £991.11 for TKR at a WTP threshold of £20,000 per QALY. Considering the costs of the digital platforms outlined in Table 2, the base case indicated that all the technologies were cost effective for both THR and TKR.

The deterministic results are available in Table 22 for THR and Table 23 for TKR in section 6.3.1 of the EAR.

Scenario and sensitivity analyses

The EAG explored uncertainty in model inputs relating to 6 parameters, as outlined in Table 4.

Table 4 - Summary of scenario analyses

Analysis	Base case	Description
Scenario 1: Alternative number of physiotherapy sessions following surgery for people in the standard care group	6	3, 4, and 5 sessions in the standard care group for the proportion of those having face-to-face physiotherapy following surgery (50% having TKR and 10% having THR)
Scenario 2: reduction in proportion of face-to-face physiotherapy in digital platforms group	40%	Altering the number of face-to-face physiotherapy sessions for the proportion of people receiving physiotherapy in the digital platform group after surgery
Scenario 3: Reduced clinician time requirement when using the digital platform	20%	Impact of changing clinician time input in when using digital platforms
Scenario 4: Reduced length of hospital stay	0.5	Range of values 0 day, 0.2, 0.8, 1 day's decrease compared to standard care (2.71 days)
Scenario 5: alternative rehabilitation need	10% THR 50% TKR	Varies the proportion of people who need face-to-face physiotherapy following surgery
Scenario 6: Alternative QALY assumptions	0.035	Assuming no QALY gain using digital tech
Scenario 7: Alternative scenario for THR QALY gain	0.035	Using THR utility (0.057) from Gray 2022 (0.114 QALY gain at 6 months, extrapolated to 12 months for this model)

TKR, total knee replacement; THR, total hip replacement; QALY, quality-adjusted life year

The EAG concluded that scenarios 1, 2, 3 and 5 had modest effects on the INMB. The results were most sensitive to scenarios 4, 6 and 7, relating to reductions in length of stay and changes in QALY gain with digital platforms. The results of these 2 scenarios are summarised below.

Scenario 4: Length of stay

Where no reduction in length of stay was assumed, the INMB dropped to £783.47 for THR and £814.96 for TKR. In this scenario, all technologies remained cost effective based on the acquisition costs in Table 2. Notably, when length of stay was assumed to be reduced by 1 day with digital platforms, the INMB rose to £1,135.78 for THR and £1,167.27 for TKR. These results indicate that reduced inpatient costs are a key economic driver. The results of this analysis are available in Table 30 of the EAR.

Scenario 6 and 7: Quality adjusted life years

Where no QALY gain with digital platforms was assumed, the INMB dropped to £259.63 for THR and £291.11 for TKR. In this scenario, all digital platforms except for Huma and Sword Thrive remained cost-effective for both THR and TKR, based on the acquisition costs in Table 2. The results of this analysis are available in Table 32 of the EAR. Where a higher QALY gain was assumed for THR, the INMB increased to £1,400.53. In this scenario, all digital platforms were cost-effective. The results of this analysis are available in Table 33 of the EAR.

Full results of the scenario analysis are in section 6.3.2 of the EAR.

Product specific analysis

Methods

The EAG repeated the modelling for individual technologies, using alternative inputs where available for each technology. For each digital platform, an optimistic and pessimistic case was presented. The optimistic case (accelerated recovery) was based on the claimed benefits of the technology for each input, irrespective of the quality or quantity of the evidence to support the claims. If no technology specific claims were available, the base case values were used. The optimistic scenario also used the cheaper technology cost where there were costs with and without company physiotherapist. The pessimistic case assumed that no reduction in length of stay or QALY gains occurred and the more expensive technology cost was used. The details of the claimed cost savings and evidence supplied by companies to inform parameters used in the product specific analyses, including the EAGs view of their risk of bias and generalisability to the decision problem, are available in Table 15 of the EAR.

Results

Under optimistic assumptions, all digital platforms had a positive INMB for both THR and TKR. This means that when including acquisition costs, at a WTP threshold of £20,000 per QALY all technologies are cost effective for both THR and TKR. Under pessimistic assumptions, BPMpathway, ForPatientApp, Good Boost, GoWellHealth, moveUP, mymobility, myrecovery and Physitrack remained cost effective for both THR and TKR. But, getUBetter, Huma, Joint Academy, Phio, QuestPrehab, Sword Thrive and Slider were not cost effective for either THR or TKR, showing a negative INMB. PreActiv was cost effective for TKR, but not for THR.

The full results of the product specific analyses are available in Table 33 of the EAR.

7. User survey

NICE ran a survey of people with lived or carer experience of hip or knee replacement to understand experiences and views on using digital platforms to support rehabilitation before and after hip or knee replacement surgery. It received 427 responses, 59% of which had not used digital platforms, had used platforms that were out of scope, or used generic sources such as Facebook and YouTube. Only responses from those that had experience of in scope digital platforms were included in the survey summary (n=174). GoWellHealth was the most frequently used digital platform, with 80% of responders using this platform either before or after surgery, or both before and after surgery. myrecovery, BPMpathway, ForPatientApp, Good Boost, Joint Academy, Physitrack and getUBetter were used by 1 or 2 respondents each.

Key findings

- Perceived support whilst using digital platforms was generally high, with 47% of respondents feeling ‘very’ or ‘extremely’ supported in users both before and after surgery. In contrast, 26% of users before surgery and 27% of users after surgery responded as feeling ‘slightly’ or ‘not at all’ supported.
- Frequency of use ranged from ‘stopped early’ through to ‘daily’. The most frequently selected response was ‘several times per week’, with 32% of users before surgery and 34% of users after surgery selecting this use pattern.

- The majority of respondents (68% of users before surgery, 69% of users after surgery) would recommend digital platforms to others undergoing THR or TKR.
- Positive experiences included ease of use, quality and usefulness of information, the ability to communicate with care teams and using the platforms to monitor progress and maintain motivation. People that used the platforms more frequently tended to report more positive experiences and were more likely to recommend them to others.
- Negative experiences included difficulty with using platforms, a lack of depth of information and adjustment to individual needs, an absence of meaningful communication with care teams and feeling that the platforms did not benefit recovery. Those that stopped using platforms early were most likely to have negative experiences and were least likely to recommend them to others.
- A common theme was a need for face-to-face support to complement digital platforms.
- Around half (52%) of respondents felt that there were barriers to using digital platforms. The most frequently selected barriers were confidence using the online platforms (35%) and access to a mobile phone or computer, or the internet to use the online platforms (30%).

Full details are available in the user survey in Appendix B.

8. Equality considerations

The final scope and the scoping equality impact assessment describe equality considerations for this assessment. The EAG did not identify additional equality issues.

9. Evidence gap analysis

The EAG noted that there was no evidence that was directly applicable to the population in the decision problem for getUBetter, Huma, QuestPrehab or PreActiv. Across all digital platforms, the EAG considered there to be little evidence, defined as 3 or fewer studies, available for:

- Confidence in recovery and self-management
- Escalation
- Psychological outcomes
- Return to usual activities
- Early identification of concerns
- Adverse effects

The EAG identified key areas for evidence generation:

- Comparative studies, ideally UK-based RCTs
- Studies including a core set of outcomes
- Quality of life data up to 12 months post-surgery, including time to recovery
- Head-to-head studies between digital platforms
- Studies including digital platforms used for both preoperative and postoperative rehabilitation

A summary of the evidence gaps identified by the EAG are available in section 8.2 and Table 35 of the EAR. Further details of the key areas for evidence generation are available in section 8.3 of the EAR.

9.1 Ongoing studies

The EAG identified 15 ongoing studies for 11 digital platforms. Not all studies reported adequate detail for the EAG to determine the relevance to the decision problem. Notably, ongoing studies were identified for GetUBetter, QuestPrehab and PreActiv, all of which had no evidence for in scope populations in the evidence review. But, the EAG were unable to assess the relevance of these studies to the decision problem. The EAG considered the ongoing studies for BPMpathway, Good Boost, Joint Academy, moveUP, Phio, Slider and Sword Thrive to be likely to address key evidence gaps. Notably, ongoing RCTs were identified for Good Boost, Joint Academy, moveUP and Slider, all of which currently have no controlled studies.

Details of the identified ongoing studies are available in Table 34 of the EAR. Further consideration of how these studies may address gaps in the evidence are included in section 8.2.1 of the EAR.

10. Key points, limitations and considerations

10.1 Clinical effectiveness

Key points

- The EAG considered mymobility, moveUP and BPMpathway to have the most extensive evidence base, followed by Physitrack, Sword Thrive and GoWellHealth, although there was no clear and consistent benefit of any digital platform on any patient reported or clinical outcomes
- Despite not showing a clear benefit of digital platforms, the EAG concluded that the evidence indicated that they did not worsen quality of life, may improve joint specific function, reduce pain, reduce readmission rates, and improve mobility and functional performance
- No evidence for in-scope populations was identified for getUBetter, Huma, PreActiv or QuestPrehab, and no effectiveness evidence was identified for myrecovery or Phio

Limitations

- In many studies, the generalisability to the NHS was uncertain. Many studies were done in non-UK settings and had different frequency and duration of physiotherapist interactions than would typically be expected in the NHS.
- The majority of studies included rehabilitation before or after surgery only. If used in the NHS, the digital platforms would be intended for use at both points in the pathway. Therefore, it is unclear how generalisable this evidence is to the NHS
- A wide range of scales and definitions were used for the outcomes reported in the included studies, limiting comparability between studies and between digital platforms
- Most evidence was in people having TKR, or studies reporting a mix of TKR and THR. There was a limited amount of evidence exclusively in people having THR. It is unclear how generalisable evidence from TKR and mixed TKR and THR populations is to those having THR.

Considerations for committee:

- Does the committee think that there is adequate evidence for digital platforms to indicate that they may be effective? Is there sufficient evidence for each technology?
- How does the committee view the evidence that is done in non-UK settings and used for rehabilitation before or after surgery only?
- Are the risks for use in an evidence generation context acceptable? Do any of these risks need to be, and can be, mitigated in the evidence generation plan? Is there any risk of harm to patients with any of the technologies?
- How generalisable is evidence in TKR and mixed TKR and THR populations to people having THR?

10.2 Health economic evidence

Key points:

- Deterministic base case results indicate that all digital platforms are cost effective at a WTP threshold of £20,000 per QALY for both THR and TKR
- Under pessimistic assumptions where no QALY gain or reduction in length of stay is assumed, BPMpathway, ForPatientApp, Good Boost, GoWellHealth, moveUP, mymobility, myrecovery and Physitrack remain cost effective for both THR and TKR. PreActiv was cost effective for TKR only. getUBetter, Huma, Joint Academy, Phio, QuestPrehab, Sword Thrive and Slider were not cost effective for either THR or TKR
- The model is most sensitive to changes in length of hospital stay and QALYs, both of which were informed by values that clinical experts and the EAG considered to be optimistic estimates

Limitations:

- Results are informed by parameters that are not specific to the individual digital platforms in the base case, or where there is no evidence in the product specific analysis and so do not consider potential benefits of additional technology features

- There is no evidence to demonstrate whether the higher cost of some digital platforms results in better outcomes. This includes the unknown benefits of additional features such as company physiotherapists and medical devices
- A number of sources used to inform the model have methodological limitations, use data from related populations (MSK rather than knee and hip replacement), apply TKR replacement data to THR, have limited generalisability to the NHS, or are based on clinical expert opinion only
- Expert opinion was used to quantify physiotherapy input and to help extrapolate QALY data from 6-months to 12-months due to a lack of evidence. Access to physiotherapy before and after surgery could vary by trust and so the model assumptions may not be applicable to all NHS practice.
- The role of company physiotherapists for some digital platforms is unclear. Some companies claimed that physiotherapists provided through the digital platform could replace the need for NHS face to face appointments. Both the optimistic and pessimistic scenarios assumed a reduction in frequency and duration of NHS physiotherapist appointments but did not model the replacement of them.
- The model considers a total knee or hip replacement population; partial knee replacement or hip resurfacing, which make up a small portion of primary joint replacement procedures (15 to 20% and 1 to 2%, respectively, based on expert opinion), will likely need fewer resources as they are smaller procedures generally done on younger people with less extensive joint damage. The QALY difference between the digital platforms and standard care is unknown for this population.
- The model considers a 2.71-day length of stay in the standard care arm. The GIRFT ambulatory hip and knee replacement guide aims for knee and hip replacement procedures to be done as a day case which could impact the cost benefits of the digital platforms if realised.

Considerations for committee:

- Does the committee think that the model structure and inputs are suitable for this early use assessment?
- Does the committee think that all of the digital platforms have the potential to be cost effective for both THR and TKR? Can this cost effectiveness be applied to partial knee replacement and hip resurfacing? Is this an acceptable unknown given it is a small population relative to THR and TKR?
- Does the committee consider the optimistic or pessimistic scenarios to be most likely to be realised in practice?

Appendix A - Abbreviations

CE	Conformité Européene
EAG	External assessment group
EAR	External assessment report
HR-QoL	Health-related quality of life
ICER	Incremental cost-effectiveness ratio
HSS	Hospital for Special Surgery
ICER	Incremental cost effectiveness ratio
INMB	Incremental net monetary benefit
NA	Not applicable
NR	Not reported
PKR	Partial knee replacement
QALY	Quality-adjusted life year
RCT	Randomised controlled trial
THA	Total hip replacement
TKA	Total knee replacement
UKCA	UK Conformity Assessed
WTP	Willingness to pay

Appendix B – User survey

Survey participants

NICE received 427 responses from people with lived or carer experience of hip or knee replacement. Among the 427 respondents, 253 (59%) did not use a digital platform at all, used a digital platform that was out of scope, or used generic sources including Facebook groups or YouTube. The answers for these respondents were not included in this summary, except for the barriers to using digital platforms, as they were not able to provide insight into the use of digital platforms. The characteristics and digital platform use of the 174 respondents included in this survey are summarised in Table B1.

Table B1 - Characteristics of survey participants who used digital platforms (n=174)

Characteristic	Proportion (n)
Age group, years	
18 to 49	3% (5)
49 to 64	37% (64)
65 to 74	41% (72)
75 to 84	16% (28)
85 years and over	3% (5)
Role	
Person with lived experience	99% (172)
Carer	1% (2)
Joint	
Hip replacement (one or both)	47% (82)
Knee replacement (one or both)	47% (81)
Both hip and knee replacement	6% (11)
Digital platform use	
Before surgery only	41% (71)
After surgery only	22% (38)
Both before and after surgery	37% (65)

Which platforms participants used

Of the participants who used a digital platform there was a range of platforms used. The most frequently mentioned platform was GoWellHealth with 80% (n=139) of responders using this platform either before or after surgery, or both before and after surgery. A small number of respondents (1 or 2 people per platform) mentioned the use of myrecovery, BPMpathway, ForPatientApp, Good Boost, Joint Academy, Physitrack and getUBetter. Some respondents did not remember the name of the platform used. Where a platform was used before and after surgery, the same platform was used for both.

Perceived level of support while using platforms

Among respondents who used a digital platform, perceived support was generally favourable. Most respondents (63% of users before surgery, 56% of users after surgery) selected feeling moderately or very supported (Figure B1).

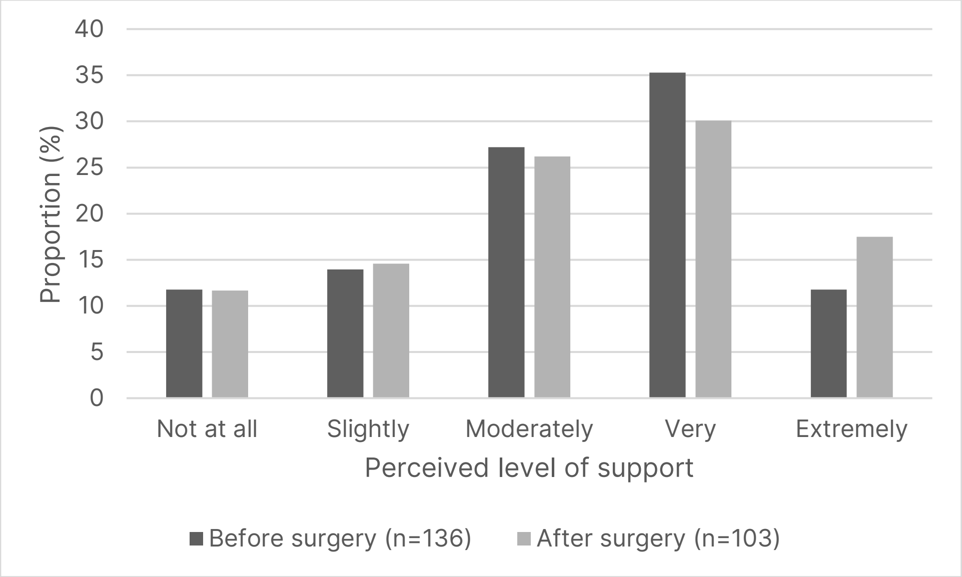

Figure B1 - Perceived support while using digital platforms (users of platforms both before and after surgery are included in both categories)

How often platforms were used

Figure B2 shows how frequently users engaged with platforms before and after surgery (from I 'stopped using it early' to 'daily'). The majority of respondents (32% of users before surgery, 34% of users after surgery) used digital platforms several times per week.

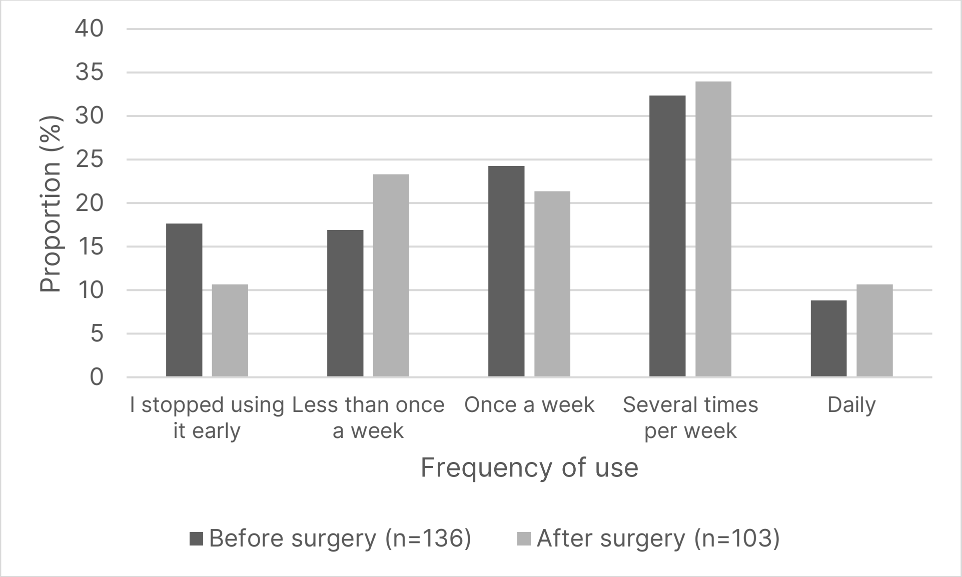

Figure B2 – Frequency of platform use (users of platforms both before and after surgery are included in both categories)

Reasons for recommending or not recommending

The majority of respondents would recommend digital platforms to others undergoing knee or hip replacement surgery, both before and after surgery (Figure B3). Of note, people that used digital platforms more frequently were more likely to recommend them. People that reported using platforms daily or several times per week almost universally responded ‘yes’ when asked if they would recommend them to others. People that used digital platforms once a week or less than once a week were most likely to respond as ‘unsure’ if they would recommend the platform to others. Those that stopped using the platform early were most likely to answer ‘no’ when asked if they would recommend the platform to others.

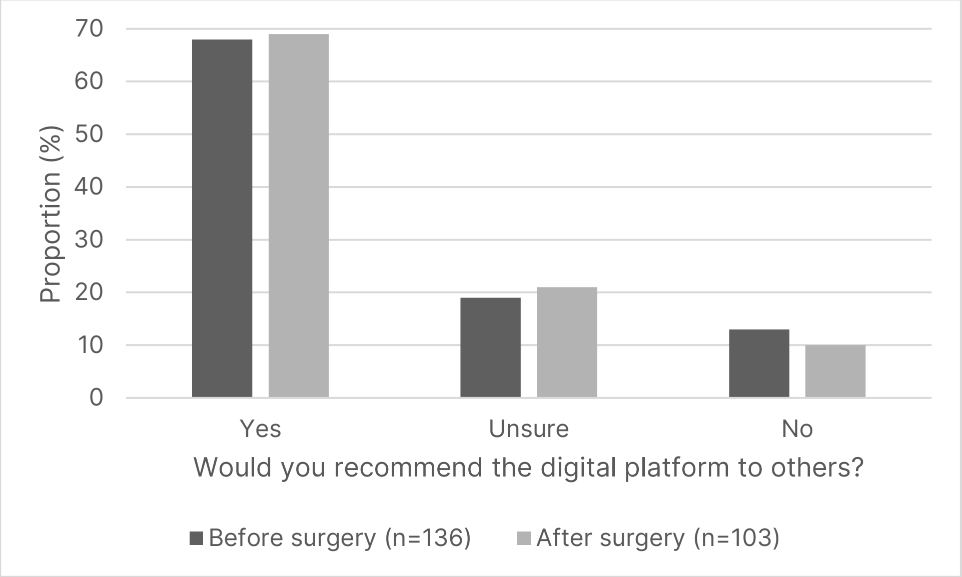

Figure B3 - Proportions of respondents that would recommend digital platforms to others undergoing knee or hip replacement surgery, before and after surgery

Table B2 summarises the identified themes, along with selected quotes from free text questions, regarding reasons to recommend or not recommend and experiences using digital platforms. Frequent users tended to have more positive experiences of the platforms. Less frequent users had mixed experiences, whilst those who stopped using the platforms early had negative experiences.

Table B2 - Identified themes and selected quotes from free text questions regarding reasons to recommend, or not recommend and experiences using digital platforms

Theme	Positives	Negatives
Ease of use and navigation	Many participants found the platforms easy to navigate, helpful, and reassuring, especially for exercises and information. *"Very easy to use and in a funny way quite reassuring."* *"Easy to use and helpful to be reminded of exercises."* *"The instructions on the site were informative and helpful and easy to understand."* *"It was very easy to use, with plenty of information."*	Others struggled with navigation, clunky interfaces, or technical issues. *"It was clunky and I just felt it didn't work in helping me."* *"Hard to use… I felt it took away the personal side of care."* *"Layout not very user friendly."* *"Often unable to access programme online because of technical problems."*
Quality and usefulness of information	Participants valued clear exercise demonstrations, expectation-setting, and structured recovery guidance. *"Helpful to see if I was reaching certain 'markers'."* *"A great tool… helped me feel supported in my recovery."* *"Very informative… I learnt so much."* *"Useful for understanding what to expect before and after surgery."*	Some felt content lacked depth, was repetitive, or didn't adjust to their individual needs. *"Not sure what benefit it had – all one way."* *"There wasn't much on it to do with my surgery."* *"Some questions about pain needed to be better worded."* *"Better to provide a menu for reference; tasks were not relevant to me."*
Support and communication with care teams	A significant number valued the ability to message teams and *receive answers.* *"Felt I could go online and ask a question which was always answered within 1–2 days."* *"Responses quickly and easily… appreciated people taking time to prepare me."* *"Good communication with the care team and quick responses."*	Others reported an absence of meaningful communication. *"Did not get a response from the doctors."* *"My input online was a waste of time… nothing done until I phoned the secretary."* *"Almost no communication with care teams offered."*

Role in recovery: motivation, exercise, and tracking	Many participants used the platforms to track progress or stay motivated. *“It kept me focused on the right things to accomplish.”* *“Gave me goals to help me get moving.”* *“It aided recovery with the advice about what exercises to do.”* *“Essential for good result—kept me on track.”*	Some felt the digital platforms didn’t improve their recovery. *“Not a substitute for speaking to someone.”* *“I wasn’t doing the exercises correctly… you need a real person to show you.”* *“Didn’t have any impact on my recovery at all.”*
Desire for human support and face-to-face care		A common theme was the need for in-person physiotherapy to complement digital tools. *“Would have liked a face-to-face physio at least once.”* *“Video is not enough—you need a real person to show you.”* *“Online platform good but must be alongside seeing the support team.”* *“Face to face physio much more helpful.”*
Variability of need: some people simply didn’t need it		A number of participants felt the platform was unnecessary because their recovery was straightforward. *“My recovery was so good I didn’t need it.”* *“I had a manual job and felt I got sufficient movement without it.”* *“Not necessary—attended physio instead.”*
System bugs, withdrawal of platforms and a lack of continuity		Several participants experienced platform shutdowns, login problems, or system bugs. *“It was taken down just after I started using it.”* *“Couldn’t login due to technical problems.”* *“Platform was discontinued before surgery completed.”* *“It was withdrawn at the time I had surgery.”*

Barriers to access and use

Among respondents that had used digital platforms, 52% (n=91) felt that that there were barriers to accessing the technology. The most commonly cited barriers included confidence using online platforms and access to a device and the internet, followed by age, disability, and medical and technical language (Figure B4). Seven respondents selected ‘other’ in in the multiple-choice selection, often due to listing multiple barriers. These respondents instead provided free text responses. Where possible, these responses were categorised into the most relevant barriers from the multiple-choice selection.

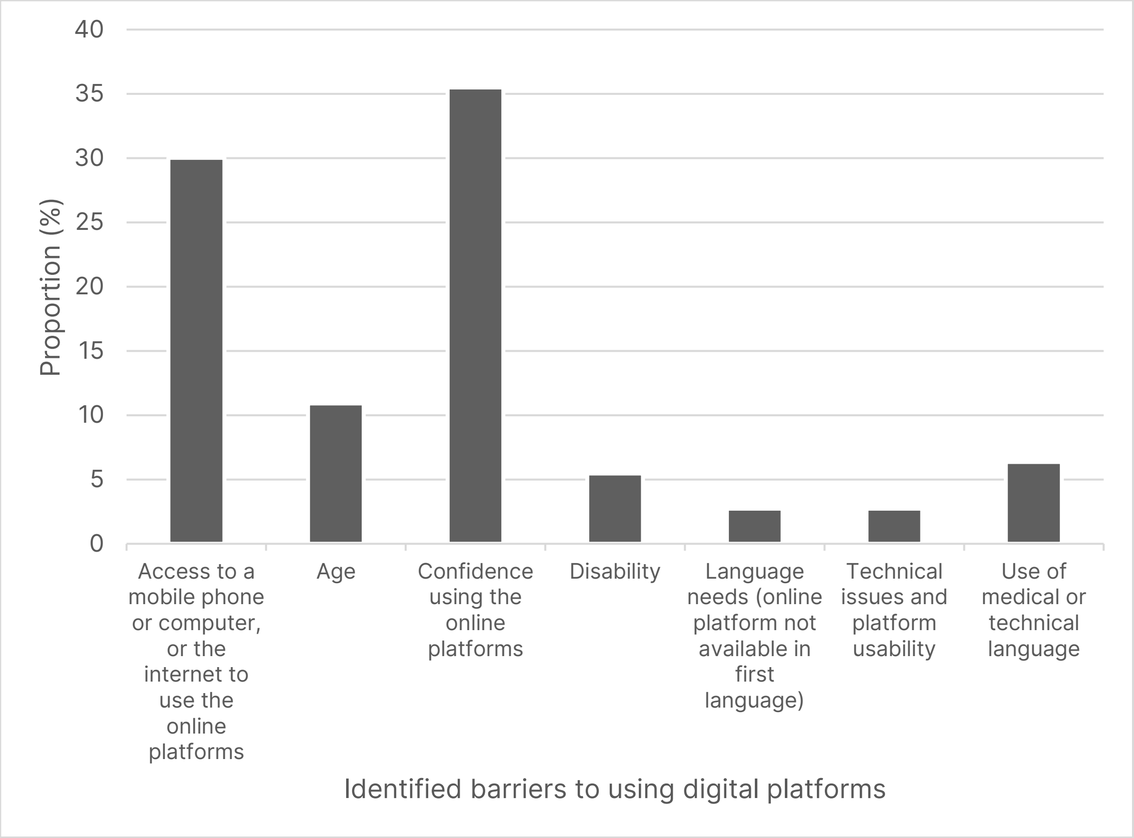

Figure B4 - Bar chart of barriers reported by digital platform users that felt there were barriers to accessing the technology (n=91).

Of the people who had not used a digital platform, 49% (n=67) agreed that there are barriers to using digital platforms. In line with the digital platforms users, their most commonly cited barriers were confidence using online platforms and access to a device and the internet.

Notes and limitations

Not all respondents had used digital platforms both before and after surgery, as is the intended use. Findings have been summarised as experiences of the digital platforms for before and after surgery separately. As a result, respondents that used digital platforms both before and after surgery are represented twice in the data. It is unclear if experiences differed between respondents with uses of digital platforms and different points in the care pathway. How the digital platforms were used was likely to differ between sites and over time, which likely influenced both experience and engagement.

Confidential information

Company name	**Document name**	**Description and location of confidential material**	**CIC/AIC**	**Place(s) in EAR where confidential material used**	**Page numbers**
270 Vision Ltd	Company RFI	Section 2 pertaining to prehabilitation support	CIC	Table 1 (two places)	**Error! Bookmark not defined.**,11
Good Boost Wellbeing Limited	Wilkins et al 2025 trial (Good Boost) The company provided subgroup analysis of participants post THR and TKR.	Data related to relevant subgroup analysis	AIC	Table 3, Table 5, Table 6, Table 7	37, **Error! Bookmark not defined.**, 80, 80, 85, 86 .
Joint Academy	Company RFI	Usage information	CIC	Section 7	**Error! Bookmark not defined.**

Abbreviations: AIC, academic in confidence; CIC, commercial in confidence; RFI, request for information

GID-HTE10069: Digital platforms to support rehabilitation before and after primary elective hip or knee replacement surgery

External assessment report

Produced by: Peninsula Technology Assessment Group (PenTAG)
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Date completed: 25/02/2026

Contains confidential information: Yes

Number of attached appendices: 3

Purpose of the early value assessment report

The purpose of this external assessment report (EAR) by an external assessment group (EAG) for early value assessment is to review the evidence currently available for technologies within the decision problem and advise what further evidence should be collected to help inform future decisions on whether the technologies should be widely adopted in the NHS. NICE has commissioned this work and provided the template for the report. The report forms part of the papers considered by the Committee when it is making decisions about the early value assessment.

Declared interests of the authors

None

Acknowledgements

The authors acknowledge the editorial support provided by Mrs Sarah Abrahamson, the administrative support provided by Mrs Sue Whiffin and Mrs Jenny Lowe and the model quality assurance check provided by Mr Frank Grimsey Jones (all PenTAG).

Responsibility for report

The views expressed in this report are those of the authors and not those of NICE. Any errors are the responsibility of the authors.

Contents

Abbreviations

Term	Definition
ADL	Activities of daily living
AQoL – 8D	Assessment of Quality of Life – 8 Dimensions
CI	Confidence interval
(30) CST	(30 second) Chair Stand Test
DASS-21	Depression Anxiety and Stress Scale – 21 items
EAG	External assessment group
EAR	External assessment report
ED	Emergency Department
EQ-5D-3L/-5L	EQ-5D (-3 level / -5 level) questionnaire
EUA	Early use assessment
F2F	Face-to-face
FJS	Forgotten Joint Score
GAD-7	General Anxiety Disorder – 7 items
GIRFT	Getting It Right First Time
HES	Hospital Episode Statistics
HOOS	Hip disability and Osteoarthritis Outcome Score
HR	Hazard ratio
HRQoL	Health Related Quality of Life
HSS	Hospital for Special Surgery scale
ICER	Incremental cost-effectiveness ratio
IQR	Interquartile range
ITT	Intention to treat
KOOS(-JR)	Knee injury and Osteoarthritis Outcome Score (-for Joint Replacement)
KSS	Knee Society Score
LoS	Length of Stay
MAUDE	Manufacturer and User Facility Device Experience
MCID	Minimal clinically important difference
MHRA	Medicines & Healthcare products Regulatory Agency
MSK	Musculoskeletal
NHB	Net health benefit
NMB	Net monetary benefit
NPS	Net Promoter Score
NR	Not Reported
NRS	Numeric Rating Scale
OA	Osteoarthritis
OHS	Oxford Hip Score

OKS	Oxford Knee Score
ONS4	Office for National Statistics four questions for wellbeing
PAM-13	Patient Activation Measure -13 Items
PKR	Partial knee replacement
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROM	Patient Reported Outcome Measure
PROMIS	Patient-Reported Outcomes Measurement Information System
PSC	Participant-Specific Complaint
QALY	Quality-adjusted life year
QoL	Quality of Life
q-RCT	Quasi-randomised controlled trial
RCT	Randomised controlled trial
RFE	Request for Evidence
RFI	Request for Information
ROM	Range of Movement
SD	Standard deviation
SF-12 / -36	12 item / 36 item Short Form survey
SLR	Straight Leg Raise
SLS	Single Leg Stand
SoC	Standard of Care
THR	Total hip replacement
TKR	Total knee replacement
TUG	Timed Up and Go
TUQ	Telehealth usability questionnaire
VAS	Visual analogue scale
WTP	Willingness to Pay

Executive summary

Background

Hip and knee joint replacements are among the most common orthopaedic operations performed in the UK. The increasing demand for knee and hip replacements places a substantial burden on NHS services, including surgical capacity, inpatient beds, physiotherapy and community support.

People scheduled to undergo joint replacement surgery engage in pre-operative exercise (prehabilitation) to build strength, mobility, and fitness to optimise their condition ahead of surgery, which can improve recovery. After surgery, rehabilitation helps restore movement, rebuild strength, and ensure the new joint functions safely and effectively. Pre- and post-operative rehabilitation is self-directed and there is variation in care provision across the NHS.

This early use assessment (EUA) summarises the clinical and economic evidence for digital platforms to support prehabilitation and rehabilitation after primary elective hip or knee replacement, while also outlining the current evidence gaps for these technologies.

Quality and relevance of the clinical evidence

The EAG identified evidence in people listed for primary elective hip or knee replacement surgery for 12 of the 16 scoped technologies from 30 studies. This included seven randomised controlled trials (RCTs)/quasi-RCTs (q-RCTs), seven controlled studies, and 16 single arm studies. Comparative data were available for seven technologies. Six technologies only had data from single-arm studies. The evidence primarily concentrated on people who have total hip/knee replacement (THR/TKR) but some studies recruited people who have partial knee replacement (PKR) in addition to TKR.

The evidence was difficult to interpret from an NHS perspective as it was often unclear if the comparator arm in each trial aligned with the prehabilitation and rehabilitation people would receive in the NHS. Only ten studies (12 records) provided data from UK settings – for a number of outcomes, these studies from UK settings showed a benefit of using the technologies. The EAG was also constrained in generalising findings due to sparse evidence for prehabilitation (as opposed to rehabilitation) and in hip (as opposed to knee) replacement surgery. Overall, the evidence base suggested that using digital platforms to support prehabilitation and/or rehabilitation for hip and knee replacement surgery provides no clear benefit (beyond typical standard of care in the NHS) for patient-reported outcomes, though retrospective evidence from the UK showed a signal of benefit for health-related quality of life and joint-specific function in both hip and knee replacement populations.

Similarly, the evidence base for clinical outcomes showed no clear benefit beyond standard care for digital platforms, though some evidence from the UK showed a signal for lower readmission rates. Adherence evidence pointed to low overall levels of compliance with digital platforms. The EAG did not consider there to be meaningful evidence on the safety of these technologies. The very sparse evidence available on adverse events flagged no concerns.

Quality and relevance of the economic evidence

The EAG developed an early model to estimate whether there was a ‘prima facie’ case for the digital platforms to be cost-effective compared with current NHS prehabilitation and rehabilitation provision. As would be expected in an early use assessment, there was a dearth of good quality randomised trial evidence to inform the model, and it was therefore largely driven by clinical expert opinion supplemented with cohort studies.

The EAGs’ approach was to develop a decision model of a ‘generic’ digital platform with hypothetical benefits, including an improvement in health-related quality of life, reductions in length of stay and in face-to-face physiotherapy sessions. This estimated a maximum economically justified price / headroom for the acquisition cost of a generic platform. The EAG then modified this for the specifics of each platform and included the acquisition cost to estimate an ICER versus current provision and incremental net monetary benefit. For each technology an optimistic and pessimistic scenario was generated.

Under the pessimistic scenarios, the EAG estimated that BPMpathway, ForPatientApp, myrecovery, Physitrack, mymobility, moveUP, GoWellHealth and Good Boost all exhibited ICERs below £20,000 per Quality Adjusted Life Year (QALY), suggesting the decision uncertainty and hence risk of investment was lower compared with other platforms. PreActiv is of borderline risk and Phio may be low risk, depending on the effective price per patient. Under optimistic scenarios all platforms appeared to yield Incremental Cost-Effectiveness Ratios (ICERs) below £20,000 compared with usual care.

These results were pairwise results compared with current provision alone and did not compare any of the platforms with each other. There was an absence of evidence to assess whether the price of higher cost platforms was justified over lower cost platforms through increased quality of life benefits for patients or additional cost offsets for the NHS. The EAG considered the evidence around quality of life gains to be inconclusive.

There was very little to no evidence in relevant populations informing the economic analyses for Joint Academy, QuestPrehab, Phio, Huma and mymobility.

The biggest drivers of cost-effectiveness were assumptions relating to health-related quality of life gains and reductions in length of stay following surgery from digital platforms vs current care. The EAG considers future research should focus on these outcomes, as well as monitoring numbers of face-to-face physiotherapy sessions associated with digital platforms and current care.

1 Decision problem

The decision problem is described in the scope and EAG comments are included in the protocol. The EAG made no further changes or comments.

2 Technologies

Each of the technologies provides a range of features. This could be how a person accesses the technology, whether it is simply a mobile app or web-based platform, whether it has sensor or additional hardware, and whether it uses camera-based motion capture. The initial exercise plan is specified in some technologies by NHS physiotherapists, in others by company physiotherapists, while others rely on standardised exercise plans. Adjustments to ongoing exercise programs can similarly be made sometimes by NHS physiotherapists, sometimes by company physiotherapists, or sometimes via automatic logic/proprietary algorithms. Each technology may offer one-way or two-way communication, and there may be real-time response or delayed response from clinicians. The technology may offer video call functionality for virtual consultations and features such as behavioural coaching.

A brief description of the technologies can be found in Table 1. Please see the scope for further details. Given the heterogeneity of the features provided, the EAG did not consider it was appropriate to classify the technologies (other than the loose groupings used to introduce the economic evaluation – see Section 6.1.1).

Table 1: Description of technologies

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
BPMpathway (270 Vision Ltd) No predecessor technologies or other company names	Prehabilitation content from [redacted] will be embedded and will include [redacted] Pre-operatively or before discharge, clinician creates a personalised post-operative support programme	Post-operative support involves tests to determine pain, range and quality of motion and PT exercises	Two weeks prior to surgery through to 3 months post-surgery	Phone and tablet	Both	Physiotherapist specifies targets and exercises Dashboard for clinician overview Two-way direct communication with clinician	Default programmes with prepopulated tests, limits and exercises Physiotherapist can tailor based on degree of joint mobility, specifying a comfortable starting position. A sensor worn during exercise or test streams data to the platform, displays data and transmits these data to the clinician, with adjustments to the rehabilitation routine.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
ForPatientApp (B. Braun Medical Ltd) No predecessor technologies, but an optional training module (Kemtai Care) integrated as ForPatientApp Move. No other company names	Assigns guided exercise plans to patients. ForPatient App Move is used in the pre-operative phase with exercise prescription and patient management. Additional information on lifestyle, smoking cessation, and weight management can also be shared with the patient	Post-operative exercise prescription, patient management, and additional information provided in a similar structure to the pre-operative phase.	Flexible, but mostly 6 weeks prior to surgery and up to 12 months post-surgery	Phone and tablet	Both	Base module for the specific treatment area, with adjustments by clinician possible. Dashboard for clinician overview, also suitable for larger healthcare systems. Predominantly one-way communication from hospital to patient, though documents can be sent two-way.	Default module for the specific treatment area. Clinician can adjust patient-specific training and review training sessions as well as range-of-motion assessments.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
getUBetter (getUBetter Ltd) No predecessor technologies or other company names	A pre-operative home exercise module, including the Virtual Knee School. Pre-operative support also includes education on what to expect as well as healthy lifestyle guidance	A peri-operative recovery package as well as post-operative module on walking, exercise intensity and returning to daily living as well as symptom monitoring.	Patients are encouraged to use the technology as soon as possible once they are on a waiting list for surgery. Peri-operative support, when patients have an operation date, supports patients from 12 weeks. The first phase of post-operative support is 12 weeks; thereafter support up to one year post-operation.	Phone, tablet and online	Both, but mostly knee	Base module for the specific treatment area, with adjustments by clinician possible. No active clinician monitoring of progress – if a patient’s actions prompt advice to seek help a letter is generated, serving as documentation that can be shared with the clinician. No direct communication with healthcare professionals facilitated.	Continuous monitoring through dynamic risk management, configured for local ICS clinical pathway and including symptom monitoring, stratification tools, outcome measures, identification of deteriorating patient, support for waitlisted patients and patient-initiated follow-up. If symptoms worsen more than three consecutive times, patients are prompted to seek help.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
Good Boost (Good Boost Wellbeing Ltd) Predecessor technologies are Good Boost HUB, Aqua Move, Move Together, We Are Undefeatable. No other company names	Structured prehabilitation through joint-specific exercises, education and behaviour-change support, including self-management strategies.	Personalised exercise plans alongside access to educational materials and lifestyle advice during recovery, including self-management strategies.	No set timeframe: ten to eleven sessions can be attended and programme continued for as long as it is beneficial. Patients are encouraged to start prehabilitation as soon as possible.	Phone and tablet	Both	Physiotherapist/ facilitator can specify targets and exercises. Dashboard shows overview of aggregate outcomes for review by the clinical team. Patients have access to their own data, which they can choose to share. There is two-way direct communication with Good Boost clinical team.	Personalised, tailored exercise sessions through automatic adjustments within the app based on symptoms and outcomes as well as manual adjustments by trained staff and the Good Boost clinical team. Those with low engagement receive nudges from the system If a risk of red flag is identified, the patient receives guidance to contact their clinician

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
GoWellHealth™ (SHI Global Ltd trading as GoWellHealth)	Explanations of the procedure, risks and benefits, alternatives and realistic outcomes; reinforcement of lifestyle advice; support patients to understand comorbidities and, in those with elevated HbA1c levels to reduce these; checklists for pre-operative appointments and medication; clinically-led preparation of self, family and home; support for conservative management.	Reinforce ward-based instructions once patients are home; provides digitised copies of exercises and self-care activities, with videos and repetition counts; schedules PROMs at flexible key milestones; ongoing education on pacing return to usual activities.	Pre-operatively from listing, or 4 to 8 weeks before surgery, and post-operatively immediately after surgery up to 3 to 6 months (with optional PROMs follow-up at 12 months post-surgery).	Phone and online	Both	Pre-batched template carepacs™ for knee or hip replacement Dashboard for clinician at-a-glance overview of completed questionnaires and forms on PROMs, pain, function and low engagement. With patient consent, additional healthcare providers may be added to the platform by patients or their core clinical team. One- or two-way communication, depending on the Trust. Two-way communication is explicitly two-way and asynchronous.	Template carepacs™ that can be adjusted for intensity and mode of digital support by the patient.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
Huma (Huma Therapeutics Ltd) Predecessor technology is Medopad. No other company names	Structured prehabilitation programme covering educational content, advice, and baseline preparation. A Patient Coach feature supports with patient adherence and a To Do feature provides daily actionable tasks and reminders to help with consistency of exercise and care.	Rehabilitation plans with symptom monitoring, recovery education. A Patient Coach feature supports with patient adherence and a To Do feature provides daily actionable tasks and reminders to help with consistency of exercise and care.	Configurable, but typically prehabilitation a few weeks prior to surgery and continued post-operatively as determined by clinical protocols.	Phone and online	Both	Each procedure type has a dedicated programme configuration. Dashboard for remote clinician monitoring of progress, engagement and recovery as well as RAG symptom flagging. The platform supports both one-way and secure two-way communication as well as secure video call functionality for virtual consultations and follow-up appointments.	No direct tailoring or feedback, but low engagement and red/amber flags trigger clinical intervention.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
Joint Academy (Artho Therapeutics Ltd and Artho Therapeutics AB) No predecessor technologies with different names, but various web and mobile versions of Joint Academy. No other company names	Pre-operative exercises as well as educational content and quizzes, with daily reminders to complete exercises.	Post-operative exercises as well as educational content and quizzes, with daily reminders to complete exercises.	Pre- and post-operative programs are both 12 weeks long but can be adapted to suit patient's needs.	Phone and tablet	Both	Initial physiotherapist call to assess baseline function and SMART goal setting. At 6 weeks follow-up a video call to reassess goals, motivate patients and discuss potential barriers and at discharge another video call to review goals, reinforce and provide further self-management. Two-way communication through a chat system for ongoing support, guidance and exercise modifications. This can be used at any time prior to discharge from active rehabilitation.	Structured, tailored programmes. Patients give feedback on tasks and exercises; the level of these can then be adjusted automatically (by the program) or manually (by the clinician). Monitoring the pain levels and functional scores can also be used to remotely adjust exercise levels. Patients receive education along with interactive quizzes.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
moveUP (moveUP NV) Predecessor technology is moveUP Therapy	Focuses on readiness for surgery through baseline physical activity assessment, educational content, goal setting and expectation management, and intro to the rehabilitation exercises.	Structured, progressive rehabilitation through daily personalized exercise protocols with video and written instructions, educational materials, symptom monitoring and reporting tools for pain, swelling, mobility, and medication use, and lifestyle advice. Weight management programs can be integrated into individual care plans.	Prehabilitation for a minimum of 6 to 8 weeks. Rehabilitation for 6 to 12 weeks after surgery,	Phone (moveUP app)	Both	Healthcare professionals access a Clinical dashboard that provides real-time patient monitoring across their entire caseload.	Throughout the rehabilitation phase, the system continuously monitors daily physical activity, pain levels, inflammation parameters, medication usage, walking aids, wellbeing scores, and exercise adherence rates.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
mymobility (Zimmer Biomet) No predecessor technologies or other company names	Procedure-specific education modules and checklists. Prescribed prehabilitation exercises. Baseline activity & risk data.	Guided rehabilitation exercises and progress tracking. Daily tasks and reminders. Objective activity and physiologic monitoring. Education discharge support.	Protocols start 365 days before procedure to typically 180 days post procedure, although can extend to up to three years.	Phone, tablet and online	Both	Two-way messaging to the care team. Videos (e.g. of symptoms) can also be shared via messaging.	The app collects and transmits objective data about the person’s recovery to their care team, including PROMs and pain assessments. This allows the medical team to monitor progress remotely and identify any potential issues early.
myrecovery (Healthcare Outcomes Performance Company (HOPCo) Ltd) Previous company name was Future Health Works (msk.ai)	Tailored procedure- and pathway-specific education, exercise guidance, and lifestyle advice, including prehabilitation programmes that focus on strength, mobility, smoking cessation, and weight management.	Structured rehabilitation exercises, wound-care reminders, symptom, pain and activity tracking (e.g. steps per day), and recovery education. Also, targeted lifestyle and wellbeing content.	“Weeks or months before surgery”. Typically for 8 to 16 weeks after surgery, depending on the clinical pathway. Many pathways collect 1-year PROMs, and some patients may continue to complete annual reviews.	Phone, tablet and online	Both	Clinicians can monitor progress remotely. The programme can be individually configured and adjusted by the clinician, either manually or through automated logic approved by clinicians. Optional two-way messaging with the care team.	The programme can be altered through automated logic approved by the clinician. App inputs, including activity data such as step counts, are available to the care team in near real-time, supporting remote progress and recovery tracking.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
3 technologies: Phio Access, Phio Engage and Phio Collect (EQL Ltd) No predecessor technologies or other company names	Structured prehabilitation programmes suitable for hip or knee joint replacement	Structured rehabilitation programmes suitable for hip or knee joint replacement surgery. “Daily sessions” to complete (via narrated video guidance).	Duration of use would usually be expected to be around 12 weeks, if no complications were encountered.	Phone and tablet	Both	There is a two-way Chat with a clinician should they need support with their exercise programme, symptom/ recovery advice. The physiotherapist can be EQL clinical services or NHS clinicians. They can adjust the programme according to needs and progress.	The programme progresses automatically based on progress. Difficulty level can be adjusted by the person using the technology within pre-defined safety limits, or more extensively by the clinician.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
Physitrack (Physitrack PLC)	Personalised pre-op exercise programs with video-guided instruction. Comunication with clinicians. Educational resources and tools to encourage consistency and build confidence before surgery	Personalised post-operative exercise plans with video guidance. Progress and pain tracking. Motivational tools for daily adherence. Real-time communication with physiotherapists educational content.	Unclear	Phone, tablet and online	Both	Physitrack is a clinician-led (usually physiotherapist) tool. They can monitor: Exercise completion Reported discomfort levels Pain scores Overall adherence	The clinician can track how the patient is responding throughout rehabilitation and make data-driven decisions.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
PreActiv (Snow Squared Ltd) Predecessor technology is MyPreHub	Individualised exercise sessions alongside multimodal personalised modules focused on education, smoking and alcohol cessation, mindfulness and nutrition	Modules focused on restoring mobility, strength, balance, and functional independence. Personalised multimodal modules include pain and swelling management, wound care, pacing, and gradual return to activity.	The standard licensing model provides 12 weeks of prehabilitation access and six weeks of post-operative rehabilitation. However, prehabilitation courses can be extended if required, and can be any length of time.	Phone, tablet and online	Both	Support from a multidisciplinary team is included where required. Programmes can be manually adjusted by healthcare professionals.	Programmes adapt to a person's feedback and exercises progress automatically over time, as milestones are achieved. Patients may interact with members of a multidisciplinary team, including physiotherapists, coaches, physiologists, doctors, and technical support staff.
QuestPrehab (C Digital Healthcare Ltd) Predecessor technology is Craetus platform (Kent and Medway Prehab)	Tailored exercise programmes, sign posting, education, and behavioural support starting before surgery.	Tailored exercise programmes, sign posting, education, and behavioural support.	2 to 6 weeks prehabilitation and continuing until people have achieved their rehabilitation goals and functional recovery after surgery	Phone	Both	Adjustments to care can be automatic via QuestPrehab's proprietary algorithms or by manual input from healthcare professionals.	Dynamically adjusting multimodal care plans (exercise, education, nutrition, psychological support and sign posting to complementary services)

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
Slider (AI Rehab Ltd) No predecessor technologies or other company names	Structured prehabilitation through short, guided daily sets with on-screen prompts. It is low-risk heel-slide–type movements. The mobile app can host educational modules (expectations after surgery, lifestyle etc.)	Exercises using the device with protocol tailoring (ranges, thresholds, and progression cadence) to match procedure, approach, and individual recovery	Prehabilitation: 2 to 8 weeks. 30 minutes/day, 5 to 7 days/week. Post-operative rehabilitation: 30 minutes/day through the early phase (weeks 0 to 6), then tapered or progressed in the later phase (weeks 6 to 12+) until functional goals are met.	AI-powered remote physiotherapy device that is linked to an app on a mobile phone. The app provides step-by-step exercise guidance and can host educational modules. Clinician-led tailoring and optional automatic adaptation	Knee, but aim to add hip in late 2026	Remote review by clinicians using the synced exercise records to adjust frequency/intensity and identify people needing escalation	In-app prompts and progress feedback, and remote clinician oversight to reinforce engagement.

Technology and company name, and any previous names	Preparation content before surgery	Recovery content after surgery	Length of treatment	Access	Hip/Knee /Both	Healthcare professional involvement	Interaction with the device (tailoring, feedback)
Sword Thrive (Sword Health) Predecessor technology is Care Programme, Digital Therapist	Specific programmes for the prehabilitation that can be adapted for partial knee replacement or hip resurfacing and can be scaled according to the person's functional status and ability. Educational resources (pain, lifestyle etc.) can be accessed.	There are specific programmes for the rehabilitation that can be adapted for partial knee replacement or hip resurfacing and can be scaled according to the person's functional status and ability.	8 weeks pre-operatively and 8 weeks post-operatively. However, is scalable and can accommodate patients for longer or shorter periods both before and after surgery.	Thrive Pad with in-built computer-vision technology.	Both	Regular input from NHS clinicians is not required but can be facilitated. A licensed Sword physiotherapist assesses and creates a personalised programme and makes adjustments as people progress. They also provide behavioural coaching to modify harmful lifestyle behaviours.	The device tracks people's movements as they perform the prescribed exercises and provides real-time feedback and advice for correction in both audio and video format. Patient-reported data: post-session check-in (pain, fatigue, satisfaction); mini-reassessment; entry and exit surveys

Abbreviations: HbA1c, glycated haemoglobin; ICS, Integrated Care System; PROM, patient-reported outcome measure; PT, physiotherapy; RAG, red/amber/green; SMART, specific, measurable, achievable, relevant, time-bound.
Note:
[a] The company did not respond to the Request for Information (RFI). The EAG have used content from the Physitrack website in this table.

3 Clinical context

National audits[1] suggest that a lack of good optimisation ahead of joint surgery is a risk factor for slower mobilisation and prolonged recovery. Structured pre-operative rehabilitation (or 'prehabilitation') is a factor that may improve these outcomes. The current care pathway within the NHS – including referral, diagnosis, peri-operative management and rehabilitation – is informed by two NICE guidelines (NG157[2] and NG226[3]) and one 2023 joint guide[1] by Getting It Right First Time (GIRFT) and the British Orthopaedic Association, as described in the NICE scope for this EUA.

Referral for joint replacement occurs when joint symptoms, e.g., pain, stiffness, reduced function or progressive deformity, have a considerable impact on quality of life (QoL) and when non-surgical management strategies, e.g. therapeutic exercise, weight loss, and pain relief, are not effective or suitable.

The GIRFT guide[1] recommends that all patients are put on an ambulatory pathway by default, except for those with greater post-operative care needs, with readiness for discharge assessed via a list of discharge competencies. To support the achievement of these competencies, therapy services are extended on the day of elective surgery. The guide further recommends that the expectation of same-day discharge or a one-night stay be embedded in patient education. However, the length of stay (LoS), according to Hospital Episode Statistics (HES) 2024/25 data, was typically between 2 and 3 days – see Table 20.

Optimisation ahead of and rehabilitation following surgery

For optimisation ahead of surgery, NICE guidance (NG157[2]) recommends the provision of information including what exercises to do before and after surgery to aid recovery, lifestyle changes, and how to maximise functional independence and QoL before and after surgery. For rehabilitation following surgery, NICE guidance (NG157[2]) recommends that inpatient rehabilitation – including mobilisation within 24 hours, advice on managing daily activities, provision of a home exercise programme, and discharge support – is offered as soon as possible following surgery. In addition, people should be provided with clear information around self-directed rehabilitation, the goals of recovery, and contact information to access advice or report concerns before discharge. For those who have difficulty managing daily activities, experience ongoing functional impairment, have cognitive impairment, or do not meet their rehabilitation goals, supervised group or individual outpatient rehabilitation should be offered.

The GIRFT guide[1] noted that many organisations had well established face-to-face (F2F) 'joint school' programmes where patients would attend in small groups approximately 4 to 8 weeks prior to surgery. The cessation of such groups during the COVID-19 pandemic and ongoing concerns regarding group interventions, limited facilities, and the resource heavy nature of some of these groups has led to the development of many alternative digital solutions. A 2025 survey of a small sample of NHS hospitals noted that pre-operative education was not offered before Total Hip Replacement (THR) and Total Knee Replacement (TKR) surgery by just under half the hospitals taking part in this study.[4] Suggested improvements to services included the provision of joint schools and more comprehensive prehabilitation offered to all patients. Barriers to delivery include funding, staffing, facilities and lack of awareness/evidence on how best to deliver services.

3.1 Equality issues

Equalities issues and considerations for this early use assessment are described in the equalities impact assessment alongside the scope. No additional equality issues have been identified during the assessment.

4 Clinical evidence

4.1 Search strategies and study selection

The searches were conducted as specified in the protocol and shown in Appendix A, where the full strategies are listed. Before running the final searches, the information specialist checked content in the (Request for

Information) RFI from each company to ensure that all synonyms or earlier names of the technologies were included in the search.

During sifting, it was identified that PhysiApp is the patient portal of Physitrack. Physitrack PLC was the one company who did not return an RFI. To ensure that no records were missed, we therefore re-ran the full searches with PhysiApp added as a term. No additional records were identified.

4.2 Included and excluded studies

The searches retrieved 1715 records. Following the removal of 399 duplicates, we screened 1316 title/abstract records and included 189 articles for full-text screening (including systematic reviews, economic evaluations and protocols). We included 24 systematic reviews[5-28], focusing on technologies supporting patients for hip or knee replacement surgery, and 14[15,29-41] economic evaluations or costing studies. We screened relevant systematic reviews for additional primary studies, identifying two additional studies not found through the search. We excluded 55 primary research articles at the full-text stage – the reasons for these exclusions are provided in Appendix B.

No additional studies were added from searches of company websites, although we did add two[42,43] additional studies from the company RFI and seven[44-50] from the Request for Evidence (RFE). We could not locate the full text of one bachelor's thesis[51] reporting satisfaction and usability for myrecovery and, therefore, could not assess its eligibility.

In total, we included 41 records, reporting 30 studies, directly evaluating a technology within scope (Table 2 and Table 3 – see PRISMA in Appendix C). The evidence primarily concentrated on people have total hip/knee replacement (THR/TKR) but some studies recruited people have partial knee replacement (PKR) in addition to TKR. We also identified 16 relevant ongoing studies (see section 8.1). In Table 2, we indicate any linked records reporting on the same study. In Table 3, we collate records where a poster, conference abstract, or online article described the results of the same study subsequently published in a journal article. In the case of sub-studies, follow-up results, or secondary analyses, we indicated these in separate rows but clearly identify it as linked to a parent study (except for one blog post,[52] which was not described separately due to a lack of available detail). To avoid double-counting in such cases, data on the same outcome were only extracted at the longest timepoint.

The similarity of the comparators to UK care was assessed. Clinical experts estimated that about 50% of patients would need physiotherapy after TKR and 10% after THR. Therefore, a proportion would have no face-to-face sessions, but those who required physiotherapy would receive approximately six 1-hour sessions. However, the EAG's clinical experts also noted the variability in rehabilitation after TKR/THR across the UK.

4.3 Studies in out-of-scope populations

Following the decision problem described in the scope and the protocol, the EAG focused on studies in people undergoing primary elective hip or knee replacement surgery. However, for those technologies for which no evidence was available for the scoped population, the question arose whether evidence in other populations should be accepted (for example, in people with osteoarthritis, general musculoskeletal conditions, or with cancer). Clinical expert advice was sought for this question. The general opinion was to be cautious about using studies from non-hip or -knee replacement populations – that it would be difficult to translate inferences about effectiveness from these other populations – while also acknowledging there may be some learning opportunities.

Arguments against including studies from other populations noted that other conditions would have different recovery trajectories, outcomes and prognoses. Non-elective surgery populations would not have a prehabilitation phase (i.e. participants are not waiting for surgery), and that rehabilitation speed and follow-up would differ between populations. User uptake and engagement would also likely be different, and experience of chronic pain would differ between musculoskeletal and cancer populations.

In addition to this, the interventions are likely to differ for different populations. For example, people are advised against certain movements after knee and hip operations to reduce the risk of dislocation, loosening, soft tissue strain, and delayed healing. Therefore, interventions or evidence from other populations will have little relevance and, in some cases, might potentially cause harm.

On the other hand, it was acknowledged that there may be generic learning opportunities from studies of platforms in non-hip or -knee replacement populations. Specifically, it was noted that general osteoarthritis rehabilitation population has some common features with the subset of people with osteoarthritis just pre- or post-replacement surgery.

Given this broad consensus, the EAG proceeded to prioritise studies in the scoped populations. However, in those cases where no evidence was available for a particular technology, the EAG included a summary of five studies from out-of-scope populations. This was the case for getUBetter and QuestPrehab (see section 5.5.1).

A further three studies were summarised for technologies where no in-scope effectiveness evidence was available (see section 5.5.2). These summaries of out-of-scope studies were not part of the 41 in-scope reports described in Table 3.

Table 2: Evidence landscape

Technology	Prospective studies (full text)	Retrospective studies (full text)	Conference abstracts
BPMpathway	Cooper 2022[53] Hong 2024a[54] Hong 2024b[55] Malhotra (unpublished)[42] Sadozai 2021[47] (linked to Cooper 2022)	-	-
ForPatientApp	Neumann-Langen 2023[56]	-	-
getUBetter	-	-	-
Good Boost	Wilkins 2025[57]	-	-
GoWellHealth	Saunders 2020[48]	Gray 2022[58]	Clark 2021 (prospective)[45] (linked to Gray 2022) Ashford 2019 (prospective)[44] (linked to Saunders 2020) Tsang 2019[59] (prospective)
Huma	-	-	-
Joint Academy	Hunter 2026[60]	-	Dahlberg 2023 (prospective)[61]
moveUP	Lebleu 2023[62] Lebleu 2021[63] Lebleu 2021[64] (linked to Lebleu 2021)	Van Overschelde 2023[65] Lebleu 2024[66]	-

Technology	Prospective studies (full text)	Retrospective studies (full text)	Conference abstracts
mymobility	Tripuraneni 2021[67] (linked to Crawford 2021a) Alexander 2023[68] (linked to Crawford 2021a) DeMik 2024[69] (linked to Crawford 2021a) Miller 2024[70] (linked to Crawford 2021a) Miner 2024[71] (linked to Crawford 2021a) Crawford 2021a[72] Crawford 2021b[73]	Booth 2023[74] Rossi 2024[75]	Parikh 2024 (retrospective)[76]
myrecovery	-	-	Starkey 2025[49] (retrospective)
Phio	Thacker 2025[50]	-	-
Physitrack	Duong 2023a[77]	Hardwick-Morris 2022[78]	Duong 2023b (prospective)[79] (linked to Duong 2023a)
PreActiv	Emery 2026[80,81] (linked to related blog post[52])	-	-
QuestPrehab	-	-	-
Slider	Islam 2023[82]	-	Sampath 2024 (prospective)[43] McDonald 2026 (prospective)[46]
Sword Thrive	Correia 2018[83] (linked to Correia 2019a) Correia 2019a[84] Correia 2019b[85]	-	-

Table 3: Description of key studies in the evidence base

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
BPMpathway (270 Vision Ltd)	Cooper 2022,[53] and linked poster Sadozai 2021[47] Single-arm observational study UK	21 adults undergoing TKR or PKR Setting: UK Calderdale and Huddersfield NHS Foundation Trust	Prehabilitation and rehabilitation Intervention: BPMpathway sensor and application (n=21) Comparator: None	Functional performance (ROM) [primary clinical] User satisfaction and usability [secondary PROM] Compliance [secondary intermediate] Interaction (messaging) with healthcare professionals [secondary intermediate] Hospital LoS [cost and resource] Inpatient physiotherapy sessions [cost and resources] Mean 20.29 ± 19.7 days pre-operatively and mean 35.10 ± 11.2 days post-operatively	Funding: BPMpathway sensors were provided by B. Braun Medical U.K. Authors received honoraria from B. Braun. Relevant population and intervention, and good generalisability. However, single-arm study, small sample size and no comparative data.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
BPMpathway (270 Vision Ltd)	Hong 2024a[54] Controlled study China	42 patients who underwent TKR Setting: Orthopaedic department of a hospital in Soochow	Rehabilitation only Intervention: BPMpathway sensor and application (n=21) Comparator: Standardised health education manual (n=21) (full match to scope) "Comprehensive explanation" of key aspects of home-based rehabilitation, covering: diet, medication, exercise, adopting a healthy lifestyle, fall prevention. Three face-to-face outpatient follow-up sessions were scheduled.	Joint-specific function (HSS) [primary PROM] HRQoL (SF-36) [primary PROM] Compliance [secondary intermediate] 6 months post-discharge	Funding: The authors report no external funding for this work. The comparator appeared to be reasonably well aligned with standard care in the NHS but the EAG had concerns related to the small sample size. Relevant study design, population, intervention, and comparator.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
BPMpathway (270 Vision Ltd)	Hong 2024b[55] Quasi-RCT China	110 patients with knee osteoarthritis after TKR Setting: Orthopaedic department of hospitals in Soochow	Rehabilitation only Intervention: Telerehabilitation based on BPMpathway (n=54) Comparator: Routine home-based rehabilitation (n=56) No details of the rehabilitation received were provided.	Joint-specific function (HSS) [primary PROM] HRQoL (SF-36) [primary PROM] Functional performance (ROM) [primary clinical] Compliance [secondary intermediate] 6 months post-operatively	Funding: Suzhou Science and Technology Plan Project. It was unclear how relevant the comparator was to the NHS setting given uncertainty around the rehabilitation received. Relevant study design, intervention and comparator. However, patient population may not be directly relevant, and questionable generalisability to UK setting.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
BPMpathway (270 Vision Ltd)	Malhotra[42] (unpublished) Prospective comparative cohort Country India	28 candidates for unilateral primary TKR Setting: NR	Rehabilitation only Intervention: BPMpathway device for rehabilitation (n=14) Comparator: Conventional physiotherapy (n=14) Defined as regular physiotherapy sessions. The number of physiotherapy sessions people received was not presented.	Joint-specific pain and function (KOOS, KSS and modified KSS) [primary PROM] HRQoL (SF-12) [primary PROM] Pain (VAS) [primary PROM] Functional performance (ROM) [primary clinical] Compliance [secondary intermediate] Hospital LoS [cost and resource] 12 months post-operatively	Funding: Not stated. It was unclear how relevant the comparator was to the NHS setting given uncertainty around the rehabilitation received. Relevant study design, population, intervention and comparator. However, small sample size, and unclear generalisability.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
ForPatientApp (B. Braun Medical Ltd)	Neumann-Langen 2023[56] Single-arm observational study France, Germany and the UK	98 adults undergoing TKR and rehabilitation Setting: NR	Rehabilitation only Intervention: ForPatientApp and Pheno4U data platform (n=98) Comparator: None	Pain (Pain DETECT, KOOS pain subscale) [primary PROM] Participation in daily life (KOOS activities of daily living subscale) [primary PROM] Functional performance (ROM as flexion and extension) [primary clinical] Anxiety (DASS-21) [secondary PROM] Patient expectation (HSS Knee Replacement Expectation Survey) [secondary PROM] User satisfaction (Net Promoter Score, HSS Fulfilment, overall satisfaction) [secondary PROM] 2 weeks pre-operatively (KOOS, HSS Expectations) 1 week pre-operatively (DASS-21, Pain DETECT) 2 weeks post-operatively (DASS-21, Pain DETECT) 6 weeks post-operatively (KOOS, KOOS pain and activities of daily living subscales) 3 months post-operatively (ROM as flexion and extension)	Funding: The research was company-funded by B. Braun Aesculap AG, Tuttlingen, Germany. Relevant population and intervention. However, single-arm study, no comparative data and limited generalisability.

Technology (manufacturer)	**Study name, design and location**	**Participants and setting**	**Intervention(s) and comparator**	**Outcomes measures and follow up (longest time point)**	**EAG comments**
Good Boost (Good Boost Wellbeing Ltd)	Wilkins 2025[57] and subgroup data provided by the company Single-arm retrospective cohort UK	Relevant subgroup: [redacted] patients undergoing hip (n=[redacted]) or knee (n=[redacted]) replacement Setting: 136 sites across the UK	Rehabilitation Intervention: Good Boost platform (n=[redacted]). Comparator: None	Pain (Mean Average Pain Score) [primary PROM] Joint function (Patient Specific Functional Scale) [primary clinical] Quality of life (ONS4) [primary PROM] At 12 weeks post-operatively	Funding: ‘Smart Grant’ #106337 and Healthy Ageing Challenge #10025696, UKRI Small Business Research Initiative 10055777. Relevant population, intervention and good generalisability. However, single-arm study, no comparative data.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
GoWellHealth (SHI Global Ltd)	Gray 2022[58] and linked conference abstract Clark 2021[45] Retrospective comparative cohort UK	2406 patients undergoing primary THR or TKR (n=1246 and n=1160, respectively) Setting: Northumbria Healthcare NHS Foundation Trust	Prehabilitation and rehabilitation Intervention: GoWellHealth platform delivered via a phone/ tablet at home or on a tablet in a community setting (n=595) Comparator: Standard practice package of care (n=1811). Written materials and face-to-face information by a specialist arthroplasty nurse or physiotherapist prior to surgery. It was unclear what physiotherapy contact people received after discharge from hospital.	Joint-specific pain and function (OHS, OKS) [primary PROM] HRQoL (EQ-5D-3L) [primary PROM] (partial match to scope) Hospital LoS [cost and resource] At 6 months post-operatively	Funding: The authors state that no funding is applicable. The study was completed in the UK and therefore the comparator arm was understood to have received the NHS standard of care in rehabilitation. However, some people used the tablet in a community setting rather than at home. Despite concerns related to the community setting, the study design, population, and comparator, were relevant, Therefore, there was reasonable generalisability. Relevant outcomes limited to two primary PROMs and LoS.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
GoWellHealth (SHI Global Ltd)	Saunders 2020,[48] and linked conference abstract Ashford 2019[44] RCT Australia	99 adults awaiting (at least 3 weeks prior to) THR Setting: private metropolitan hospital in Western Australia	Prehabilitation and rehabilitation Intervention: GoWellHealth platform (n=50) Comparator: Standard practice package of care (n=49) Written materials and face-to-face information by a nurse, occupational therapist, pharmacist and physiotherapist prior to surgery. Post-discharge phone call with nurse.	HRQoL (HOOS QoL subscale) [primary PROM] Pain (HOOS pain subscale) [primary PROM] Participation in daily life (HOOS activities of daily living subscale) [primary PROM] HRQoL (EQ-5D-5L) [primary PROM] Confidence in recovery and self-management (Self-Efficacy for Managing Chronic Disease) [primary PROM] User satisfaction (survey) [secondary PROM] At 6 months post-operatively	Funding: HPH Research Foundation The comparator arm received fewer face-to-face physiotherapy sessions than people who required physiotherapy would have received in the NHS. Relevant study design, population, intervention and comparator. However, poor generalisability.
GoWellHealth (SHI Global Ltd)	Tsang 2019[59] Prospective single-arm study UK	771 patients awaiting TKR/THR surgery South Tees Hospitals NHS Foundation Trust, Middlesbrough, UK	Prehabilitation and rehabilitation Intervention: GoWellHealth platform (n=771) Comparator: None	Healthcare use (readmission) [primary clinical] Hospital LoS [cost and resource]	Funding: NR Relevant population, intervention and good generalisability. However, single-arm study, no comparative data.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
Joint Academy (Artho Therapeutics Ltd and Artho Therapeutics AB)	Hunter 2026[60] Unpublished abstract Single-arm study Scotland	116 adults awaiting knee or hip surgery	Prehabilitation Intervention: Joint Academy digital treatment programme (n=116) Comparator: None	No outcome data reported.	The paper contained statements related to the efficacy of the Joint Academy
Joint Academy (Artho Therapeutics Ltd and Artho Therapeutics AB)	Dahlberg 2023[61] conference abstract Single-arm observational study Scotland	110 adults awaiting knee or hip surgery Setting: Scotland NHS Highlands (waitlist)	Prehabilitation Intervention: Joint Academy digital treatment programme (n=110) Comparator: None	Pain (NRS) [primary PROM] Functional performance (30 CST) [primary clinical] Engagement [secondary intermediate] 3 months of intervention pre-operative	Funding: NR Relevant population, intervention and good generalisability. However, single-arm study, no comparative data. Relevant outcomes limited to two primary PROMs and engagement.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
moveUP (moveUP NV)	Lebleu 2021[64] and linked online article Lebleu 2021[63] Single-arm cohort Belgium MORE Clinical Study (Clinical Trial Number: B117201732334)	132 adults awaiting knee or hip surgery Belgium healthcare system (3 hospitals)	Rehabilitation Intervention: moveUP medical device and smart virtual platform (n=132) Comparator: None	HRQoL (KOOS QoL subscale, HOOS QoL subscale) [primary PROM] Pain (KOOS pain subscale, HOOS pain subscale) [primary PROM] Participation in daily life (KOOS activities of daily living subscale, HOOS activities of daily living subscale) [primary PROM] Functional performance (step count) [primary clinical] Pain (KSS satisfaction scale) [primary PROM] 3 months after surgery	Funding: Stated no external funding. Author lists included representatives of moveUP. Relevant population and intervention. However, single-arm study, no comparative data and poor generalisability.

Technology (manufacturer)	**Study name, design and location**	**Participants and setting**	**Intervention(s) and comparator**	**Outcomes measures and follow up (longest time point)**	**EAG comments**
moveUP (moveUP NV)	Lebleu 2023[62] Single-arm cohort Belgium and France	127 people who underwent TKR Setting: Hospitals in Belgium and France	Rehabilitation Intervention: moveUP medical device and smart virtual platform (n=87) Comparator: None	Joint-specific pain and function (OKS) [primary PROM] HRQoL (QALYs from EQ-5D, KOOS QoL subscale) [primary PROM] Pain (KOOS pain subscale) [primary PROM] Participation in daily life (KOOS activities of daily life subscale) [primary PROM] Functional performance (active ROM) [primary clinical] Unplanned consultations [primary clinical] User satisfaction (KSS) [secondary PROM] 6 months post-operatively	Funding: Stated no external funding. Author lists included representatives of moveUP. Relevant population and intervention. However, single-arm study, no comparative data and poor generalisability.

Technology (manufacturer)	**Study name, design and location**	**Participants and setting**	**Intervention(s) and comparator**	**Outcomes measures and follow up (longest time point)**	**EAG comments**
moveUP (moveUP NV)	Van Overschelde 2023[65] Retrospective single-arm cohort Subgroups of patients receiving surgery before and during COVID-19 (normal versus early discharge) Belgium	182 patients who underwent elective primary THR or TKR (n=100 and n=82, respectively) Setting: Hospital in Antwerp	Rehabilitation Intervention: moveUP medical device and smart virtual platform (n=182) Comparator: None	HRQoL (HOOS and KOOS QoL subscale) [primary PROM] Pain (VAS, HOOS and KOOS pain subscale) [primary PROM] Participation in daily life (HOOS and KOOS activities of daily living subscale) [primary PROM] Unplanned consultations [primary clinical] User satisfaction (KSS, custom questionnaire) [secondary PROM] Pre-operatively (HOOS and KOOS subscales) 20 days post-operatively (VAS) 3 months post-operatively (HOOS and KOOS subscales, KSS, custom questionnaire)	Funding: Stated no external funding. Author lists included representatives of moveUP. Prior to surgery, participants received access to the app along with an individualised training session on the management plan and app. Relevant population and intervention. However, single-arm study, no comparative data and poor generalisability.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
moveUP (moveUP NV)	Lebleu 2024[66] Retrospective single-arm observational study NCT06157190 Belgium, France and the Netherlands	Depersonalised data from 1144 patients who underwent elective THR or TKR/PKR (n=683 and n=461, respectively) Setting: NR	Rehabilitation Intervention: moveUP medical device and application (n=1144) Comparator: None	Joint-specific pain and function (HOOS, KOOS, OKS, FJS) [primary PROM] HRQoL (EQ-5D) [primary PROM] Functional performance (steps per day, steps per minute) [primary clinical] Return to activities (UCLA Activity Scale) [secondary PROM] 3 months (step counts)	Funding: Stated no external funding. Author lists included representatives of moveUP. Relevant population and intervention. However, single-arm study, no comparative data and poor generalisability.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
mymobility (Zimmer Biomet)	Crawford 2021[72] RCT NCT03737149 USA, Italy, Netherlands, Australia	452 adults scheduled to undergo a unilateral primary TKR or PKR. Setting: NR	Prehabilitation and rehabilitation Intervention: The mymobility platform with an Apple Watch (n=208) Comparator: Each institution's standard post-operative rehabilitation protocol (n=244) This typically included formal in-person physiotherapy three times per week for four weeks following surgery	Functional performance (SLS) [primary clinical] Healthcare use (non-standard care physician visits, ED visits, urgent care visits, readmission) [primary clinical] 3 months after surgery	Funding: Zimmer Biomet KOOS and HRQoL are reported at a longer timepoint in Alexander 2023[68] The comparator arm appeared to receive more face-to-face physiotherapy than people would receive in the NHS. Relevant study design, population, intervention, and comparator, but limited generalisability.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
mymobility (Zimmer Biomet)	Alexander 2023[68] **Follow-up results of Crawford 2021[72] RCT** NCT03737149 USA	401 adults scheduled to undergo unilateral primary TKR or PKR Setting: NR	Prehabilitation and rehabilitation Intervention: Smartphone-based care platform mymobility with an Apple Watch (n=160) Comparator: Each institution's standard post-operative rehabilitation protocol (n=241) This typically included formal in-person physiotherapy three times per week for four weeks following surgery	Return to activity [primary PROM] Joint-specific pain and function (KOOS, JR) [primary PROM] HRQoL (EQ-5D-5L) [primary PROM] User satisfaction [secondary PROM] 12 months post-operatively (KOOS-JR and EQ-5D) 90 days post-operatively (return to activities and user satisfaction)	Funding: NR however an author was affiliated with Zimmer Biomet. The comparator arm appeared to receive more face-to-face physiotherapy than people would receive in the NHS. Relevant study design, population, intervention, and comparator, but limited generalisability.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
mymobility (Zimmer Biomet)	Tripuraneni 2021[67] **Sub-study of Crawford 2021[72] RCT** NCT03737149 Subgroups by intervention compliance (higher versus lower) USA	337 adults qualified for unilateral TKR due to degenerative joint disease Setting: NR	Prehabilitation and rehabilitation Intervention: The mymobility platform with an Apple Watch (n=153) Comparator: Each institution's standard post-operative rehabilitation protocol (n=184) This typically included formal in-person physiotherapy three times per week for four weeks following surgery	Functional performance (active ROM) [primary clinical] Pre-operatively and at 3 months post-operatively	Funding: Zimmer Biomet (Warsaw, IN). Apple Watches were provided by Apple (Cupertino, CA). KOOS and HRQoL are reported without stratifying by compliance subgroups in Alexander 2023[68] The comparator arm appeared to receive more face-to-face physiotherapy than people would receive in the NHS. Relevant study design, population, intervention, and comparator, but limited generalisability.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
mymobility (Zimmer Biomet)	DeMik 2024[69] **Sub-study of Crawford 2021[72] RCT** NCT NCT03737149 USA	304 adults undergoing elective primary TKR Setting: NR	Prehabilitation and rehabilitation Intervention: Digital care management platform mymobility with an Apple Watch (n=119) Comparator: Standard of care procedures based on each institution's established protocols (n=185) This typically included formal in-person physiotherapy three times per week for four weeks following surgery	Return to activity (sexual activity) [primary PROM] Pain (NRS) [primary PROM] Functional performance (SLS, TUG) [primary clinical] Anxiety (GAD-7) [secondary PROM] Pre-operatively (anxiety) Pre-operatively and at 90 days post-operatively (PROMs and functional performance)	Funding: Zimmer Biomet, Warsaw, Indiana [grant number CLU2018-13CH]. KOOS and HRQoL are reported at a longer timepoint in Alexander 2023[68] ROM is reported at a longer timepoint in Tripuraneni 2021[67] It was unclear how relevant the comparator was to the NHS setting given uncertainty around the prehabilitation/rehabilitation received. Relevant study design, population, intervention, and comparator, but limited generalisability.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
mymobility (Zimmer Biomet)	Crawford 2021[73] RCT NCT03737149 USA, Italy, Netherlands, Australia	365 adults scheduled to undergo a unilateral primary THR. Setting: NR	Prehabilitation and rehabilitation Intervention: The mymobility platform with an Apple Watch (n=167) Comparator: Standard of care procedures based on each institution's established protocols (n=198) While there was no standardization of protocols, nearly all participating sites prescribed PT following surgery.	Joint-specific pain and function (HOOS, JR) [primary PROM] HRQoL (EQ-5D-5L) [primary PROM] Functional performance (TUG) [primary clinical] Healthcare use (non-standard care physician visits, ED visits, urgent care visits, readmission) [primary clinical] Mobility (ROM) [primary clinical] 3 months after surgery	Funding: Zimmer Biomet It was unclear how relevant the comparator was to the NHS setting given uncertainty around the rehabilitation received. Relevant study design, population, intervention, and comparator, but limited generalisability.

Technology (manufacturer)	**Study name, design and location**	**Participants and setting**	**Intervention(s) and comparator**	**Outcomes measures and follow up (longest time point)**	**EAG comments**
mymobility (Zimmer Biomet)	Miller 2024[70] **Secondary analysis of Crawford 2021a and 2021b[68] RCTs** NCT03737149 USA	835 adults undergoing THR, TKR or PKR (n=380, n=347 and n=108, respectively) Setting: NR	Prehabilitation and rehabilitation Intervention: Digital care management platform mymobility with an Apple Watch (n=384) Comparator: Standard of care procedures based on each institution's established protocols (n=451) While there was no standardization of protocols, nearly all participating sites prescribed PT following surgery.	Compliance (completing PROM surveys) [secondary intermediate] 180 days prior to surgery 1 year post-operatively	Funding: Zimmer Biomet It was unclear how relevant the comparator was to the NHS setting given uncertainty around the prehabilitation/rehabilitation received. Relevant population, intervention, and comparator. However, secondary analysis and limited generalisability. Relevant outcomes are limited to compliance.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
mymobility (Zimmer Biomet)	Miner 2024[71] **Single-arm secondary analysis of [68]Crawford 2021a and 2021b RCTs** NCT03737149 Subgroups of patients receiving surgery early or later in the COVID-19 pandemic USA	1665 adults undergoing THR, TKR or PKR (n=706, n=766 and n=193, respectively) Setting: NR	Prehabilitation and rehabilitation Intervention: Digital care management platform mymobility with an Apple Watch (n=1665) Comparator: None	Functional performance (step counts) [primary clinical] 90 days post-operatively	Funding: Zimmer Biomet (#1389) Comparative data for HOOS, JR are reported in Crawford 2021[73] Relevant population and intervention. However, single-arm secondary analysis with no comparative data, limited generalisability and outcome reporting. KOOS values at a later timepoint are reported in Alexander 2023. HOOS values and step count data are eligible.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
mymobility (Zimmer Biomet)	Booth 2023[74] (first study, Group A) Single-arm retrospective cohort USA	166 adults undergoing elective primary THR, TKR or PKR Setting: NR	Prehabilitation and rehabilitation Intervention: Digital care management platform mymobility with an Apple Watch (n=106) Comparator: None	User satisfaction [secondary PROM] 3 months post-operatively	Funding: NR Relevant population and intervention. However, single-arm study and limited generalisability. Relevant outcomes are limited to user satisfaction.
mymobility (Zimmer Biomet)	Rossi 2024[75] Single-arm retrospective survey-based analysis Italy	218 adults who had undergone robotic total knee arthroplasty (rTKA) Setting: NR	Prehabilitation and rehabilitation Intervention: Digital care management platform mymobility (n=218) Comparator: None	User satisfaction and acceptability [secondary PROM] An average of 485 days post-intervention	Funding: This research received no external funding. Relevant population and intervention. However, single-arm study and limited generalisability. Relevant outcomes are limited to user satisfaction.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
mymobility (Zimmer Biomet)	Parikh 2024[76] conference abstract Single-arm retrospective observational study Subgroups of patients followed up virtually or in-person at 1 year Country NR	50 patients having undergone TKR Setting: NR	Rehabilitation Intervention: mymobility digital care management platform (n=50) Comparator: None	User satisfaction [secondary PROM] Engagement [secondary intermediate] Provider charges [secondary cost] (partial match to scope) 3 months post-operatively (engagement) 1-year (user satisfaction and provider charges)	Funding: NR however one of the authors is affiliated to Zimmer Biomet Relevant population and intervention. However, single-arm study and unclear generalisability. Relevant outcomes are limited to user satisfaction and engagement.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
myrecovery (Healthcare Outcomes Performance Company (HOPCo) Ltd)	Starkey 2025[49] conference abstract Retrospective comparative observational study Country: UK	1172 people who had undergone a hip (n=788) or knee arthroplasty (n=434) and were on the myrecovery system. This was compared with HES data from each trust. Setting: NR	Prehabilitation and rehabilitation Intervention: myrecovery mobile application (n=1172) Comparator: usual care	Healthcare use (Readmission) [primary clinical] Healthcare use (28-day ED attendance) [primary clinical] Hospital LoS [cost and resource] Follow-up was not reported	Funding: not reported The study used data from people treated in the UK and therefore the comparator arm was understood to have received the NHS standard of care in prehabilitation /rehabilitation. Relevant study design, population, intervention and comparator.. Good generalisability, but relevant outcomes are limited to healthcare use and LoS.

Technology (manufacturer)	**Study name, design and location**	**Participants and setting**	**Intervention(s) and comparator**	**Outcomes measures and follow up (longest time point)**	**EAG comments**
3 technologies: Phio Access, Phio Engage and Phio Collect (EQL Ltd)	Thacker 2025[50] Prospective single-arm study Country: UK	53 adults awaiting hip or knee replacement surgery Setting: UK NHS Trust "based in the Midlands"	Prehabilitation and rehabilitation Intervention: exercise program through the Phio Engage platform (n=53) Comparator: None	User satisfaction (Net Promoter Score (NPS)) [secondary PROM] Intervention adherence (completion rate) [intermediate outcome] 12 weeks post-operatively	Funding: not reported Relevant population and intervention, and good generalisability. However, single-arm study with small sample size and no comparative data. Relevant outcomes are limited to user satisfaction and adherence.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
Physitrack (Physitrack PLC)	Hardwick-Morris 2022[78] Retrospective comparative observational study Australia	186 patients who underwent TKR Setting: Hospital centre in Queensland	Prehabilitation and rehabilitation Intervention: Physitrack digital application (n=124) Comparator: Usual care (n=62) Pre-operative consultation with orthopaedic surgeon and face-to-face physiotherapy. After surgery, patients were given an exercise instruction sheet and potentially had face-to-face physiotherapy	HRQoL (KOOS QoL subscale) [primary PROM] Joint-specific pain and function (KOOS-JR) [primary PROM] Pain (KOOS pain subscale) [primary PROM] Participation in daily life (KOOS activities of daily living subscale) [primary PROM] Hospital LoS (acute ward and rehabilitation ward) [cost and resource] 12 months post-operatively	Funding: none The care received by the comparator arm could have been similar to the NHS where a proportion of people receive face-to-face physiotherapy after surgery. Relevant study design, population, intervention, and comparator. However, limited generalisability.

Technology (manufacturer)	**Study name, design and location**	**Participants and setting**	**Intervention(s) and comparator**	**Outcomes measures and follow up (longest time point)**	**EAG comments**
Physitrack (Physitrack PLC)	Duong 2023a[77] and linked conference abstract Duong 2023b[79] RCT ACTRN12618001448235 Australia	102 adults having undergone TKR Setting: Three rehabilitation hospitals in Sydney	Rehabilitation Intervention: PhysiApp health fitness app with wearable activity tracker (Fitbit) (n=51) Comparator: Usual post-operative care (n=51) This included standard inpatient and outpatient rehabilitation. No details of how much physiotherapy people received.	HRQoL (AQoL-8D) [primary PROM] Pain (NRS, Pain Disability Index, Global Rating of Change) [primary PROM] Confidence in recovery and self-management (PAM-13) [primary PROM] At 12 months	Funding: Ramsay Hospital Research Foundation. It was unclear how relevant the comparator was to the NHS setting given uncertainty around the rehabilitation received in the comparator arm. Relevant study design, population, intervention, and comparator. However, limited generalisability.

Technology (manufacturer)	**Study name, design and location**	**Participants and setting**	**Intervention(s) and comparator**	**Outcomes measures and follow up (longest time point)**	**EAG comments**
PreActiv (Snow Squared Ltd)	Emery 2026[80,81] and related blog post[52] Single-arm observational study NCT06137781 UK	35 adults awaiting major elective surgery (with subgroup analysis in blog post of those awaiting TKR or THR) Setting: Royal United Hospital Bath NHS Foundation Trust	Prehabilitation Intervention: PreActiv v1.0 digital platform (n=35) Comparator: None	Adherence [secondary PROM] User Satisfaction [secondary PROM]	Funding: Royal United Hospital Bath NHS Foundation Trust. A subset of the population (n not specified) was within the scope of this appraisal – i.e. adults awaiting TKR or THR. Outcomes for this population were reported in the blog post. Both lead authors were employees of Snow Squared Ltd.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
Slider (AI Rehab Ltd)	Islam 2023[82] Single-arm observational study UK	17 adults awaiting knee replacement surgery Setting: The Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Foundation Trust	Prehabilitation Intervention: Slider device and application (n=17) Comparator: None	User satisfaction and acceptability (TUQ) [secondary PROM] Adverse events [secondary intermediate] At 2 weeks	Funding: none Relevant population and intervention, and good generalisability. However, single-arm study, small sample size and no comparative data. Outcomes limited to user satisfaction and adverse events.
Slider (AI Rehab Ltd)	Sampath 2024[43] conference abstract Single-arm observational study Country NR	18 patients awaiting TKR Setting: NR	Prehabilitation and rehabilitation Intervention: Slider device and application (n=18) Comparator: None	Functional performance (SLR) [primary clinical] Duration of use [secondary intermediate] Timepoint of follow-up NR	Funding: AI Rehab Ltd Relevant population and intervention. However, single-arm study, small sample size, no comparative data, and unclear generalisability. Outcomes limited to functional performance and duration of use.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
Slider (AI Rehab Ltd)	McDonald 2026[46] conference proceedings Controlled study Country NR	18 patients undergoing robotic primary TKR Setting: NR	Rehabilitation Intervention: Slider device and application (n=9) Comparator: Standard physiotherapy (n=9) No details of standard physiotherapy were presented.	Joint-specific pain and function (OKS) [primary PROM] HRQoL (EQ-5D-3L) [primary PROM] Functional performance (ROM and flexion) [primary clinical] User satisfaction [secondary PROM] Hospital LoS [cost and resources] Inpatient physiotherapy sessions [cost and resources] 6 weeks post-operatively	Funding: NR It was unclear how relevant the comparator was to the NHS setting given uncertainty around the rehabilitation received. Relevant study design, population, intervention, and comparator. However, small sample size and unclear generalisability.

Technology (manufacturer)	**Study name, design and location**	**Participants and setting**	**Intervention(s) and comparator**	**Outcomes measures and follow up (longest time point)**	**EAG comments**
Sword Thrive (Sword Health)	Correia 2019a[84] Quasi-RCT NCT03047252 Correia 2018[83] Feasibility study of Correia 2019a[84] Portugal	59 adults admitted for TKR Setting: Hospital in Porto	Rehabilitation Intervention: SWORD digital biofeedback system and mobile application (n=30) Comparator: Home-based rehabilitation with physiotherapist sessions (n=29) A home-based supervised program provided by a physiotherapist, three times a week, for 1 hour.	Therapist-patient interaction [secondary intermediate] At 8 weeks HRQoL (KOOS QoL subscale) [primary PROM] Pain (KOOS pain subscale) [primary PROM] Participation in daily life (KOOS activities of daily living subscale) [primary PROM] Functional performance (TUG, ROM as flexion and extension) [primary clinical] User satisfaction [secondary PROM] Compliance [secondary intermediate] Adverse events [secondary intermediate] 6 months	Funding: European Commission through (Grant Agreement number 672814) and Sword Health The comparator arm appeared to receive more face-to-face physiotherapy than people would receive in the NHS. Relevant study design, population, intervention, and comparator. However, small sample size, and limited generalisability.

Technology (manufacturer)	Study name, design and location	Participants and setting	Intervention(s) and comparator	Outcomes measures and follow up (longest time point)	EAG comments
Sword Thrive (Sword Health)	Correia 2019b[85] Quasi-RCT NCT03045549 Portugal	57 adults admitted for THR Setting: Hospital in Porto	Rehabilitation Intervention: SWORD digital biofeedback system and mobile application (n=30) Comparator: Home-based rehabilitation with physiotherapist sessions (n=27) A home-based supervised program provided by a physiotherapist, 3 times a week, for 1 hour (total of 24 hours of active treatment time).	HRQoL (HOOS QoL subscale) [primary PROM] Pain (HOOS pain subscale) [primary PROM] Participation in daily life (HOOS activities of daily living subscale) [primary PROM] Functional performance (TUG, ROM as flexion, abduction and extension) [primary clinical] User satisfaction [secondary PROM] Therapist-patient interaction [secondary intermediate] Adherence [secondary intermediate] Adverse events [secondary intermediate] 6 months	Funding: European Commission through (Grant Agreement number 672814) and Sword Health The comparator arm appeared to receive more face-to-face physiotherapy than people would receive in the NHS. Relevant study design, population, intervention, and comparator. However, small sample size, and limited generalisability.

Abbreviations: 30 CST, 30-second chair stand test; AQoL-8D, Assessment of Quality of Life-8 Dimensions; DASS-21, Depression, Anxiety and Stress Scale-21 Items; EAG, external assessment group; ED, emergency department; EQ-5D(-3L/-5L), EQ-5D (-3 Level/-5 Level) questionnaire; FJS, Forgotten Joint Score; GAD-7, General Anxiety Disorder-7; HES, hospital episode statistics; HOOS, Hip disability and Osteoarthritis Outcome Score; HRQoL, health-related quality of life; HSS, hospital for special surgery scale; KOOS (JR), Knee injury and Osteoarthritis Outcome Score (for Joint Replacement); KSS, Knee Society Score; LoS, length of stay; NPS, Net Promoter Score; NR, not reported; NRS, numeric rating scale; OHS, Oxford Hip Score; OKS, Oxford Knee Score; ONS4, Office for National Statistics four questions for personal wellbeing; PAM-13, 13-item Patient Activation Measure; PKR, partial knee replacement; PROM, patient-reported outcome measure; QALY, quality-adjusted life year; QoL, Quality of Life; RCT, randomised controlled trial; ROM, range of motion; SF-12, 12-item Short-Form survey; SF-36, 36-item Short-Form survey; SLR, straight leg raise; SLS, single leg stance; THR, total hip replacement; TKR, total knee replacement; TUG, timed up and go; TUQ, telehealth usability questionnaire; UK, United Kingdom; USA, United States of America; VAS, visual analogue score

5 Clinical evidence review

5.1 Quality appraisal of studies

Formal risk-of-bias assessment was not undertaken, in line with the protocol for this EUA. Instead, this report provides a narrative appraisal of the overall strength and limitations of the evidence base. Study-specific issues related to scope match are considered in Table 3. This section therefore focuses on the broader implications of including a diverse range of study designs and key considerations for interpreting the evidence collectively.

This review incorporated RCTs, prospective observational studies, retrospective analyses, and single-arm studies. This broad inclusion strategy allowed the evidence base to reflect the full range of available research on digital platforms for pre- and post-operative rehabilitation in hip and knee replacement (both full and partial replacement). Given the rapid development of digital technologies and the relative scarcity of RCT evidence, observational and single-arm studies provide important early insights.

The RCTs provided the most reliable estimates of comparative effectiveness,[86] although their certainty remained tempered by challenges such as small sample sizes. In contrast, evidence from single-arm studies offers considerably lower certainty due to the absence of comparator groups and heightened susceptibility to confounding, selection bias, and regression to the mean. While such studies provide useful early indicators of feasibility and patient experience, they cannot support strong conclusions about clinical effectiveness.

Generalising findings to routine NHS practice requires caution. There were UK-based studies and evidence generated within UK settings was more directly aligned with NHS rehabilitation pathways, staffing models, referral processes, and commissioning arrangements. It also reflected the digital infrastructure and governance frameworks commonly encountered in NHS organisations (e.g., information governance, data protection, and integration with existing electronic systems) and captures patient populations more representative of the NHS case-mix, including variation in deprivation, digital access, and comorbidity burden. However, many studies were conducted outside the UK, in systems with different rehabilitation pathways, resource structures, and patient expectations. These different rehabilitation pathways could have involved different access to physiotherapy and different quantities of physiotherapy.

In summary, the mixed evidence base offered a valuable but methodologically heterogeneous set of findings. RCTs provide the most reliable comparative data, while observational and single-arm studies contribute contextual and real-world information. Some of the reports identified through the clinical review process were also relevant to the economic analysis.[42,46,47,58,62,78,87] The combined evidence supported early indications of feasibility and potential clinical benefit, but limitations relating to bias, confounding, and generalisability must be carefully considered. Study-level discussions of these limitations and their impact on outcome interpretation are provided in section 5.3.

5.2 Unpublished studies

The EAG observed that there was a completed study, detailed in the company's RFE, which had not yet been published. The EAG was not able to search more widely for relevant studies that had not been published within the timescale of this appraisal and there could be further relevant studies.

Table 4: Unpublished studies relevant to the decision problem

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
BPMpathway (1 study)			
Accelerometry and Rehabilitation After Knee Replacement Study (ARK) NCT05412940[a]	Intervention: BPMpathway wearable sensor: Match to scope. Comparator: standard care. Unclear if matched to scope. Population: People having primary TKR: full match to scope. Prehabilitation or rehabilitation: Unclear.	01/12/2023	The company noted that the study manuscript is scheduled for completion in January 2026. Conducted in UK

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
	Outcomes: OKS and satisfaction: full match to scope.		

Abbreviations: OKS, Oxford Knee Score; TKR, Total Knee Replacement.
Note:
[a] https://clinicaltrials.gov/study/NCT05412940

5.3 Results from the evidence base

We report narratively on all outcomes for all comparative study designs and noted the availability of evidence from single-arm studies. Results for single arm studies were presented for technologies where no comparative data were available. Based on the large number of studies identified, we prioritised the reporting of outcomes based on the frequency of their reporting. In addition to narrative reporting, numeric results for prioritised outcomes are also presented in tabulated format, but only for comparative study designs

The EAG's clinical experts agreed that NHS prehabilitation was often limited, though an ideal programme would last around 6–8 weeks, with some suggesting longer. Rehabilitation typically spans 6–18 weeks, depending on how individuals progress, and usually involves approximately 3–6 in-person physiotherapy sessions, though some people may receive only one session and then continue with self-directed exercises. People having THR typically have a faster recovery trajectory and require less support than those with TKR. A minority of patients who recover more slowly may require extended rehabilitation up to 24 weeks. Overall, provision varies widely across the NHS and is shaped by local resources and individual needs.

5.3.1 Primary outcomes

Health-related quality of life

Seventeen included studies reported on this outcome. Three studies, a controlled prospective study (Hong 2024a[54]), a quasi-RCT (Hong 2024b[55]), and a prospective comparative cohort (Malhotra, unpublished[42]) reported HRQoL for BPMpathway using SF-36 (Hong 2024a and Hong 2024b) and SF-12 (Malhotra). The comparator arm in Hong 2024a appeared to be reasonably well aligned with standard care in the NHS but the treatment received by the comparator arms in Hong 2024b and Malhotra were unclear. One prospective single-arm study (Wilkins 2025[57]) reported HRQoL (ONS4) in a wide musculoskeletal (MSK) population who used Good Boost and the company provided subgroup data in people who had hip or knee replacement surgery. One RCT (Saunders 2020) and one retrospective comparative cohort (Gray 2022[58]) reported HRQoL for GoWellHealth using EQ-5D measures. Saunders 2020 additionally reported QoL using the HOOS QoL subscale. Gray 2022 was a UK study and the comparator arm was understood to have received the NHS standard of care in rehabilitation. Saunders 2020 was conducted in Australia and the comparator arm received fewer face-to-face physiotherapy sessions than people who required physiotherapy would have received in the NHS.

Two RCTs (Alexander 2023,[68] Crawford 2021b[73]) reported HRQoL for mymobility using EQ-5D-5L. The people in the comparator arms in these studies received more face-to-face physiotherapy than people typically would in the NHS.

Four single-arm observational studies reported HRQoL for moveUP: one prospective cohort (Lebleu 2023[62]) reported QALYs, measured using EQ-5D and calculated using the Belgian value set,[88] and the KOOS QoL subscale; a second prospective cohort (Lebleu 2021) reported QoL using the HOOS and KOOS QoL subscales; and one retrospective cohort (Van Overschelde 2023[65]) reported quality of life using the KOOS and HOOS QoL subscales. One RCT (Duong 2023a[77]) reported HRQoL for Physitrack using AQoL-8D; one comparative retrospective observational study (Hardwick-Morris 2022[78]) reported propensity score matched HRQoL for Physitrack using the KOOS QoL subscale. The rehabilitation received by comparator arm in Hardwick-Morris 2022[78] was not described in detail but it did appear to be similar to that offered in the NHS. The rehabilitation in Duong 2023a[77] was not reported in sufficient detail to assess its similarity to standard of care in the NHS.

One prospective controlled study reported as a conference abstract (McDonald 2026[46]) qualitatively reported HRQoL for Slider using EQ-5D-3L.

The treatment received by the comparator arm, and its relevance to the NHS setting, in McDonald was unclear. Two quasi-RCT reported HRQoL for Sword Thrive; one (Correia 2019a[84]) using the KOOS quality of life subscale and another (Correia 2019b[85]) the HOOS quality of life subscale. The participants in the comparator arms in the two Correia (2019a, 2019b) trials received notably more face-to-face physiotherapy than would be expected in the NHS.

However, Lebleu 2024[66] reported measuring EQ-5D values, but did not report these results. Van Overschelde 2023[65] reported KOOS and HOOS QoL subscales, but only compared patients who were discharged early or later due to the COVID-19 pandemic.

A summary of the numeric results is shown in Table 5.

Table 5: Health-related quality of life

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
RCTs and quasi-RCTs										
Hong 2024b[55] TKR Rehabilitation only SF-36. It was unclear what measure was reported: PCS/MCS/ individual domain	BPMpathway	54	6 months post-operatively	Mean (SD) 54.08 (8.81)	Mean (SD) 93.90 (5.59)	NR	NR	NR	p=0.000[a]	Significant difference favouring the intervention
	Home-based rehabilitation	56		Mean (SD) 52.84 (7.18)	Mean (SD) 80.96 (5.63)	NR	NR			
Saunders 2020 THR Prehabilitation and rehabilitation Change in EQ-5D-5L index score. The score was calculated using the UK	GoWellHealth	32	6 months post-operatively	Mean (SD) 0.64 (0.19)	NR	Mean (SD) 0.22 (0.18)	NR	Mean (95% CI) -0.05 (-0.15 to 0.05)	p=0.20	
	Standard practice package of care	39		Mean (SD) 0.59 (0.21)	NR	Mean (SD) 0.27 (0.22)	NR			

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
EQ-5D-5L value set.										
Saunders 2020 THR Prehabilitation and rehabilitation Change in EQ-5D-5L VAS	GoWellHealth	31	6 months post-operatively	Mean (SD) 64.79 (20.02)	NR	Mean (SD) 15.77 (16.90)	NR	Mean (95% CI) 2.54 (-4.63 to 9.72)	0.48	
	Standard practice package of care	39		Mean (SD) 68.55 (18.23)	NR	Mean (SD) 13.23 (13.21)	NR			
Saunders 2020 THR Prehabilitation and rehabilitation HOOS QoL subscale	GoWellHealth	32	6 months post-operatively	Mean (SD) 30.72 (17.57)	NR	Mean (SD) 45.12 (27.39)	NR	Mean (95% CI) -2.34 (-14.19 to 9.55)	0.70	
	Standard practice package of care	39		Mean (SD) 27.26 (16.09)	NR	Mean (SD) 47.44 (22.75)	NR			
Alexander 2023[68] TKR and PKR[b] Rehabilitation only EQ-5D-5L	mymobility	160	12 months post-operatively	NR	Mean (SD) 0.88 (0.17)	Mean (SD) 0.27 (0.26)	NR	NR	p=0.10 for follow-up; p=0.64 for change	
	Standard of care	241		NR	Mean (SD) 0.91 (0.13)	Mean (SD) 0.28 (0.24)				

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
Crawford 2021b[73] THR Prehabilitation and rehabilitation EQ-5D-5L	mymobility	167	3 months post-operatively	Mean (SD) 0.5 (0.3)	Mean (SD) 0.8 (0.2)	Mean (SD) 0.4 (0.3)	NR	NR	p=0.393	
	Traditional physiotherapy	198		Mean (SD) 0.5 (0.3)	Mean (SD) 0.8 (0.2)	Mean (SD) 0.3 (0.3)				
Duong 2023a[77] TKR Rehabilitation only AQoL-8D	Physitrack	51	12 months	NR	NR	NR	NR	Mean (95% CI) -6.68 (-10.07 to -3.28)	p<0.001	Significant difference favouring the intervention
	Usual care	51		NR	NR	NR	NR			
Correia 2019a[84] TKR Rehabilitation only KOOS QoL subscale	Sword	30	6 months	Median (IQR) 13.0 (19.0)	Median (IQR) 94.0 (12.0)	Median (IQR) 81.0 (20.0)	NR	Hodges-Lehman difference (95% CI) 36.5 (24.0 to 49.0)	p<0.001	The difference was statistically and clinically significant, favouring the intervention
	Home-based rehabilitation with physiotherapy sessions	29		Median (IQR) 25.0 (19.0)	Median (IQR) 63.0 (37.5)	Median (IQR) 43.0 (40.5)	NR			
Correia 2019b[85] THR	Sword	30	6 months	Median (IQR) 13.0 (13.0)	Median (IQR) 94.0 (12.0)	Median (IQR) 75.0 (32.0)	NR	Mean (95% CI) 19.0 (6.0 to 25.0)	p=0.01	The difference was statistically

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
Rehabilitation only HOOS QoL subscale	Home-based rehabilitation with physiotherapy sessions	27		Median (IQR) 19.0 (25.0)	Median (IQR) 81.0 (19.0)	Median (IQR) 56.0 (31.0)	NR			and clinically significant, favouring the intervention
Comparative non-randomised studies										
Hong 2024a[54] TKR Rehabilitation only SF-36	BPMpathway	21	6 months post-discharge	Mean (SD) 58.20 (8.21)	Mean (SD) 90.79 (7.39)	NR	NR	NR	p=0.373	No significant difference was observed
	Standardised health education manual	21		Mean (SD) 57.51 (9.07)	Mean (SD) 88.31 (10.19)	NR	NR			
Malhotra unpublished[42] TKR Rehabilitation only SF-12 physical component score	BPMpathway	14	12 months post-operatively	No difference between groups (p=0.15)	NR	NR	NR	NR	p=0.33	No significant difference
	Conventional physiotherapy	14		NR	NR	NR	NR			
Malhotra unpublished[42]	BPMpathway	14		No difference between	NR	NR	NR	NR	p=0.53	No significant difference

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
TKR Rehabilitation only SF-12 mental component score			12 months post-operatively	groups (p=0.52)						
	Conventional physiotherap	14		NR	NR	NR	NR			
Gray 2022[58] THR Prehabilitation and rehabilitation EQ-5D-3L	GoWellHealth	308	6 months post-operatively	NR	NR	NR	NR	Linear regression mean (SD) 0.114 (0.026)	p<0.001	EQ-5D improvements were significantly higher for GoWellHealth compared to standard care for both THR and TKR
	Standard package of care	938		NR	NR	NR	NR			
Gray 2022[58] TKR Prehabilitation and rehabilitation EQ-5D-3L	GoWellHealth	287	6 months post-operatively	NR	NR	NR	NR	Linear regression mean (SD) 0.070 (0.032)	p=0.039	
	Standard package of care	873		NR	NR	NR	NR			
Hardwick-Morris 2022[78] TKR Prehabilitation and rehabilitation KOOS QoL subscale	Physitrack	232	12 months post-operatively	Mean (SD) 26.2 (16.8)[c]	NR	NR	NR	NR	p=0.475	No significant difference observed
	Usual care	62		Mean (SD) 25.4 (19.6)[c]	NR	NR	NR			

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
McDonald 2026[46] TKR Rehabilitation only EQ-5D-3L	Slider	9	6 weeks post-operatively	NR	Mean 85	NR	NR	NR	p=0.778	Better in the intervention group
	Standard physiotherapy	9		NR	Mean 79	NR	NR			
Single-arm studies for technologies with no comparative evidence										
Wilkins 2025[57] TKR Rehabilitation only ONS4	Good Boost	[redacted]	12 weeks post-operatively	[redacted]	[redacted]	[redacted]	NR	NR	NR	[redacted]
Wilkins 2025[57] THR Rehabilitation only ONS4	Good Boost	[redacted]	12 weeks post-operatively	[redacted]	[redacted]	[redacted]	NR	NR	NR	[redacted]
Lebleu 2023 TKR QALYs from EQ-5D	moveUP	87	6 months post-operatively	Mean (SD) 0.59 (0.26)	Mean (SD) 0.85 (0.12)	Mean (SD) 0.26 (0.25)	NR	NA	NA	The mean QALY gain was 0.26 (0.25)
Lebleu 2023 TKR	moveUP	127	6 months post-operatively	Mean (SD) 30 (18)	Mean (SD) 56 (22)	Mean (SD) 26 (27)	NR	NA	NA	Significant improvement of 26 points in KOOS-QoL

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
KOOS QoL subscale										

Abbreviations: 95% CI, 95% confidence interval; AQoL-8D, Assessment of Quality of Life-8 Dimensions; EQ-5D(-3L/5L), EQ-5D (-3 Level/-5 Level); IQR, interquartile range; HOOS, Hip disability and Osteoarthritis Outcome Score; KOOS, Knee injury and Osteoarthritis Outcome Score; NA, not applicable; NR, not reported; ONS, Office for National Statistics; PKR, partial knee replacement; QALY, quality-adjusted life years; QoL, quality of life; RCT, randomised controlled trial; SD, standard deviation; SF-12, 12-item Short-Form survey; SF-36, 36-item Short-Form survey; THR, total hip replacement; TKR, total knee replacement, VAS, visual analogue score.

Notes:

[a] As reported in the paper

[b] Results by PKR and TKR subgroups are also reported – all differences are non-significant

[c] Propensity score matched

Joint-specific function and pain

Included studies reported on knee-specific function using Knee injury and Osteoarthritis Outcome Scores (KOOS) composite scores, Oxford Knee Score (OKS), Knee Society Score (KSS), Hospital for Special Surgery (HSS) knee-rating scale, the Forgotten Joint Score (FJS) and the Patient-Specific Complaint (PSC) scale.

Four included studies reported on KOOS composite scores as an outcome. One prospective comparative cohort (Malhotra, unpublished[42]) reported KOOS for BPMpathway. It was unclear how well aligned the comparator arm in Malhotra (unpublished) was with standard care in the NHS. One single-arm observational study (Lebleu 2024[66]) reported KOOS for moveUP. One RCT (Alexander 2023[68]) reported KOOS-JR for mymobility, though the EAG noted that participants in the comparator arm likely received more face-to-face physiotherapy than patients would receive in the NHS. One comparative retrospective observational study (Hardwick-Morris 2022[78]) reported KOOS-JR for Physitrack, where care received in the comparator arm was not comprehensively described, but appeared similar to standard care received in the NHS. However, Lebleu 2024[66] reported measuring KOOS, but did not report these results at follow-up.

For OKS, one comparative retrospective study (Gray 2022[58]) reported on GoWellHealth. This study was conducted in the UK using NHS data and therefore the standard of care arm was understood to be well-aligned to NHS care. Two single-arm observational studies (Lebleu 2023,[62] Lebleu 2024[66]) reported on moveUP, and one controlled study (McDonald 2026[46]) reported on Slider. Lebleu 2024,[66] however, did not report any OKS results at follow-up. For KSS, one comparative prospective cohort (Malhotra, unpublished[42]) reported knee score and functional knee score data for BPMpathway. For HSS, two studies, a quasi-RCT (Hong 2024b[55]) and a controlled study (Hong 2024a[54]), reported on BPMpathway. The comparator arm in Hong (2023)[54] appeared to be reasonably well aligned with standard care in the NHS.

For FJS, one single-arm observational study (Lebleu 2024[66]) reported on moveUP, but did not report any results at follow-up. For the PSC, one single-arm observational study (Wilkins 2025[57]) reported on Good Boost in a wide MSK population; the company provided subgroup data in people who had knee replacement surgery.

Included studies reported on hip-specific function using Hip disability and Osteoarthritis Outcome Scores (HOOS) composite scores, Oxford Hip Score (OHS) and the FJS.

Three included studies reported on HOOS composite scores as an outcome. One single-arm observational study (Lebleu 2024[66]) reported HOOS for moveUP. However, these results were not reported at follow-up. One RCT (Crawford 2021b[73]) reported HOOS-JR for mymobility. It was unclear how relevant the comparator was to the NHS setting given uncertainty around the rehabilitation received. An additional single-arm secondary analysis also reported HOOS for mymobility, but only comparing changes in HOOS during the earlier and later periods of the COVID-19 pandemic (Miner 2024). For OHS, one comparative retrospective study (Gray 2022[58]) reported on GoWellHealth and, as noted above, the trial was conducted in the UK. For FJS, one single-arm observational study (Lebleu 2024[66]) reported on moveUP, but did not report any results at follow-up. One prospective single-arm study (Wilkins 2025[57]) reported on the Patient-Specific Functional Scale in a wide MSK population who used Good Boost and the company provided subgroup data in people who had hip replacement surgery.

A summary of the numeric results is shown in Table 6.

Table 6: Joint-specific function

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
RCTs and quasi-RCTs										
Hong 2024b[55] TKR Rehabilitation only HSS	BPMpathway	54	6 months post-operatively	Mean (SD) 55.81 (10.00)	Mean (SD) 92.46 (5.77)	NR	NR	NR	p=0.000	Significant difference favouring the intervention
	Home-based rehabilitation	56		Mean (SD) 54.63 (9.31)	Mean (SD) 84.32 (5.36)	NR	NR			
Alexander 2023[68] TKR and PKR[a] Rehabilitation only KOOS-JR	mymobility	160	12 months post-operatively	NR	Mean (SD) 84.1 (14.0)	Mean (SD) 30.5 (17.1)	NR	NR	p=0.88 at follow-up; p=0.51 for change	NR
	Standard of care	241		NR	Mean (SD) 83.8 (14.6)	Mean (SD) 32.1 (17.4)				
Crawford 2021b[73] THR Prehabilitation and rehabilitation HOOS-JR	mymobility	167	3 months post-surgery	Mean (SD) .3 (12)	Mean (SD) 81.4 (12.8)	Mean (SD) 28.4 (17)	NR	NR	p=0.011	Significantly lower change scores in the intervention arm (favours comparator). However, the
	Traditional physiotherapy	198		Mean (SD)	Mean (SD)	Mean (SD)				

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
				49.3 (13.1)	83.5 (14.5)	33.9 (18.2)				change was reported to be less than the MCID.
Comparative non-randomised studies										
Hong 2024a[54] TKR Rehabilitation only HSS	BPMpathway	21	6 months post-discharge	Mean (SD) 55.24 (11.44)	Mean (SD) 89.81 (3.60)	NR	NR	NR	p=0.000	Significant difference with higher scores in the intervention group (favours intervention)
	Standardised health education manual	21		Mean (SD) 54.57 (9.99)	Mean (SD) 76.19 (3.14)	NR	NR			
Malhotra, unpublished[42] TKR Rehabilitation only KOOS	BPMpathway	14	12 months post-operatively	No difference between groups (p=0.87)	NR	NR	NR	NR	p=0.49	No significant difference
	Conventional physiotherapy	14			NR	NR	NR			
Malhotra, unpublished[42] TKR Rehabilitation only KSS knee score	BPMpathway	14	12 months post-operatively	No difference between groups (p=0.64)	NR	NR	NR	NR	p=0.5	No significant difference
	Conventional physiotherapy	14		NR	NR	NR	NR			

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
Malhotra, unpublished[42] TKR Rehabilitation only KSS functional knee score	BPMpathway	14	12 months post-operatively	No difference between groups (p=1)	NR	NR	NR	NR	p=0.01	Significantly better in intervention group
	Conventional physiotherapy	14			NR	NR	NR			
Gray 2022[58] THR Prehabilitation and rehabilitation OHS	GoWellHealth	308	6 months post-operatively	NR	NR	NR	NR	Linear regression mean (SD) 4.106 (0.937)	p<0.001	Significantly greater improvement compared with standard care
	Standard package of care	938		NR	NR	NR	NR			
Gray 2022[58] TKR Prehabilitation and rehabilitation OKS	GoWellHealth	287	6 months post-operatively	NR	NR	NR	NR	Linear regression mean (SD) 5.016 (1.429)	p<0.001	Significantly greater improvement compared with standard care
	Standard package of care	873		NR	NR	NR	NR			
Hardwick-Morris 2022[78] TKR Prehabilitation and rehabilitation KOOS-JR	Physitrack	124	12 months post-operatively	Mean (SD) 46.8 (15.1) [b]	NR	NR	NR	NR	p=0.170	No significant difference observed
	Usual care	62		Mean (SD) 44.9 (13.1) [b]	NR	NR	NR			

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
McDonald 2026[46] TKR Rehabilitation only OKS	Slider	9	6 weeks post-operatively	NR	Mean 39	NR	NR	NR	p=0.045	OKS significantly better in the intervention group
	Standard physiotherapy	9		NR	Mean 33	NR	NR			
Single-arm studies for technologies with no comparative evidence										
Wilkins 2025[57] TKR Rehabilitation only PSC	Good Boost	[redacted]	12 weeks post-operatively	[redacted]	[redacted]	[redacted]	NR	NR	NR	[redacted]
Wilkins 2025[57] THR Rehabilitation only PSC	Good Boost	[redacted]	12 weeks post-operatively	[redacted]	[redacted]	[redacted]	NR	NR	NR	[redacted]
Lebleu 2023[62] TKR OKS	moveUP	127	6 months post-operatively	Mean (SD): 24 (8)	Mean (SD) 38 (7)	Mean (SD) 14 (9)	NR	NR	NR	Improved over the course of the study

Abbreviations: HOOS, Hip disability and Osteoarthritis Outcome Score; HSS, Hospital for Special Surgery; KOOS(-JR), Knee injury and Osteoarthritis Outcome Score (-for Joint Replacement); KSS, Knee Society Score; MCID, minimal clinically important difference; NR, not reported; OHS, Oxford Hip Score; OKS, Oxford Knee Score; PKR, partial knee replacement; PSC, Patient-Specific Complaint-specific compliant; RCT, randomised controlled trial; SD, standard deviation; THR, total hip replacement; TKR, total knee replacement.

Notes:

[a] Results by PKR and TKR subgroups are also reported – all differences are non-significant

[b] Propensity score matched

Thirteen studies reported on pain as an outcome. One prospective comparative cohort (Malhotra, unpublished[42]) reported pain on a visual analogue scale (VAS) for BPMpathway, one single-arm observational study (Neumann-Langen 2023[56]) reported pain using Pain DETECT and the KOOS pain subscale for the ForPatientApp, one RCT (Saunders 2020) reported pain using the HOOS pain subscale for GoWellHealth, one single-arm observational study reported as a conference abstract (Dahlberg 2023[61]) reported pain using a numeric rating scale (NRS) for Joint Academy, and one RCT each reported on pain using NRS for mymobility (DeMik 2024[69]) and Physitrack (Duong 2023a[77]) with the second RCT also reporting pain disability index and global rating of change (Duong 2023a[77]). It was unclear how well-aligned the comparator arm in Malhotra was when compared with standard care in the NHS. The comparator arm in Saunders (2020) received fewer post-operative face-to-face physiotherapy than would be received in the NHS. It was unclear how relevant the comparator was to the NHS setting in DeMik (2024) and Duong (2023) due to uncertainty around the rehabilitation received.

Three single-arm cohorts reported pain for moveUP: one retrospective study (Van Overschelde 2023[65]) using VAS and the KOOS and HOOS pain subscales, one prospective study (Lebleu 2023[62]) using the KOOS pain subscale and the other (Lebleu 2021) reporting results for both the HOOS and KOOS pain subscale. One comparative retrospective observational study (Hardwick-Morris 2022[78]) reported pain for Physitrack using the KOOS pain subscale. Two quasi-RCTs reported pain for Sword Thrive; one (Correia 2019a[84]) using the KOOS pain subscale and another (Correia 2019b[85]) the HOOS pain subscale. The physiotherapy received post-operatively in Hardwick-Morris at al. (2022) appeared to be similar to NHS care whereas the participants in the comparator arms in the two Correia (2019a, 2019b) trials received notably more face-to-face physiotherapy than would be expected in the NHS.

However, DeMik 2024[69] did not report the pain outcome in the arms to which participants were randomised and instead reported it in people who either did, or did not, return to sexual activity. Furthermore, it was unclear how relevant the comparator was to the NHS setting given uncertainty around the prehabilitation/rehabilitation received. Neumann-Langen 2023[56] only reported results for Pain DETECT in figures, as did Van Overschelde 2023[65] for VAS. Furthermore, Van Overschelde 2023 reported pain with KOOS and HOOS pain subscales only comparing patients who were discharged early or later due to the COVID-19 pandemic. One prospective single-arm study (Wilkins 2025[57]) reported pain (VAS) for patients using Good Boost in a wide MSK population and the company provided subgroup data in people who had hip or knee replacement surgery.

A summary of the numeric results is shown in Table 7.

Table 7: Pain

Study ID, indication, outcome name	Arm	N at follow-up	Follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
RCTs and quasi-RCTs										
Saunders 2020 THR Prehabilitation and rehabilitation HOOS pain subscale	GoWellHealth	32	6 months post-operatively	Mean (SD) 51.49 (12.41)	NR	Mean (SD) 38.52 (19.01)	NR	-2.21 (-11.27 to 6.86)	p=0.63	NR
	Standard practice package of care	38		Mean (SD) 45.33 (14.07)	NR	Mean (SD) 40.72 (18.88)	NR			
Duong 2023a[77] TKR Rehabilitation only 10-point NRS	Physitrack	51	12 months post-operatively	Mean (SD) 5.5 (2.6)	NR	NR	NR	Mean (95% CI) -4.91 (-5.63 to –4.19)	p<0.001	Significant reduction in pain intensity favouring the intervention group
	Usual care	51		Mean (SD) 6.4 (2.1)	NR	NR	NR			
Duong 2023a[77] TKR Rehabilitation only Pain disability index	Physitrack	51	12 months post-operatively	NR	NR	NR	NR	Mean (95% CI) -15.98 (-20.43 to –11.52)	p<0.001	Significant reduction in pain intensity favouring the intervention group
	Usual care	51		NR	NR	NR	NR			
Duong 2023a[77]	Physitrack	51		NR	NR	NR	NR		p=0.16	NR

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
TKR Rehabilitation only Impression of change in pain intensity - global rating of change	Usual care	51	12 months post-operatively	NR	NR	NR	NR	Mean (95% CI) 2.59 (0.70 to 9.60)		
Correia 2019a[84] TKR Rehabilitation only KOOS pain subscale	Sword	30	6 months	Median (IQR) 33.0 (12.0)	Median (IQR) 100.0 (8.0)	Median (IQR) 61.0 (11.8)	NR	Hodges-Lehman difference (95% CI) 20.0 (14.0 to 28.0)	p<0.001	The difference was statistically and clinically significant, favouring the intervention
	Home-based rehabilitation with physiotherapy sessions	29		Median (IQR) 47.0 (24.0)	Median (IQR) 86.0 (23.5)	Median (IQR) 39.0 (24.0)	NR			
Correia 2019b[85] THR Rehabilitation only HOOS pain subscale	Sword	30	6 months	Median (IQR) 33.0 (13.0)	Median (IQR) 100.0 (5.0)	Median (IQR) 65.0 (18.0)	NR	Mean (95% CI) 7.0 (-5.0 to 17.0)	p=0.21	NR
	Home-based rehabilitation with physiotherapy sessions	27		Median (IQR) 33.0 (35.0)	Median (IQR) 100.0 (7.0)	Median (IQR) 53.0 (30.0)	NR			
Comparative non-randomised studies										

Study ID, indication, outcome name	Arm	N at follow-up	Follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
Malhotra, unpublished[42] TKR Rehabilitation only VAS (Wong-Baker Faces Pain Rating Scale)	BPMpathway	14	12 months post-operatively	No difference between groups (p=0.5)	NR	NR	NR	NR	p=0.8	No significant difference
	Conventional physiotherapy	14			NR	NR	NR			
Hardwick-Morris 2022[78] TKR Prehabilitation and rehabilitation KOOS pain subscale	Physitrack	232	12 months post-operatively	Mean (SD) 45.1 (18.4)[a]	NR	NR	NR	NR	p=0.223	No significant difference observed
	Usual care	62		Mean (SD) 42.7 (15.4)[a]	NR	NR	NR			
Single-arm studies for technologies with no comparative evidence										
Wilkins 2025[57] TKR Rehabilitation only VAS	Good Boost	[redacted]	12 weeks post-operatively	[redacted]	[redacted]	[redacted]	NR	NR	NR	[redacted]

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
Wilkins 2025[57] THR Rehabilitation only VAS	Good Boost	[redacted]	12 weeks post-operatively	[redacted]	[redacted]	[redacted]	NR	NR	NR	[redacted]
Neumann-Langen 2023 TKR KOOS pain subscale	ForPatientApp	54	6 weeks post-operatively	NR	NR	NR	NR	NA	NA	Significant reduction in pain (p<0.01)
Dahlberg 2023[61] Knee or hip surgery NRS	Joint Academy	110	3 months of pre-operative intervention	Average pain 7.0	Average pain 5.5	NR	NR	NA	NA	Statistically and clinically significant reduction in participant-reported pain
Lebleu 2023[62] TKR KOOS pain subscale	moveUP	127	6 months post-operatively	Mean (SD) 44 (19)	Mean (SD) 78 (19)	Mean (SD) 36 (20)	NR	NA	NA	Significant improvement of 14 points in KOOS-Pain

Abbreviations: 95% CI, 95% confidence interval; HOOS, Hip disability and Osteoarthritis Outcome Score; IQR, interquartile range; KOOS, Knee injury and Osteoarthritis Outcome Score; NA, not applicable; NR, not reported; NRS, numeric rating scale; PKR, partial knee replacement; RCT, randomised controlled trial; SD, standard deviation; THR, total hip replacement; TKR, total knee replacement; VAS, visual analogue scale

Note:

[a] Propensity score matched

Meaningful function and participation in daily life

Eight studies reported on this outcome. One single-arm observational study (Neumann-Langen 2023[56]) reported using the KOOS activities of daily living subscale for the ForPatientApp. One RCT (Saunders 2020) reported this outcome using the HOOS activities of daily living subscale for GoWellHealth. The comparator arm in Saunders (2020) received fewer post-operative face-to-face physiotherapy than would be received in the NHS. Two single-arm studies, a prospective (Lebleu 2023[62]) and retrospective (Van Overschelde 2023[65]) cohort, reported KOOS activities of daily living subscale for moveUP. Another single-arm prospective cohort (Lebleu 2021) reported HOOS and KOOS activities of daily living subscales for moveUP. For Physitrack, a comparative retrospective observational study (Hardwick-Morris 2022) reported KOOS activities of daily living subscale, respectively. For Sword Thrive, two quasi-RCTs (Correia 2019a,[84] Correia 2019b[85]) reported the activities of daily living subscales for KOOS and HOOS, respectively. The rehabilitation received by the comparator arm in Hardwick-Morris was not described in detail but did appear to be similar to that offered in the NHS. The participants in the comparator arms in the two Correia (2019a, 2019b) trials received notably more face-to-face physiotherapy than would be expected in the NHS. However, Van Overschelde 2023 reported KOOS activities of daily living subscale results only by comparing patients who were discharged early or later due to the COVID-19 pandemic.

A summary of the numeric results is shown in Table 8.

Table 8: Meaningful function and participation in daily life

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
RCTs and quasi-RCTs										
Saunders 2020[48] THR Prehabilitation and rehabilitation HOOS activities of daily living subscale	GoWellHealth	32	6 months post-operatively	Mean (SD) 56.44 (15.50)		Mean (SD) 30.71 (19.50)	NR	Mean (SD) -6.84 (-16.19 to 2.50)	p=0.15	The difference favoured standard practice but it was not statistically
	Standard practice package of care	39		Mean (SD) 47.78 (14.86)		Mean (SD) 37.55 (19.76)	NR			
Correia 2019a[84] TKR Rehabilitation only KOOS activities of daily living subscale	Sword	30	6 months	Median (IQR) 34.0 (18.0)	Median (IQR) 97.0 (6.0)	Median (IQR) 58.0 (17.5)	NR	Hodges-Lehman difference (95% CI) 19.0 (11.0 to 26.0)	p<0.001	The difference was statistically and clinically significant
	Home-based rehabilitation with physiotherapy sessions	29		Median (IQR) 41.0 (18.0)	Median (IQR) 87.0 (14.5)	Median (IQR) 43.0 (23.0)	NR			
Correia 2019b[85] THR Rehabilitation only HOOS activities of daily living subscale	Sword	30	6 months	Median (IQR) 29.0 (15.0)	Median (IQR) 96.0 (11.0)	Median (IQR) 63.0 (22.0)	NR	Difference in median (95% CI) 7.0 (-1.0 to 15.0)	p=0.10	NR
	Home-based rehabilitation with	27		Median (IQR)	Median (IQR)	Median (IQR)	NR			

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
	physiotherapy sessions			28.0 (28.0)	88.0 (19.0)	56.0 (25.0)				
Comparative non-randomised studies										
Hardwick-Morris 2022[78] TKR Prehabilitation and rehabilitation KOOS activities of daily living subscale	Physitrack	232	12 months post-operatively	Mean (SD) 50.6 (19.1) [a]	NR	NR	NR	NR	p=0.757	No significant difference observed
	Usual care	62		Mean (SD) 47.0 (16.2) [a]	NR	NR	NR			
Single-arm studies for technologies with no comparative evidence										
Neumann-Langen[56] 2023 TKR KOOS activities of daily living subscale	ForPatientApp	54	6 weeks post-operatively	NR	NR	NR	NR	NA	NA	Significant improvement in ADL (p<0.05)
Lebleu 2023[62] TKR KOOS activities of daily living subscale	moveUP	127	6 months post-operatively	Mean (SD) 49 (20)	Mean (SD) 78 (18)	Mean (SD) 31 (22)	NR	NA	NA	Improvement in ADL over the course of the study

Abbreviations: 95% CI, 95% confidence interval; ADL, activities of daily living; IQR, interquartile range; HOOS, Hip disability and Osteoarthritis Outcome Score; KOOS, Knee injury and Osteoarthritis Outcome Score; NA, not applicable; NR, not reported; PKR, partial knee replacement; RCT, randomised controlled trial; SD, standard deviation; THR, total hip replacement; TKR, total knee replacement

Note:

[a] Propensity score matched

Confidence in recovery and self-management

Two RCTs reported on this outcome. Duong 2023a reported on the 13-item Patient Activation Measure (PAM-13) for Physitrack, finding non-significant mean differences (95% CI) between groups for both scores (-0.04 (-4.67 to 4.59); p=0.99) and activation levels (0.03 (-0.26 to 0.32); p=0.83) at 12 months. It was unclear how relevant the comparator was to the NHS setting in due to uncertainty around the rehabilitation received. Saunders 2020 reported on Self-Efficacy for Managing Chronic Disease (SEMCD) for GoWellHealth, finding non-significant mean (95% CI) difference in change from baseline between intervention and control groups at 6 months (0.31 (-0.61 to 1.22); p=0.51). The comparator arm in Saunders (2020)[48] received fewer post-operative face-to-face physiotherapy than would be received in the NHS.

Healthcare use

Five studies reported on this outcome. Two RCTs (Crawford 2021a,[72] Crawford 2021b[73]) reported on this outcome for mymobility; both measuring this as non-standard care physician visits, emergency department visits, urgent care visits and readmission within 90 days. Crawford 2021a reported statistically significantly fewer emergency department visits in the intervention arm than the control arm in people who had a knee arthroplasty. Both RCTs found non-significant differences between groups for non-standard care physician visits, urgent care visits and readmission in patients having undergone THR, TKR and PKR, respectively. It was unclear how relevant the comparator was to the NHS setting given uncertainty around the rehabilitation received.

One comparative retrospective observational study (Starkey 2025[49]) reported on this outcome for myrecovery. In this study, zero people who used the app were readmitted, compared to 1.9% hip of non-app users who had a THR and 1.4% of non-app users who had a TKR. The timepoint was not specified. The 28-day emergency department attendance was 0% in app users compared to 3.4% hip of non-app users who had a THR and 5.2% of non-app users who had a TKR. The data used were sourced in the UK and therefore the comparator arm was understood to have received the NHS standard of care in prehabilitation/rehabilitation. A prospective observational study (Tsang 2019[59]) compared people who activated the GoWellHealth app (n=595) to those who did not (n=176) and found readmission rates were lower in patients using the app (3.6% versus 5.6%).

Two single-arm observational studies, a prospective (Lebleu 2023[62]) and retrospective (Van Overschelde 2023[65]) cohort, reported on this outcome for moveUP; both measuring this as unplanned consultations. Lebleu at al. reported that two people (2.4%) were readmitted to the hospital for manipulation under anaesthesia. Van Overschelde (2013) reported that 30 (10.3%) people had complications/readmissions/unplanned consultations

Escalation to face-to-face clinical review

No studies reported on this outcome.

Mobility and functional performance tests

Ten included studies reported on range of motion (ROM) as an outcome. Three studies, a single-arm observational study (Cooper 2022[53]), a quasi-RCT (Hong 2024b[55]), and a prospective comparative cohort (Malhotra, unpublished[42]) reported ROM for BPMpathway. In both Hong (2024) and Malhotra it was unclear how relevant the comparator was to the NHS setting given uncertainty around the rehabilitation received.

A single-arm observational study (Neumann-Langen 2023[56]) reported ROM for ForPatientApp. A single-arm cohort (Lebleu 2023[62]) reported active ROM for moveUP. Two RCTs (Tripuraneni 2021,[67] [69]Crawford 2021b[73]) reported active ROM for mymobility. Tripuraneni 2021 reported results by intervention subgroups of higher (completion ≥90% app-based exercises) and lower (completion < 90% app-based exercises) compliance. One prospective controlled study reported as a conference abstract (McDonald 2026[46]) reported ROM for Slider. Two quasi-RCTs (Correia 2019a,[84] Correia 2019b[85]) reported ROM for Sword Thrive. The comparator arms in the four RCTs/quasi-RCTs received slightly more physiotherapy than would be expected in NHS usual care; it was unclear how relevant the comparator in McDonald was to the NHS setting.

Four randomised or quasi-randomised trials (DeMik 2024,[69] Crawford 2021b,[73] Correia 2019a,[84] Correia 2019b[85]) also reported on timed up-and-go (TUG) for mymobility and Sword Thrive. The face-to-face physiotherapy reported in the comparator arms on the two Correia (2019a, 2019b) trials was notably more than people would receive in the NHS. For mymobility, Crawford 2021b[73] reported non-significant differences in TUG means (SDs) of 11.8 (5.1) seconds in the intervention and 11.9 (5.0) seconds in the control group at 90 days (p=0.859). DeMik 2024, however, only compared TUG between those who had and had not returned to sexual activity. For Sword Thrive, Correia 2019a reported significantly better TUG scores (p<0.001) in the intervention group at 6 months, with median (IQR) of 6.86 (1.6) in the intervention and 8.74 (4.0) in the control group. Correia 2019b also reported significantly better TUG (p<0.001) in the intervention group at 6 months, with median (IQR) of 6.38 (2.3) in the intervention and 8.20 (4.2) in the control group.

Two RCTs (DeMik 2024[69], Crawford 2021a[72]) reported on single-leg stance (SLS) for mymobility. For mymobility, Crawford 2021a[72] reported non-significant differences in SLS means (SDs) of 22.9 (21.1) seconds in the intervention and 21.6 (19.9) seconds in the control group at 3 months (p=0.651). DeMik 2024, however, only compared SLS between those who had and had not returned to sexual activity.

Three single-arm studies (Lebleu 2021, Lebleu 2024,[66] Miner 2024[71]) reported on step count for moveUP and mymobility and one single-arm study (Sampath 2024[43]) reported on straight leg raise for Slider. One single-arm study (Dahlberg 2023) reported on the 30 Second Chair Stand Test for Joint Academy and found people improved from 9.5 at baseline to 15 three months after the operation. A summary of the numeric results for ROM is shown in Table 9.

Table 9: Joint range of motion

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
RCTs and quasi-RCTs										
Hong 2024b[55] TKR Rehabilitation only ROM	BPMpathway	54	6 months post-operatively	Mean (SD) 80.52 (4.12)	Mean (SD) 124.10 (3.91)	NR	NR	NR	p=0.000	Significant difference favouring the intervention
	Home-based rehabilitation	56		Mean (SD) 80.89 (3.72)	Mean (SD) 115.76 (5.19)	NR	NR			
Tripuraneni 2021[67] TKR Prehabilitation and rehabilitation Active ROM	mymobility (high compliance)	54	3 months post-operatively	NR	Mean (SD) 119.4 (8.3)	Mean (SD) 4.6 (14.3)	NR	NR	p=0.1594 at follow-up; p=0.0818 for change	NR
	mymobility (lower compliance)	99		NR	Mean (SD) 117.4 (10.2)	Mean (SD) 2.6 (13.8)	NR		p=0.9097 at follow-up; p=0.2952 for change	
	Traditional physiotherapy	184		NR	Mean (SD) 117.2 (11.3)	Mean (SD) 0.3 (13.3)	NR		Reference	

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
Crawford 2021b[73] THR Prehabilitation and rehabilitation Mean hip flexion	mymobility	167	3 months post-operatively		Mean (SD) 101° (10.8°)	NR	NR	NR	p = 0.507	
	Traditional physiotherapy	198			Mean (SD) 100° (11.3°)	NR	NR			
Correia 2019a[84] TKR Rehabilitation only Lying flexion, °	Sword	30	6 months	Mean (SD) 80.7 (12.4)	Mean (SD) 103.4 (10.6)	Mean (SD) 22.7 (12.9)	NR	Mean (95% CI) 5.8 (-2.1 to 13.8)	p=0.15	No significant or clinically meaningful difference
	Home-based rehabilitation with physiotherapy sessions	29		Mean (SD) 84.7 (18.7)	Mean (SD) 101.5 (13.3)	Mean (SD) 16.8 (17.4)	NR			
Correia 2019a[84] TKR Rehabilitation only Sitting flexion, °	Sword	30	6 months	Mean (SD) 85.3 (16.0)	Mean (SD) 102.5 (10.8)	Mean (SD) 17.2 (19.1)	NR	Mean (95% CI) -5.4 (-3.4 to 14.1)	p=0.22	No significant of clinically meaningful difference
	Home-based rehabilitation with physiotherapy sessions	29		Mean (SD) 90.4 (13.1)	Mean (SD) 102.2 (12.3)	Mean (SD) 11.9 (13.9)	NR			
Correia 2019a[84] TKR	Sword	30	6 months	Mean (SD) 71.6 (20.3)	Mean (SD) 97.4 (9.9)	Mean (SD) 25.7 (20.1)	NR	Mean (95% CI)	p=0.002	Significantly higher and clinically

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
Rehabilitation only Standing flexion, °	Home-based rehabilitation with physiotherapy sessions	29		Mean (SD) 78.8 (16.6)	Mean (SD) 89.9 (11.7)	Mean (SD) 11.2 (14.0)	NR	14.6 (5.5. to 23.6)		meaningful in the digital intervention group
Correia 2019a[84] TKR Rehabilitation only Sitting extension, °	Sword	30	6 months	Mean (SD) 26.5 (8.4)	Mean (SD) 7.1 (6.6)	Mean (SD) -19.4 (8.4)	NR	Mean (95% CI) -4.3 (-8.8 to 0.2)	p=0.06	No significant or clinically meaningful difference
	Home-based rehabilitation with physiotherapy sessions	29		Mean (SD) 24.8 (7.8)	Mean (SD) 9.7 (5.8)	Mean (SD) -15.1 (8.7)	NR			
Correia 2019b[85] THR Rehabilitation only Lying flexion, °	Sword	30	6 months	Median (IQR) 28.2 (19.1)	Median (IQR) 80.7 (24.4)	Median (IQR) 52.5 (26.6)	NR	Difference in median (95% CI) 19.6 (6.73 to 32.50)	p=0.003	Significant difference between mean changes, favouring the intervention
	Home-based rehabilitation with physiotherapy sessions	27		Median (IQR) 37.1 (20.0)	Median (IQR) 70.0 (19.3)	Median (IQR) 32.8 (25.6)	NR			
Correia 2019b[85] THR Rehabilitation only Lying abduction, °	Sword	30		Median (IQR) 12.2 (5.4)	Median (IQR) 49.8 (18.2)	Median (IQR) 37.6 (18.2)	NR	Difference in median (95% CI) 11.9 (3.57 to 20.20)	p=0.01	Significant difference between mean changes, favouring the intervention
	Home-based rehabilitation with	27		Median (IQR) 15.9 (9.1)	Median (IQR) 41.6 (14.3)	Median (IQR) 25.7 (15.2)	NR			

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
	physiotherapy sessions									
Correia 2019b[85] THR Rehabilitation only Standing flexion, °	Sword	30		Median (IQR) 45.1 (15.9)	Median (IQR) 90.2 (23.1)	Median (IQR) 45.1 (22.6)	NR	Difference in median (95% CI) 9.9 (-0.79 to 20.57)	p=0.07	No significant difference between mean changes
	Home-based rehabilitation with physiotherapy sessions	27		Median (IQR) 49.6 (16.7)	Median (IQR) 84.8 (19.8)	Median (IQR) 35.2 (20.6)	NR			
Correia 2019b[85] THR Rehabilitation only Standing hyperextension, °	Sword	30		Median (IQR) -11.9 (7.0)	Median (IQR) -34.1 (15.1)	Median (IQR) -22.2 (13.3)	NR	Difference in median (95% CI) -8.7 (-14.72 to -2.59)	p=0.01	Significant difference between mean changes, favouring the intervention
	Home-based rehabilitation with physiotherapy sessions	27		Median (IQR) -15.4 (8.8)	Median (IQR) -28.8 (9.2)	Median (IQR) -13.5 (11.1)	NR			
Correia 2019b[85] THR Rehabilitation only Standing abduction, °	Sword	30	6 months	Median (IQR) 23.5 (6.8)	Median (IQR) 51.7 (15.1)	Median (IQR) 28.2 (14.3)	NR	Difference in median (95% CI) 10.2 (3.64 to 16.74)	p=0.003	Significant difference between mean changes, favouring the intervention
	Home-based rehabilitation with physiotherapy sessions	27		Median (IQR) 25.8 (10.7)	Median (IQR) 43.8 (11.8)	Median (IQR) 18.0 (12.1)	NR			
Comparative non-randomised studies										

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
Malhotra, unpublished[42] TKR ROM	BPMpathway	14	12 months post-operatively	No difference between groups (p=0.46)	Mean (SD) 109.3 (8.3)	NR	NR	NR	p=0.65	No significant difference
	Conventional physiotherapy	14			Mean (SD) 110.7 (8.3)	NR	NR			
McDonald 2026[46] TKR Fixed flexion	Slider	9	6 weeks post-operatively	NR	5	NR	NR	NR	p=0.127	Fixed flexion showed a trend favouring the intervention
	Standard physiotherapy	9		NR	1	NR	NR			
McDonald 2026[46] TKR ROM	Slider	9	6 weeks post-operatively	Mean 118	Mean 104	NR	NR	NR	p=0.121	Superior in the intervention group
	Standard physiotherapy	9		Mean 108	Mean 89	NR	NR			
Single-arm studies for technologies with no comparative evidence										
Neumann-Langen[56] 2023 TKR Flexion and extension	ForPatientApp	98	6 weeks post-operatively	NR	NR	There was an improvement in ROM with a median of 90/5/0°	NR	NA	NA	
Neumann-Langen[56] 2023 TKR Flexion	ForPatientApp	98	3 months post-operatively	NR	NR	NR	NR	NA	NA	Further improvements in flexion parameters of up to 120°

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
Lebleu 2023[62] TKR Active ROM	moveUP	127	6 weeks post-operatively	NR	Median (SD) active range of motion at 6 weeks post-operatively was 105° (19°)	NR	NR	NA	NA	

Abbreviations: 95% CI, 95% confidence interval; IQR, interquartile range; NA, not applicable; NR, not reported; PKR, partial knee replacement; RCT, randomised controlled trial; ROM, range of motion; SD, standard deviation; THR, total hip replacement; TKR, total knee replacement

5.3.2 Secondary outcomes

Psychological outcomes

Two studies reported on this outcome. One single-arm observational study (Neumann-Langen 2023[56]) reported on this outcome for the ForPatientApp, while one RCT (DeMik 2024[69]) reported on this outcome for mymobility. The people in the comparator arms in DeMik (2024) received more face-to-face physiotherapy than people typically would in the NHS. Neumann-Langen 2023 reported on stress and depression using the Depression, Anxiety and Stress Scale (DASS-21); the authors graphically depicted DASS-21 scores and narratively reported that stress and depression were significantly improved from the pre- to the post-operative timepoint ($p<0.01$ and $P<0.001$, respectively). There appeared to be no significant change in anxiety from the pre- to post-operative timepoint. DeMik (2024) reported on anxiety but only compared those who had and had not returned to sexual activity.

User satisfaction and acceptability

Fifteen studies reported outcomes related to user satisfaction and acceptability. Of these, two (Saunders 2020,[48] GoWellHealth; Alexander 2023,[68] mymobility) were RCTs and two were quasi-RCTs (Correia 2019a[84] and 2019b,[85] Sword Thrive), though outcomes were only reported in the intervention arm for three of these (Alexander 2023,[68] Correia 2019a[84] and 2019b[85]). The comparator arm in Saunders at al. received fewer face-to-face physiotherapy sessions than people who required physiotherapy would have received in the NHS. The comparator arm in Alexander (2023) appeared to receive more face-to-face physiotherapy than people would receive in the NHS and the face-to-face physiotherapy reported in the comparator arms on the two Correia (2019a, 2019b) trials was notably more than people would receive in the NHS.

One study was controlled (McDonald 2026,[46] Slider), though this was a conference abstract and only a p-value for between-arm differences was reported. Details of the care received in the comparator arm of McDonald at al. were not reported. Single arm studies were available for BPMpathway

(Cooper 2022[53]), ForPatientApp (Neumann-Langen 2023[56]), moveUP (Lebleu 2023,[62] Van Overschelde 2023[65]), mymobility (Booth 2023,[74] Parikh 2024,[76] Rossi 2024[75]), Phio (Thacker 2025[50]), PreActiv (Emery 2026[52,80]), and Slider (Islam 2023[82]).

Table 10: User satisfaction and acceptability

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
RCTs and quasi-RCTs								
Saunders 2020 THR Somewhat/strongly agree: I feel that the package that was supplied assisted me in my recovery	GoWellHealth	50	6 months post-operatively	NA	N (%) 36 (92.3%)	NA	NA	NR
	Standard practice package of care	49		NA	N (%) 37 (86.0%)	NA		
Saunders 2020 THR Somewhat/strongly agree: I found the information easy to follow	GoWellHealth	50	6 months post-operatively	NA	N (%) 39 (100.0%)	NA	NA	NR
	Standard practice package of care	49		NA	N (%) 40 (93.0%)	NA		
Saunders 2020 THR Somewhat/strongly agree: Overall, I was satisfied with the application	GoWellHealth	50	6 months post-operatively	NA	N (%) 33 (89.2%)	NA	NA	NR
Alexander 2023 TKR	mymobility	160	12-months post-operatively	NA	N (%) 80 (81.6%)	NA	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
Participants with perceived significant positive or positive impact on overall surgical and post-surgical experience								
Alexander 2023 TKR Participants with perceived significant positive or positive effect on amount of anxiety	mymobility	160	12-months post-operatively	NA	N (%) 57 (58.8%)	NA	NA	NR
Alexander 2023 TKR Participants with significantly more or more prepared for surgery and recovery	mymobility	160	12-months post-operatively	NA	N (%) 65 (67.7%)	NA	NA	NR
Alexander 2023[68] TKR Participants with better or much better experience with mymobility app compared to previous	mymobility	160	12-months post-operatively	NA	N (%) 68 (78.2%)	NA	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
medical and surgical experiences								
Alexander 2023[68] TKR Participants with better or much better anxiety with mymobility app compared to previous medical and surgical experiences	mymobility	160	12-months post-operatively	NA	N (%) 56 (53.8%)	NA	NA	NR
Correia 2019a[84] TKR Satisfaction (scale of 1 – 10, higher scores are better)	Sword	29	6 months	NA	Mean (SD) 9.90 (0.41)	NA	NA	Follow-up doesn't include seven participants who withdrew consent in the first week of the study, due to the inability to interact with the system (7/30, 23.3% of the recruited sample)

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
Correia 2019b[85] THR Satisfaction (scale of 1 – 10, higher scores are better)	Sword	34	6 months	NA	Mean (SD) 9.94 (0.24)	NA	NA	One participant did not complete this.
Comparative non-randomised studies								
McDonald 2016[46] TKR Satisfaction (details of measure NR)	Slider	9	6 weeks post-operatively	No difference between groups (p=0.5)	NR	NR	NR (p = 0.017)	Company stated that there was a statistically significant difference in satisfaction scores between groups, in favour of Slider. However, further details and results NR.
	Standard physiotherapy	9			NR	NR		
Single-arm studies								
Cooper 2022[53] TKR or PKR	BPMpathway	17	Mean (SD) 35.10 (11.2) days post-operatively	NA	13/16 (81.25%)	NR	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
Agree or strongly agree with "I liked using the range-of-motion sensor"								
Cooper 2022[53] TKR or PKR Agree or strongly agree with "Downloading the app was easy to do"	BPMpathway	17	Mean (SD) 35.10 (11.2) days post-operatively	NA	15/16 (93.75%)	NR	NA	NR
Cooper 2022[53] TKR or PKR Agree or strongly agree with "I understood how to do my rehabilitation using the range-of-motion sensor and app"	BPMpathway	17	Mean (SD) 35.10 (11.2) days post-operatively	NA	14/17 (82.35%)	NR	NA	NR
Cooper 2022[53] TKR or PKR Agree or strongly agree with "The range-of-motion sensor motivated me to do my rehabilitation"	BPMpathway	17	Mean (SD) 35.10 (11.2) days post-operatively	NA	15/17 (88.24%)	NR	NA	NR
Cooper 2022[53] TKR or PKR	BPMpathway	17	Mean (SD) 35.10 (11.2) days post-operatively	NA	11/17 (64.71%)	NR	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
Agree or strongly agree with "I felt secure with the remote monitoring as the physiotherapist could see my progress"								
Cooper 2022[53] TKR or PKR Agree or strongly agree with "I felt secure contacting the rehabilitation team via the app"	BPMpathway	17	Mean (SD) 35.10 (11.2) days post-operatively	NA	11/17 (64.71%)	NR	NA	NR
Cooper 2022[53] TKR or PKR Agree or strongly agree with "I was able to use the range-of-motion sensor by myself"	BPMpathway	17	Mean (SD) 35.10 (11.2) days post-operatively	NA	15/17 (88.24%)	NR	NA	NR
Neumann-Langen 2023[56] TKR Net Promoter Score (0 – 10, higher scores represent more satisfaction with the intervention)	ForPatientApp	54	6 weeks post-operatively	NA	NR	NR	NA	States that this was measured but outcomes not reported

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
Lebleu 2023[62] TKR Knee Society satisfaction score (0-40, higher scores are better)	moveUP	127	6 months post-operatively	Pre-op mean (SD) 15 (7)	Mean (SD) 30 (8)	Mean (SD) 16 (11)	NA	NR
Lebleu 2023[62] TKR Answer 'yes' to question 'would you choose digital rehabilitation again?'	moveUP	127	6 months post-operatively	NA	113/127 (89%)	NA	NA	NR
Van Overschelde 2023[65] TKR Knee Society satisfaction score (0-40, higher scores are better)	moveUP	82	3 months	NA	Median (IQR): Pre-COVID group: 26 (18 – 30) COVID group: 29 (22 – 32)	NR	NA	NR
Booth 2023[74] TKR, THR and PKR Agree or disagree that the app was easy to use (5 point scale from strongly agree to strongly disagree)	mymobility	78	3 months	NA	Company stated that 92% of participants said it was easy to use (THR 92.7%, TKR/PKR 92.6%)	NR	NA	Data consistent with the measurement scale NR and therefore subject to bias

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
Booth 2023[74] TKR, THR and PKR Agree or disagree that the app motivated them to complete the rehabilitation/therapy exercises (5 point scale from strongly agree to strongly disagree)	mymobility	78	3 months	NA	THR 87.8% and TKR/PKR 94.5% stated that the intervention motivated them	NR	NA	Data consistent with the measurement scale NR and therefore subject to bias
Booth 2023[74] TKR, THR and PKR Agree or disagree that the app allowed my surgeon and their team to more closely monitor my recovery (5 point scale from strongly agree to strongly disagree)	mymobility	78	3 months	NA	THR 65.9% and TKR/PKR 81.9% felt that the technology allowed the surgeon to more closely monitor them	NR	N	Data consistent with the measurement scale NR and therefore subject to bias
Booth 2023[74] TKR, THR and PKR Agree or disagree that they would recommend the app to other patients following total joint replacement (5 point scale from strongly	mymobility	78	3 months	NA	THR 85% and TKR/PKR 94.5% would recommend	NR	NA	Data consistent with the measurement scale NR and therefore subject to bias

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
agree to strongly disagree)								
Booth 2023[74] TKR, THR and PKR Agree or disagree that the app could replace in person physical therapy following total joint replacement (5 point scale from strongly agree to strongly disagree)	mymobility	78	3 months	NA	THR 85.4% and TKR/PKR 41.3% agreed that digital could replace in-person	NR	NA	Data consistent with the measurement scale NR and therefore subject to bias
Booth 2023[74] TKR, THR and PKR Which intervention participants thought was the best approach for recovery following total joint replacement (in person physical therapy only, digital rehabilitation only, combination of in-person and digital)	mymobility	78	3 months	NA	THR 90.2% and TKR/PKR 84.4% considered a combination of in-person and digital to be best	NR	NA	Data consistent with the measurement scale NR and therefore subject to bias
Booth 2023[74] TKR, THR and PKR	mymobility	78	3 months	NA	On average, participants felt that 35% of in-person	NR	NA	Data consistent with the

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
For those who considered a combination of in-person and digital to be best, what proportion of in-person delivery could be reduced by digital (20%, 40%, 60% or 80%)					visits could be reduced in place of digital			measurement scale NR and therefore subject to bias
Rossi 2024[75] Ease of use	mymobility	64	485 days	NA	100% found mymobility easy to use	NA	NA	NR
Rossi 2024[75] Informed by the app	mymobility	64	485 days	NA	93.3% reported feeling more informed since using mymobility.	NA	NA	NR
Rossi 2024[75] Surgical anxiety	mymobility	64	485 days	NA	93.3% reported a reduction in surgical anxiety through mymobility usage	NA	NA	NR
Parikh 2024[76] TKR Surgery satisfaction; measure and scale NR	mymobility	50	12 months	NA	Mean 8.76 (in-person visit); 8.87 (virtual visit)	NA	NA	Reported as both high, but no information on scale and measurement.

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
Thacker 2025[50] Hip/knee arthroplasty Net Promoter Scores (1-10)	Phio Engage	20	12 weeks	NA	Eleven people scored Phio 9-10 and are considered 'promoters' of Phio Engage.	NA	NA	NR
Emery 2026[52,80] TKR or PKR Average anxiety score	PreActiv	NR	NR	NA	Reduced from mild (9/21) to normal (7/21)	NA	NA	NR
Emery 2026[52,80] TKR or PKR Preparation for surgery	PreActiv	NR	NR	NA	Participants agreed or strongly agreed that the exercises were appropriate for their preparation needs	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (intervention provides for physiotherapy needs before surgery; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	100% strongly agree or agree	NA	NA	NR
Islam 2023[82] TKR	Slider	17	2-weeks	NA	87% agree or strongly agree	NA	NA	NR

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline (p-value, if reported)**	**Between-group difference (p-value, if reported)**	**Authors' narrative**
Telehealth Usability Questionnaire (intervention saves time travelling to clinic or hospital; 5-point scale ranging from strongly agree to strongly disagree)					(estimated from figure)			
Islam 2023[82] TKR Telehealth Usability Questionnaire (intervention improves access to physiotherapy; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	87% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (belief they could become productive quickly with the intervention; 5-point scale ranging from	Slider	17	2-weeks	NA	87% agree or strongly agree (estimated from figure)	NA	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
strongly agree to strongly disagree)								
Islam 2023[82] TKR Telehealth Usability Questionnaire (believe it was easy to learn to use; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	78% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (believe it was simple to use; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	78% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (intervention is able to do everything I want it to be able to do; 5-point scale ranging from	Slider	17	2-weeks	NA	81% agree or strongly agree (estimated from figure)	NA	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
strongly agree to strongly disagree)								
Islam 2023[82] TKR Telehealth Usability Questionnaire (intervention is simple and easy to understand; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	84% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (participants like using the intervention; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	84% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (interacting with the intervention is pleasant; 5-point scale ranging	Slider	17	2-weeks	NA	81% agree or strongly agree (estimated from figure)	NA	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
from strongly agree to strongly disagree)								
Islam 2023[82] TKR Telehealth Usability Questionnaire (intervention gave error messages and these were clear; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	41% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (after making a mistake, they could recover easily and quickly; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	81% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (exercised using	Slider	17	2-weeks	NA	94% agree or strongly agree (estimated from figure)	NA	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline (p-value, if reported)	Between-group difference (p-value, if reported)	Authors' narrative
intervention were the same as in-clinic; 5-point scale ranging from strongly agree to strongly disagree)								
Islam 2023[82] TKR Telehealth Usability Questionnaire (overall satisfaction; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	95% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (would use the intervention again after an operation; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	100% agree or strongly agree (estimated from figure)	NA	NA	NR
Islam 2023[82] TKR Telehealth Usability Questionnaire (acceptable way to	Slider	17	2-weeks	NA	100% agree or strongly agree (estimated from figure)	NA	NA	NR

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline (p-value, if reported)**	**Between-group difference (p-value, if reported)**	**Authors' narrative**
perform pre-operative interventions; 5-point scale ranging from strongly agree to strongly disagree)								
Islam 2023[82] TKR Telehealth Usability Questionnaire (feel comfortable performing exercises using the intervention; 5-point scale ranging from strongly agree to strongly disagree)	Slider	17	2-weeks	NA	100% agree or strongly agree (estimated from figure)	NA	NA	NR

Abbreviations: IQR, Interquartile range; NA, not applicable; NR, not reported; PKR, partial knee replacement; RCT, Randomised Controlled Trial, SD, Standard Deviation; THR, total hip replacement; TKR, total knee replacement.

Return to usual activities

Three studies reported this outcome. One single-arm retrospective study (Lebleu 2024[66]) reported on this outcome for moveUP and two RCTs (Alexander 2023 and DeMik 2024[69]) reported on this outcome for mymobility. The people in the comparator arms in the RCTs received more face-to-face physiotherapy than people typically would in the NHS. Alexander 2023[68] reported on a number of activities, finding no significant differences between groups for walking without assistive devices (p=0.39), driving independently (p=0.81), returning to work (p=0.65), light household activities (p=0.3) or heavy household activities (p=1.00); however, the authors did find a significant difference (p=0.02) between the intervention (n=83, 59.3%) and control (n=84, 46.4%) groups for return to sexual activities. Also, participants in the mymobility arm returned to walking without an assistive device significantly sooner than the control group. DeMik 2024[69] also reported on return to sexual activity, finding comparable return to sexual activity in the intervention (n=59, 58.4%) and control (n=57, 39.6%) groups (p=0.014) as well as similar mean (range) days to return to sexual activity in the intervention (42.0 (10 to 94) and control (33.1 (7 to 78)) groups (p=0.023). Lebleu 2024[66] reported on return to pre-operative physical activity levels. They reported that participants who had undergone PKR returned to pre-operative total number of steps by 36 days; those who had undergone TKR took 90 days. For peak 6-minute consecutive cadence, participants with PKR and TKR took 25 and 41 days, respectively, to return to pre-operative levels. For peak 1-minute cadence, participants with PKR and TKR took 28 and 51 days, respectively, to return to pre-operative values. These metrics were only depicted graphically for comparisons of hip and knee replacements.

Intervention adherence

Ten studies reported outcomes related to intervention adherence. Three RCTs reported this outcome for BPMpathway (Hong 2024b[55]) and Sword (Correia 2019a[84], Correia 2019b[85]). It was unclear how well aligned the care received in the comparator arms of Hong (2024b) was to care in the NHS. Three comparative non-randomised studies reported this outcome for

BPMpathway (Malhotra[42], Hong 2024a[54]), mymobility (Miller 2024[70]). Four single-arm studies reported for BPMpathway (Cooper 2022[53]), Phio Engage (Thacker 2025[50]), PreActiv (Emery 2026[52,80]), and Slider (Sampath 2024[43]). The rehabilitation received by the comparator arm in Hong at al. appeared to be reasonably well aligned with standard care in the NHS. It was unclear how well aligned the comparators in the other two comparative non-randomised studies were to NHS care. There was no standardised method of measuring intervention adherence and those reported included compliance with recommended session frequency, proportion of participants completing each survey on time, and duration intervention was used.

Table 11: Intervention adherence

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
RCTs and quasi-RCTs										
Hong 2024b[55] TKR Function exercise compliance score	BPMpathway	54	6 months post-operatively	NR	Mean (SD) 54.26 (6.66)	NR	NR	NR	p=0.000	Significant difference favouring the intervention
	Home-based rehabilitation	56		NR	Mean (SD) 45.88 (5.56)	NR	NR			
Correia 2019a[84] TKR Compliance with recommended session frequency (5 times per week)	Sword	30	6 months	NA	4/30 (13.3%)	NA	NA	NR	NR	Seven patients withdrew consent in the first week of the study, due to the inability to interact with the system
	Home-based rehabilitation with physiotherapy sessions	29		NA	NR	NA	NA			
Correia 2019a[84] TKR Total active treatment time	Sword	30	6 months	NA	Median 31.5 hours (IQR 18.0, range 10.8, 69.1)	NA	NA	NR	P=0.005	

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
	Home-based rehabilitation with physiotherapy sessions	30		NA	NR	NA	NA			
Correia 2019b[85] THR Compliance with recommended session frequency (5 times per week)	Sword	30	6 months	NA	5/30 (16.7%)	NA	NA	NR	NR	Data for control NR
	Home-based rehabilitation with physiotherapy sessions	27		NA	NR	NA	NA			
Miller 2024[70] Secondary analysis of Alexander 2023[68] RCT THR Proportion of participants completing each survey within the designated windows	mymobility	159	12 months	NA	113/159 (71.1%)	NA	NA	NR	p<0.0001	
	Standard of care	197		NA	97/197 (49.2%)	NA	NA			

Study ID, indication, outcome name	**Arm**	**N at follow-up**	**Timepoint of follow-up**	**Baseline**	**Follow-up**	**Change from baseline**	**p-value change from baseline**	**Between-group difference**	**p-value between-group difference**	**Authors' narrative**
Miller 2024[70] Secondary analysis of Alexander 2023[68] RCT TKR/PKR Proportion of participants completing each survey within the designated windows	mymobility	187	12 months	NA	135/187 (72.2%)	NA	NA	NR	p<0.0001	
	Standard of care	229		NA	123/229 (53.7%)	NA	NA			
Comparative non-randomised studies										
Malhotra, unpublished[42] TKR Non-compliance with device in ITT population (non-compliance and measure not defined)	BPMpathway	14	12 months post-operatively	NA	5/20 (25%)	NR	NR	NR	NR	Data for control NR
	Conventional physiotherapy	14			NR	NR	NR			

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
Malhotra, unpublished[42] TKR Intervention compliance in those included in study (compliance and measure not defined)	BPMpathway	14	12 months post-operatively	NA	84.4% (range 15 – 100)	NA	NA	NR	NR	
	Conventional physiotherapy	14		NA	NR	NA	NA			
	Standard of care	229		NA	123/229 (53.7%)	NA	NA			
Hong 2024a[54] TKR Functional exercise compliance scale (scale NR but possibly 15 to 75, higher scores indicating greater compliance with the exercise)	BPMpathway	21	6 months post-operatively	Mean (SD) 45.29 (7.40)	Mean (SD) 41.95 (12.26)	NR	NR	NR	p=0.868	No change from admission and no significant difference observed
	Home-based rehabilitation	21		Mean (SD) 45.57 (7.13)	Mean (SD) 41.48 (4.57)	NR	NR			
Single-arm studies										
Cooper 2022[53] TKR or PKR	BPMpathway	21	Mean (SD) 35.10 (11.2)	NA	32.3% (19.6% pre-operative	NA	NA	NA	NA	NR

Study ID, indication, outcome name	Arm	N at follow-up	Timepoint of follow-up	Baseline	Follow-up	Change from baseline	p-value change from baseline	Between-group difference	p-value between-group difference	Authors' narrative
Compliance with 3x daily exercises			days post-operatively		and 41% post-operative)					
Cooper 2022[53] TKR or PKR Compliance with 1x daily exercises	BPMpathway	21	Mean (SD) 35.10 (11.2) days post-operatively	NA	52.4% (34.4% pre-operative and 62.1% post-operative)	NA	NA	NA	NA	NR
Thacker 2025[50] Hip/knee arthroplasty Completion rate	Phio Engage	38	12 weeks	NA	52.6%	NA	NA	NA	NA	NR
Emery 2026[52,80] TKR or PKR Completion rate	PreActiv	NR	NR	NA	93%	NA	NA	NA	NA	NR
Sampath[43] TKR Duration intervention was used	Slider	12	NR	NA	Mean (SD) 42.9 weeks (18.2)	NA	NA	NA	NA	NR

Abbreviations: IQR, Interquartile range; NA, not applicable; NR, not reported; PKR, partial knee replacement; RCT, Randomised Controlled Trial; SD, Standard Deviation; THR, total hip replacement; TKR, total knee replacement.Abbreviations: IQR, Interquartile range; ITT, intention to treat; NA, not applicable; NR, not reported; PKR, partial knee replacement; RCT, Randomised Controlled Trial; SD, Standard Deviation; THR, total hip replacement; TKR, total knee replacement.

Interaction with healthcare professionals

Five studies reported outcomes related to interaction. Two quasi-RCTs (Correia 2018,[83] Correia 2019b[85]) reported this outcome for Sword Thrive, both measuring this as the number of face-to-face sessions, extra contacts, and telephone calls. Correia 2018[83] reported 24 face-to-face sessions in the control group and 3 face-to-face sessions in the intervention group; the intervention group also received a mean (SD) of 0.4 (0.7) extra contacts for technical assistance as well as median (IQR) of 2.5 (3.0) telephone calls, in addition to the two scheduled per-protocol calls. Correia 2019b[85] reported 24 face-to-face sessions in the control group and 3 face-to-face sessions in the intervention group; the intervention group also received a mean (range) of 0.6 (0 to 2) extra contacts for technical assistance as well as median (range) of 4 (0 to 7) telephone calls, in addition to the two scheduled per-protocol calls. Three single arm-observational studies reported results for BPMpathway (Cooper 2022[53]), Joint Academy (Dahlberg 2023[61]), and mymobility (Parikh 2024[76]). Cooper 2022 recorded 81 visits (11 outpatient appointments and 70 at-home physiotherapy sessions), reporting a 35.7% reduction in face-to-face visits and median reduction of visits per participant from 6 to 4. Furthermore, they reported that 212 messages (35 pre-operatively and 177 post-operatively) were sent during the pilot study, with most patients using the feature to contact clinicians. The topics of these messages are also detailed. Dahlberg 2023 reported narratively that most users remain highly engaged and accessing the platform multiple times each week. Parikh 2024 reported 36% and 26% of patients reviewed platform data weekly and daily, respectively.

Early identification of concerns

Two studies reported this outcome. One single-arm cohort (Lebleu 2023[62]) reported on this outcome for moveUP; one single-arm observational study (Sampath 2024[43]) reported on this outcome for Slider. Lebleu 2023 reported on various types of alerts raised, and actions taken, through the moveUP platform. A total of 67 alerts were raised through the web-based platform for 32 patients, with the types of alerts detailed. The most frequent actions taken by clinicians based on these were medication changes (27%), wound information and reassurance (15%) and referral (15%); ten physical consultations resulted from these referrals, therefore potentially avoiding 57 consultations. Sampath 2024 reported on the identification of infections and abnormal trends by the Slider algorithm ahead of scheduled clinic appointments. The study reported that two patients developed infections or abnormal trends in their knee exercise results; these were detected by the Slider algorithm before their appointments, with the result that patients were seen earlier.

5.4 Adverse events and clinical risk

Adverse events related to the intervention were not well-reported across the included studies. No studies reported adverse outcomes that were clearly related to the safety of the intervention over usual care; rather, studies typically reported adverse event data that was more relevant to the consequences of surgery and the clinical effectiveness of the intervention (e.g. infections, need for manipulation). There were no reports of adverse events from the Medicines and Healthcare products Regulatory Agency (MHRA) or US Food and Drug Administration (FDA) websites.

Three studies reported or commented on adverse event rates in a way that may relate to the safety of the intervention – in all cases, it was not clear what was measured and how, and so to what extent this was relevant to the NICE scope. This evidence was as follows:

- Islam 2023[82] (Slider; single-arm study). No data relevant to the safety of the intervention was reported, however the authors noted that no participants disclosed adverse effects or safety concerns while using the intervention.
- Correia 2019a[84] (Sword; quasi-RCT). The authors commented that no adverse events were reported in any of the study groups after the end of the active treatment stage. In particular, they noted no falls occurred during this period.
- Correia 2019b[85] (Sword; quasi-RCT). The authors commented that there was no statistically significant difference in adverse events and safety

between the intervention arms. They noted that one fall occurred in each arm, however this did not occur during use of the intervention (no detail was provided about when the fall in the control arm occurred).

Overall, the EAG did not consider the included evidence to provide meaningful evidence for the safety of the technology.

5.5 Technologies with no or little evidence

Three technologies had no-in scope comparative or non-comparative data for the population of interest. These were: getUBetter, Huma, and QuestPrehab. We describe the available evidence in out-of-scope populations for these technologies in section 5.5.1.

Two technologies – Phio and myrecovery – have some evidence presented in the report but no in-scope patient-reported or functional effectiveness evidence. We describe any available effectiveness evidence in out-of-scope populations for these technologies in section 5.5.2.

None of the studies described in this section are counted as formal includes in this assessment, as they are all out of scope. However, given the scarcity of in-scope evidence for the above name technologies, the EAG included a summary of a selection of out-of-scope articles to support committee discussion.

5.5.1 Technologies for which there is no in-scope evidence

Table 12 lists studies identified for getUBetter and QuestPrehab that were in out-of-scope populations. No studies were identified for Huma.

getUBetter

There were three studies available for getUBetter, all in mixed MSK populations (no information was offered regarding the proportion of conditions in the mixed populations).[89-91] Husselbee 2025[89] was the only study of the three that was an assessment of effectiveness of the app. It was a mixed methods evaluation that investigated a similar mixed population (all patients on community MSK waiting list). People on the waiting list were sent a postal invite for getUBetter. Of 14,500 invitations sent, just 4.5% downloaded the app and only 17 responded to the follow-up questionnaire. Of these respondents, 17% reported improved pain, 21% reported improved confidence and had been helped back to work.

The other two apps investigated how access and uptake could be improved. Wanless[91] used questionnaires and structured interviews of people self-managing MSK conditions and clinicians in primary care to investigate digital exclusion. The paper reported that one of the main reasons for some people not wanting to use the app is the concern that it would replace F2F interaction with physiotherapists. A dedicated helpline for queries was recommended by patients to help with engagement, motivation and reassurance when using the app. Finally, Berry 2022[90] explored a logic model of behaviour change to support getUBetter to scale into the NHS. There was no intervention component of the study, and the population of focus was people self-managing their musculoskeletal condition – no specific mention of hip or knee replacement or surgery was made.

Huma

No studies were identified

QuestPrehab

Two linked studies were identified for QuestPrehab, looking at a population of people with cancer.[92,93] Wu (2021),[92] found that the intervention was feasible and that participants improved their self-perceived health ($p = 0.001$), and fatigue ($p = 0.000$), which helped to mitigate the unwanted consequences of cancer treatment, although no change in EQ-5D. The authors reported a high recruitment rate (76%), a high retention rate (72%), and positive patient feedback. Wu (2022)[93] was a follow up study that conducted 22 interviews to understand the capabilities, opportunities, and motivations of participants in Wu (2021).

5.5.2 Technologies for which there is no in-scope evidence of patient-reported or functional effectiveness

Table 13 lists effectiveness studies for Phio and myrecovery that were in out-of-scope (but closely related) populations.

Phio

Two single arm studies by Thacker[94,95] were both in the wrong population (people with mild to moderate hip and knee OA). The first, a single arm, pragmatic retrospective study across both the NHS and private settings[94] included 2,225 NHS participants and 3,198 private participants. The exercise programmes were of 12 weeks duration. The primary outcomes included measures of primary and secondary patient-actuated functional goals (PAFG) – assessed using a 0-10 scale (0 = 'unable to do at all' to 10 = 'able to do as before') – and pain scores (also measured on a 0-10 scale). The study reported significant improvements in PAFM and pain. The second Thacker study, another single arm pragmatic study,[95] was in 121 participants, and again of 12 weeks duration. The authors reported significant improvements in physical and emotional wellness, quality of life, and social and work engagement. In both studies exercise performance was monitored by a qualified physiotherapist from EQL.

myrecovery

A retrospective cohort study[96] reported on the outcomes of 11,753 patients with a variety of MSK conditions who registered to use myrecovery (as part of an enrolment in a wider value-based care programme). Investigators reported the changes in PROMIS-10 (Patient-Reported Outcomes Measurement Information System) Global Health scores – a score that aims to capture physical, mental, and social health and functioning – before and after registration in the programme. It was reported that the app was (independently of the wider value-based care programme) associated with statistically significant improvements in PROMIS-10 physical and mental health scores. Although most changes did not exceed the MCID threshold.

Table 12: Out-of-scope studies for technologies with no included evidence base

Technology	Company	Article title	Reason for exclusion	EAG commentary
getUBetter	getUBetter	A Tailored App for the Self-management of Musculoskeletal Conditions: Evidencing a Logic Model of Behavior Change[90]	Wrong study type (explored a logic model of behaviour change) and wrong population (people self-managing MSK conditions)	No outcomes relevant to this assessment
		Evaluating impact of getUBetter, a digital self-management support tool, deployed to 14,500 patients on a community MSK physiotherapy waiting list[89]	Wrong population (mixed population of MSK conditions)	This mixed methods evaluation concluded that getUBetter modestly improved user confidence for people self-managing their MSK condition
		How Do We Better Serve Excluded Populations When Delivering Digital Health Technology? Inclusion Evaluation of a Digital Musculoskeletal Self-Management Solution[91]	Wrong study design (a mixed method exploratory service evaluation) and wrong population (people self-managing MSK conditions and clinicians in primary care)	This service evaluation identified why some users may not use the app, or clinicians not prescribe it.
Huma	Huma therapeutics	No studies identified or submitted		
QuestPrehab	C Digital Healthcare Ltd	The Feasibility and Effects of a Telehealth-Delivered Home-Based Prehabilitation Program for Cancer Patients during the Pandemic[92]	Wrong population (people with cancer)	This pre- and post-intervention survey reported that users significantly improved their self-perceived health and fatigue
		Understanding Patients' Experiences and Perspectives of Tele Prehabilitation: A Qualitative Study to Inform Service Design and Delivery.[93]	Wrong population (people with cancer)	This qualitative study of 22 interviews reported that tele-prehabilitation widened access and improved the motivation of users

Abbreviations: EAG, External Assessment Group; MSK, musculoskeletal.

Table 13: Out-of-scope studies for technologies with no effectiveness evidence base

Technology	Company	Article title	Reason for exclusion	EAG commentary
Phio	EQL Ltd	A Pragmatic Retrospective Study Assessing the Impact of Phio Engage Digital Exercise and Education On The Management of Patients with Non-Traumatic Joint Disease[94]	Wrong population (people with mild to moderate hip and knee OA)	This single arm, pragmatic retrospective study across both the NHS and private settings reported significant improvements in patient-actuated functional goals and pain.
		A Novel Retrospective Pilot Study Assessing the Impact of Phio Engage Digital Exercise and Education On Wellbeing In Patients with Mild to Moderate OA.[95]	Wrong population (people with mild to moderate hip and knee OA)	This single arm pragmatic study reported significant improvements in physical and emotional wellness, quality of life, and social and work engagement.
myrecovery	HOPCo Ltd	Value-Based Care and a Digital Patient Engagement App May Enhance PROMIS-10 Outcomes in Musculoskeletal Care[96]	Wrong population (people self-managing MSK conditions)	This cohort study reported statistically significant improvements in PROMIS-10 Global Health scores in a large, mixed MSK population who registered for a patient engagement app (myrecovery).

Abbreviations: EAG, External Assessment Group; MSK, musculoskeletal; OA, osteoarthritis; PROMIS, Patient-Reported Outcomes Measurement Information System

5.6 Clinical evidence summary and interpretation

Most included records (n=19, 46%) described the effect of rehabilitation only. The remaining records predominantly described the effect of prehabilitation and rehabilitation (n=17, 42%); only five records (12%) described the effect of prehabilitation only. In addition, the majority of included records (n=21, 51%) described evidence for TKR – most of the remaining records provided evidence for mixed populations undergoing THR or TKR (n=16, 39%), with only four records (10%) described evidence for THR.

Furthermore, eleven records described evidence exclusively (Cooper 2022, Emery 2026[52,80], Hunter [submitted],[60] Wilkins 2025,[57] Gray 2022,[58] Clark 2021,[45] Dahlberg 2023,[61] Starkey 2025,[49] Islam 2023,[82] Thacker 2025,[50] Tsang 2019[59]) or partly (Neumann-Langen 2023[56]) from UK settings. Only three of these studies, however, were comparative study designs (Gray 2022,[58] Starkey 2025,[49] Tsang 2019[59]) reporting on limited outcomes.

As noted in Table 1, each of the technologies provide a range of features. Given the heterogeneity of the features provided, the EAG did not consider it was appropriate to further categorise the technologies. It was not possible to disambiguate the efficacy of specific features of a technology from the overall estimate of effect of the technology.

5.6.1 Primary outcomes

Patient-reported outcomes

For HRQoL, randomised comparative evidence did not provide a clear direction of effect, with some finding digital interventions result in significantly higher values and others finding no between-group differences. The evidence was obtained from studies including participants who had undergone THR as well as TKR and PKR. However, this evidence was mostly obtained from studies where comparator arms had unclear relevance to standard care in the NHS (Hong 2024b, BPMpathway; Crawford 2021b, mymobility; Duong 2023a, Physitrack), with the remaining evidence coming from studies where comparator arms received either more (Alexander 2023, mymobility; Correia 2019a and 2019 b, both Sword Thrive) or fewer (Saunders 2020, GoWellHealth) physiotherapy sessions. Though most non-randomised comparative evidence suggests no significant differences between digital intervention and comparator, one large retrospective cohort conducted in the UK (Gray 2022, GoWellHealth) found significant differences in EQ-5D-3L favouring the intervention in both THR and TKR patients. Importantly, other non-randomised evidence was only from participants who had undergone TKR, where recovery is known to take longer than for THR. Evidence from another study (Hong 2024a, BPMpathway) with a comparator that was reasonably well-aligned to the NHS showed no significant difference, though the EAG noted the small sample size of the study. Another retrospective comparative study (Hardwick-Morris 2022, Physitrack) – again with a comparator that may be similar to standard care in the NHS – also showed no significant difference. The relevance of the comparators in the remaining studies (Malhotra, unpublished, BPMpathway; McDonald 2026, Slider) remained unclear. In sum, the comparative evidence found either indicated no difference in effect or a benefit for digital interventions. No studies indicated digital interventions worsened quality of life in comparison to usual care.

Similarly, for joint-specific function, randomised comparative evidence did not provide a clear direction of effect, with some studies suggesting significant improvement with intervention and others suggesting no difference. However, two of these studies had comparator arms with unclear relevance to standard care in the NHS (Hong 2024b, BPMpathway; Crawford 2021b, mymobility), with the third having a comparator arm who received more (Alexander 2023, mymobility) physiotherapy sessions than typical in the NHS. The evidence was also mostly from participants who had undergone TKR and PKR, with limited evidence for THR. Non-randomised evidence also provided no clear signal, however, one large retrospective cohort conducted in the UK (Gray 2022, GoWellHealth) found significantly greater improvement in OHS and OKS values favouring the intervention in both THR and TKR patients. Importantly, other non-randomised evidence was only from participants who had undergone TKR, where recovery is known to take longer than for THR. Evidence from one study (Hong 2024a, BPMpathway) was also obtained from a comparator that was reasonably well-aligned to the NHS, and which also indicated a significant difference favouring the intervention, though the EAG noted the small sample size of the study. Evidence from a retrospective comparative study (Hardwick-Morris 2022) appeared to derive from a comparator that may be similar to standard care in the NHS but found no difference in outcome. Evidence from a retrospective comparative study (Hardwick-Morris 2022, Physitrack) appeared to derive from a comparator that may be similar to standard care in the NHS but found no difference in outcome. The relevance of the comparators in the remaining studies (Malhotra, unpublished, BPMpathway; McDonald 2026, Slider) remained unclear. In sum, the comparative evidence found either indicated no difference in effect or it indicated a benefit for digital interventions.

Randomised comparative evidence for pain similarly did not provide a clear direction of effect, with studies suggesting either significant improvements or no difference between groups. The evidence was obtained from studies including participants who had undergone THR as well as TKR. However, this evidence was mostly obtained from studies where comparator arms received more (Correia 2019a and 2019b, both Sword Thrive) physiotherapy sessions than is typical in the NHS, with the remaining evidence coming from studies where comparator arms had unclear relevance to standard care in the NHS (Duong 2023a, Physitrack) or received fewer (Saunders 2020, GoWellHealth) physiotherapy sessions. Non-randomised evidence, only in participants who had undergone TKR, showed no significant between-group difference. No studies reporting on pain were directly relevant to the UK setting. However, evidence from a retrospective comparative study (Hardwick-Morris 2022, Physitrack) appeared to derive from a comparator that may be similar to standard care in the NHS. The relevance of the comparator in the other study (Malhotra, unpublished, BPMpathway) was unclear. In sum, the technologies that showed a benefit in reducing pain over usual care were Physitrack and Sword (for TKR).

Digital interventions did not appear to result in significant differences in meaningful function and participation in daily life, with randomised comparative evidence providing conflicting results and non-randomised comparative evidence showing no difference. The evidence was obtained from studies including participants who had undergone THR as well as TKR. All randomised evidence was obtained from studies where comparator arms had limited relevance, with participants receiving more (Correia 2019a and 2019b, both Sword Thrive) or fewer (Saunders 2020, GoWellHealth) physiotherapy sessions than is typical in the NHS. However, non-randomised evidence (Hardwick-Morris 2022, Physitrack) appeared to derive from a comparator that may be similar to standard care in the NHS, though it was restricted to the TKR indication. No studies reporting on these outcomes were directly relevant to the UK setting.

Randomised comparative evidence for confidence in recovery and self-management, none of it from the UK, showed no significant difference between intervention and control groups. The evidence described effects in participants undergoing THR or TKR. Studies reporting on these outcomes had comparators with limited relevance to the NHS, with one having unclear relevance due to uncertainty around rehabilitation received (Duong 2023a, Physitrack) and the other describing a comparator receiving fewer face-to-face physiotherapy than would be received in the NHS (Saunders 2020, GoWellHealth).

Clinical outcomes

Randomised comparative evidence, both for THR and TKR, found no significant between-group differences for healthcare use, with the exception of one outcome reported in Crawford 2021a where there were statistically significantly fewer emergency department visits in the intervention arm than the control arm in people who had a knee arthroplasty. However, these RCTs (Crawford 2021a and 2021b, both mymobility) reported results using a comparator with uncertain relevance to the NHS. Furthermore, one non-randomised comparative study from the UK (Starkey 2025, myrecovery) and one prospective single-arm study from the UK (Tsang 2019[59]), GoWellHealth), both describing results in participants undergoing THR or TKR, found lower readmission rates in the intervention group when compared with controls.

No studies explicitly reported on escalation to face-to-face clinical review.

For mobility and functional performance, randomised comparative evidence for our prioritised outcome, joint ROM, did not provide a clear direction of effect, with some finding digital interventions resulting in significantly better outcomes and others finding no between-group differences. The evidence was obtained from studies including participants who had undergone THR as well as TKR. However, this evidence was mostly obtained from studies where comparator arms received either more (Tripuraneni 2021, mymobility; Correia 2019a and 2019 b, both Sword Thrive) physiotherapy sessions, with the remaining evidence coming from studies with comparators that had unclear relevance to standard care in the NHS (Hong 2024b, BPMpathway; Crawford 2021b, mymobility). Non-randomised evidence for joint ROM showed no significant between-group difference, though evidence was restricted to those who had undergone TKR. The relevance of the comparator in these non-randomised studies (Malhotra, unpublished, BPMpathway; McDonald 2026, Slider) was unclear. Randomised comparative evidence similarly found conflicting effects of digital interventions on TUG and SLS measures. No studies reporting on mobility and functional performance were directly relevant to the UK setting. In sum, the comparative evidence found either indicated no difference in effect or it indicated a benefit for digital interventions over usual care. The technologies that showed a statistically significant benefit over usual care were BPMpathway and Sword Thrive.

5.6.2 Secondary outcomes

Patient-reported outcomes

No relevant comparative evidence was available for psychological outcomes.

For user satisfaction and acceptability, limited comparative evidence from randomised comparative studies provided no conclusive direction of effect. The evidence was obtained from studies including participants who had undergone THR as well as TKR. Randomised comparative evidence was only obtained from studies where comparator arms received either more (Alexander 2023, mymobility; Correia 2019a and 2019 b, both Sword Thrive) or fewer (Saunders 2020, GoWellHealth) physiotherapy sessions than in the NHS. The relevance of the comparator in the study reporting non-randomised evidence (McDonald 2026, Slider) was unclear. Non-randomised comparative evidence from this study was also restricted to those who had undergone TKR. Varied ratings of satisfaction and acceptability were generally high (> 80%) for digital interventions, though perceived effects on anxiety and preparedness for surgery were lower. Evidence from non-randomised and single-arm studies, including two small studies from the UK (Emery 2026, PreActiv; Islam 2023, Slider) and one including evidence from the UK (Neumann-Langen 2023, ForPatientApp), provided similarly inconclusive results.

Randomised comparative evidence for return to usual activities, none of it from the UK and all in participants who had TKR or PKR, found no differences between intervention and comparator groups for a variety of activity measures. This evidence was obtained from a study where the comparator arm received more physiotherapy sessions than in the NHS (Alexander 2023, mymobility), while the relevance of the comparator in the other study (DeMik 2024, mymobility) was unclear.

Intermediate outcomes

For intervention adherence, limited comparative evidence from randomised comparative studies provided inconclusive results for the intervention but generally indicated low levels of compliance. The evidence was obtained from studies including participants who had undergone THR as well as TKR and PKR. However, this evidence was mostly obtained from studies where comparator arms received either more (Correia 2019a and 2019b, both Sword Thrive) physiotherapy sessions, with the remaining evidence coming from studies with comparators that had unclear relevance to standard care in the NHS (Hong 2024b, BPMpathway; Miller 2024, mymobility). Non-randomised comparative evidence indicated higher levels of compliance, but between-group results remain inconclusive, and evidence was restricted to participants with TKR. This evidence was from a study (Hong 2024a, BPMpathway) with a comparator that was reasonably well-aligned to the NHS as well as a study (Malhotra, unpublished, BPMpathway) describing a comparator arm with unclear relevance to the NHS. Low compliance was also observed in evidence from single-arm studies. No studies reporting on adherence or compliance were directly relevant to the UK setting.

Randomised comparative studies reporting on interaction with healthcare professionals, none of them from the UK, reported additional contacts for technical assistance and telephone calls beyond the per-protocol scheduled calls for the intervention group. The evidence was obtained from studies including participants who had undergone THR as well as TKR. However, these were difficult to contextualise without comparative intra- or inter-study data. Furthermore, these studies (Correia 2019a and 2019b, Sword Thrive) also described comparator arms that received more face-to-face physiotherapy than patients in the NHS. Non-comparative evidence was obtained from studies in THR and TKR.

No comparative studies reported on early identification of concerns; the two single-arm studies providing evidence for this outcome were not from the UK and provided only evidence for TKR.

Evidence for adverse events was very sparse but described some evidence for both THR and TKR. The three studies, including one small study from the UK (Islam 2023, Slider), that reported some element of safety flagged no concerns.

Weight of evidence across different technologies

mymobility, moveUP and BPMpathway were the three technologies with the most extensive evidence base, followed by Physitrack, Sword Thrive and GoWellHealth. At the other end of the evidence scale, there were three technologies for which no studies have been included in this assessment: getUBetter, Huma and QuestPrehab. While some studies for two of these technologies were identified, none were found to be relevant to the scope. The instruments used to measure outcomes across studies were highly heterogenous.

The EAG considered this variability prohibitive for comparing outcomes across interventions. We expand on this limitation in Section 8.3.

6 Economic evidence

6.1 Prior economic evidence

The sections below report the EAG’s review of evidence relating to economic issues from company evidence submissions followed by findings from the EAG’s review of the literature.

6.1.1 Company evidence submissions

For the purposes of the decision analysis, the technologies included fall into two broad categories, plus an additional sub-category (Table 14).

The first group comprises software-only digital platforms delivering rehabilitation and pathway management via mobile or applications without the use of external sensors or hardware. These technologies deliver prehabilitation/rehabilitation through educational material and/or video guided exercises, usually collect data on patient engagement and enable patients to message either NHS or company physiotherapists who have access to a physician dashboard.

The second comprises digitally enabled rehabilitation systems that include wearable sensors, motion capture or rehabilitation devices. In addition to the features described in the first group, they can capture objective biomechanical data including improvement in patients’ ranges of motion enabling remote surveillance of patients’ progress.

In addition to the above, a subcategory makes use of motion capturing on the patient’s smartphone or tablet cameras to deliver movement assessment without the need for additional hardware.

Table 14: Broad Technology classification

Apps / Web platforms	Sensor / hardware-based	Camera-based motion capture (via phone/tablet)
getUBetter	BPMpathway	ForPatientApp / MOVE (Kemtai)
Good Boost	Slider	myrecovery (Deep Vision)
GoWellHealth / Digital Joint School	moveUP	

Apps / Web platforms	Sensor / hardware-based	Camera-based motion capture (via phone/tablet)
Joint Academy Phio QuestPrehab PreActiv myrecovery (core platform) Huma Physitrack	mymobility Sword Thrive	

The following is a summary of the relevant data available for each product which could inform specific economic benefits. Where a product is omitted, the EAG identified no relevant data.

A large quantity of economic evidence was provided by **getUBetter**. However, all pertained to MSK conditions in general and not to THR or TKR. The EAG considered that the most transferrable evidence was estimates of reduction in physiotherapy appointments. In a report of a pilot in Lambeth and Southwark of 835 patients on an MSK waiting list,[97] patients engaging with getUBetter in any capacity accrued an average of 2.06 physiotherapy sessions compared with the "recognised average of 3.5". However, the source of the 'recognised average' was not stated.

Wilkins (2025)[57] reported an evaluation and cost consequences analysis of **Good Boost** in people with MSK conditions. A prospective cohort study of 4429 participants with MSK conditions estimated a cost saving of £168.72 per patient.[57] This was based on an assumed elimination of 6 F2F physiotherapy sessions, replaced by either 12 group or solo digital sessions. The EAG noted the reporting of the economic analysis was brief and appeared to be based on comparison of treatment protocols rather than observed data. It therefore represents a hypothetical difference in costs.

The **GoWellHealth / Digital Joint School** platform was assessed in a retrospective cohort comparison study (Gray 2022).[58] Data collection covered 2018-2019 with 595 patients receiving the digital platform and 1811 acting as controls. The intervention was associated with a 33% reduction in LoS for THR but not TKR, and a reduced requirement for F2F physiotherapy although the raw numbers were not reported. Another poster[59] reported results from the platform in 771 registered patients undergoing hip and knee arthroplasty, with outcomes available for 330 surgical patients. Thirty-day readmission rates were significantly lower among programme users compared with non-users (3.6% vs 5.6%; p < 0.05). However, given the non-randomised retrospective design of these studies, it is uncertain whether the differences observed can be attributed to the intervention alone rather than any underlying differences between groups.

Evidence for **Phio** is based on service evaluations in general MSK.[98] A "waiting-well" evaluation reported an approximate reduction of one follow-up physiotherapy session per patient among digital tool users. this was described as an early indication without clear comparative analysis. A separate evaluation[99] found that 10.7% of patients (515/4804) accepted digital self-management and 7.9% (378/4804) completed fully digitally, suggesting some reduction in F2F physiotherapy. The evidence is observational and its applicability to THR/TKR populations is uncertain.

The company submitted an economic model for **PreActiv** (data on file) that assumed cost savings from a 50% reduction in readmissions and a 2-day reduction in LoS. The evidence supporting these assumptions was not clearly referenced, and the source of associated cost inputs was unclear.

A conference abstract/poster[49] reported assessment of **myrecovery** in supporting patients undergoing knee (n=434) and hip (n=788) arthroplasties, finding reductions in length of stay associated with use of the platform. Neither details of the methods nor statistical inference / measures of uncertainty were reported so it was not possible for the EAG to assess the quality of the study.

Two observational Australian studies evaluated **Physitrack**; one study[78] reported a significant reduction in total length of stay of approximately 4 days (12.0 vs 8.0 days p=0.03), while another study[87] reported a smaller reduction in acute length of stay of 0.2 days (p=0.392). Both studies were retrospective and non-randomised, small sample size (64 and 38) conducted in single-centre settings (including single-surgeon cohorts), limiting causal inference and raising concerns about the possibility of selection bias and generalisability to the NHS.

Evidence for mymobility is based on a US RCT,[72] which reported physiotherapy use and emergency department visits (8.2% vs 2.5%; p=0.014), with no statistically significant difference in readmissions. Additional cost analysis[36] suggested lower overall costs driven primarily by reduced physiotherapy utilisation.

A before and after study of experience of introducing **BPMpathway** for patients undergoing TKR in an NHS trust shortly after the covid pandemic was reported in a poster[47] and subsequent manuscript.[33] Costs considered in the study included hospital length of stay (LoS), physiotherapy visits, surgeon visits, teleconsultations, and wearable devices. The study estimated that an NHS trust could achieve savings of £1,261 per patient driven largely by reductions in hospital LoS from 3.6 days to one and fewer in-person appointments for prehabilitation and rehabilitation, as well as reductions in F2F physiotherapy visits from 6 to 3.6 (44% reduction).

The EAG identified some limitations with this analysis. Notably, the SoC comparator used hospital LoS data from 2019, while the intervention data were collected during or after the COVID-19 pandemic. This represents a potential source of bias, as hospital LoS was significantly reduced during the pandemic, and post-pandemic practice increased emphasis on early discharge in line with GIRFT recommendations. Clinical experts also noted that not all patients undergoing TKR would require six physiotherapy visits, as assumed in the model.

The study had a small sample size (n=21). This limitation is further compounded by restrictive exclusion criteria, which excluded patients with comorbidities that may be associated with longer hospital stays, slower recovery, or increased support needs. Excluded populations included patients with a history of falls, cardiac disease, severe asthma, chronic obstructive pulmonary disease, smoking, insulin-treated diabetes, or anaemia.

Finally, the study population was younger than the typical NHS population undergoing knee replacement surgery, with a mean age of 57 years compared with an average age of 70 years reported in Hospital Episode Statistics (HES). This would reasonably affect recovery trajectories.

An unpublished non-randomised comparative study (Malhotra, unpublished[42]) reported a prospective cohort of 20 patients undergoing TKR who made use of the **BPMpathway** platform in India. An age- and sex-matched control group followed conventional physiotherapy. A statistically significant reduction in length of stay of 0.8 days (4.1 vs 4.9) was observed in the intervention group, but no significant difference in days of analgesic use. The major limitations of this study were its non-randomised nature and that it was conducted in India, which may be less generalisable to England.

A pilot study[46] compared outcomes between **Slider** and standard physiotherapy in 18 patients following (robotic) knee replacement. Outcomes included range of motion, Oxford Knee Score (OKS), EQ-5D-3L and patient reported outcome measures. At six weeks, range of motion and EQ-5D-3L were numerically superior and LoS numerically shorter by one day, albeit not statistically significant. Satisfaction scores and OKS improvements were significantly higher in the Slider arms. The major limitation of this study is the small sample size (as a pilot) and non-randomised design. A further study[43] primarily investigated quadriceps inhibition post knee arthroplasty based on a case series of 18 patients who used the **Slider** device, observing the potential for the device to be useful in early detection of infection. The company also shared a model that assumed savings from avoided F2F physiotherapy appointments, using a unit cost of £60 per appointment and estimating that avoiding 3.33 appointments would offset the £200 platform cost. The reduction in appointments was hypothetical, and the 2024 PSSRU unit cost for a F2F physiotherapy appointment is £41. Results were therefore sensitive to both the assumed unit cost and appointment reduction.

Lebleu (2023)[62] reported a retrospective analysis of 740 patients who underwent TKR and used the **moveUP** digital platform to record pain levels and analgesic usage. The authors hypothesised that the platform has the potential to detect complications more quickly than conventional methods, reducing pain (and by implication use of analgesics).

The company also shared an economic model for **moveUP** (data on file) that assumed a utility gain of 0.03 lasting 8 weeks in the intervention arm and a utility decrement of 0.1 lasting 4 weeks in SoC due to complications, alongside a 30% reduction in LoS and a 20% reduction in complication rates. These assumptions were not clearly supported by comparative evidence and benefits were highly dependent on these assumptions

The study by Arias (2023)[100] reported a reduction in analgesics use observed in US claims data associated with the use of digital rehabilitation platform **Sword Thrive** but as this was based on a single-arm, post hoc analysis without a comparator, it limited causal inference, and the US setting limits generalisability to the NHS.

A 6-month pilot of **ForPatientApp / MOVE / Kemtai** was reported in a conference poster[101] in an Israel Health Maintenance Organisation (HMO). Thirty-five clinicians and 250 patients took part in the study. Patients were aged 18-75 and presented for general MSK conditions and traumatic injuries and were assigned to intervention or a control group (standard in-person physical therapy). The study observed a 33% reduction in F2F appointments (5.7 vs 3.8 per patient). The EAG noted that the study population was general MSK patients rather than those undergoing hip or knee replacement. Limited information was provided in the poster but it appears not to have been a randomised study design.

6.1.2 EAG literature review

A single set of searches was conducted to identify both clinical and economic evidence for the included technologies (as specified in the protocol – search strategies are reported in Appendix A). The databases searched included INAHTA and the Tufts CEA Registry, and as such would have retrieved relevant economic analyses in addition to those identified by the company evidence submissions. Alongside the main search, a rapid, pragmatic review for relevant economic models was also conducted by searching previous relevant NICE appraisals and Google Scholar for any cost-effectiveness analysis of rehabilitation and/or prehabilitation for hip or knee replacement (regardless of the use of digital tools). These would be used to inform the design of this analysis.

Titles and abstracts were sifted by one reviewer. Full texts were assessed to select those meeting the scope definition. Economic evidence identified was sifted for studies reporting resource use and cost estimates or HRQoL estimates.

The review identified two pre-existing economic models that were relevant to the assessment: Fusco (2016)[37] and Zanghelini (2024).[30] The technology reported in Zanghelini (2024) was excluded from the NICE scope for this assessment due to the timing of the technology delivery. Nevertheless, its analytic approach may provide insight into the structure of the current analysis.

Fusco (2016)[37] compared a mixed rehabilitation pathway comprising F2F and remote rehabilitation sessions with standard care consisting of 20 F2F sessions in patients undergoing TKR in Italy. The authors developed a Markov model with four health states (post-primary success, revision surgery, post-revision success, and death) analysed over a 10-year horizon. The study noted that utilities for telerehabilitation were uncertain, and that assumptions for the costs of standard rehabilitation versus telerehabilitation required further investigation. Cost-effectiveness was primarily driven by reduced resource use, from a lower number of rehabilitation sessions from the standard of 20 session (substantially higher than typical NHS practice of 4 to 6 sessions), alongside reduced transportation costs. Scenario analyses explored hypothetical utility gains and alternative long-term revision risks.

Zanghelini (2024)[30] evaluated the cost utility of a digital rehabilitation programme over a 17-week post-operative horizon in patients undergoing total hip or knee replacement. A decision-tree model compared 4 sessions of rehabilitation delivered using a digital platform and sensor-based medical device vs self-directed home exercises, and group or individual outpatient physiotherapy (typically 4-6 sessions). Over 17 weeks, the model estimated a small QALY gain (0.02) associated with increased engagement with rehabilitation. Digital rehabilitation was dominant (lower cost and better outcomes), with cost savings driven primarily by reduced physiotherapy contact time. However, results were highly dependent on expert elicited assumptions, for example treatment response for self-managed rehabilitation was assumed to achieve only half the response of the digital programme, an assumption that significantly favoured the cost effectiveness of digital rehabilitation.

6.1.3 Summary

Across submissions the strongest and most consistently reported financial impact was reduction in length of stay and reductions in F2F physiotherapy. Claims of reductions in readmissions, complications and medication use were less consistently evidenced and were frequently derived from single arm studies or modelling assumptions or routine hospital data, making both claims and values reported less certain. Table 15 summarises the value claims for each product. Claims are highlighted in red, amber or green according to the EAG's subjective opinion as to the risk of bias and generalisability, with the final column providing a brief reasoning of the EAG's opinion. Previous decision modelling studies used either Markov or decision tree structures with results primarily driven by reductions in resource use, namely reductions in F2F physiotherapy sessions.

Table 15: Claimed cost saving and evidence supplied by companies informing parameters by technology

Technology	**Reduced length of stay**	**Reduced face-to-face physiotherapy**	**Reduced outpatient / GP activity**	**Reduced readmissions / emergency attendances**	**Reduced post-operative complications**	**Reduced medication use**	**EAG comments**
BPMpathway (270 Vision Ltd)	Reduction from 4 days to 1 day (Sadozai(47 linked to Cooper 2023[33]); RED 0.8-day reduction (Malhotra[42]) AMBER	44% reduction (6 to 3.6 sessions) (Sadozai [47]) AMBER	-	-	-	-	Sadozai[47] is a poster focusing on reducing hospital stay immediately after covid therefore limited generalisability. Malhotra[42] not randomised, less generalisable to UK.
Slider (AI Rehab Ltd)	1-day reduction (non-significant) (McDonald[46]) AMBER	-	-	-	Early infection detection via motion patterns and swelling (Sampath[43]) AMBER	-	McDonald[46] is a pilot study finding non-significant difference in LoS from UK study. Sampath[43] raises hypothesis that early detection of infection could be possible.

Technology	Reduced length of stay	Reduced face-to-face physiotherapy	Reduced outpatient / GP activity	Reduced readmissions / emergency attendances	Reduced post-operative complications	Reduced medication use	EAG comments
Joint Academy (Arthro Therapeutics AB)	-	-	-	-	-	-	-
ForPatientApp (B. Braun)	-	33% reduction in appointments in patients with MSK conditions[101] AMBER	-	-	-	-	Poster[101] report of 6m pilot. MSK not hip or knee replacement. Non-randomised, Israel based, less generalisable to UK.
QuestPrehab (C Digital Healthcare Ltd)	-	-	-	-	-	-	-
Phio (EQL Ltd)		A reduction of approximately one follow-up physiotherapy session among digital tool users has been reported; however, it is not	Reported 10.7% MSK patients (515 / 4804) Accepted digital pathway and 7.9% (378 / 4804) Completed fully digital care[99]	-	-	-	Follow-up reduction is based on an early observational estimate without statistical analysis. Evidence is from

Technology	Reduced length of stay	Reduced face-to-face physiotherapy	Reduced outpatient / GP activity	Reduced readmissions / emergency attendances	Reduced post-operative complications	Reduced medication use	EAG comments
		clear how this estimate was derived, as no statistical analysis was reported[98] RED	RED				MSK populations rather than THR/TKR, limiting direct applicability
getUBetter (getUBetter Ltd)	-	40% fewer musculoskeletal (MSK) face-to-face physio (appointments (3.5 to 2.06)[97] RED NHS South East London Integrated Care System NHSE Partnership award Guys and St Thomas's Hospital Foundation Trust[97] RED		-	-	-	Grodon[97] reports results of a survey in MSK patients not TKR or THR. Source of 3.5 appointments for conventional physiotherapy is not cited.

Technology	**Reduced length of stay**	**Reduced face-to-face physiotherapy**	**Reduced outpatient / GP activity**	**Reduced readmissions / emergency attendances**	**Reduced post-operative complications**	**Reduced medication use**	**EAG comments**
Good Boost (Good Boost Ltd)	-	Reduction in F2F physio sessions in MSK conditions[57] RED	-	-	-	-	Hypothetical difference based on treatment protocols. MSK in general, not TKR or THR.
myrecovery (HOPCo Ltd)	Hip: 3.6 vs 4.1 days; Knee: 3.7 vs 4.7 days[49] AMBER	-	350 fewer outpatient appointments[49] AMBER	0% ED visits within 28 days (no SoC comparator)[49] AMBER	-	-	UK poster No statistical analysis.
Huma (Huma Therapeutics Ltd)	-	-	-	-	-	-	-
moveUP (moveUP N.V.)	1-day reduction (Company data on file) RED	-	-	Assumed in the economic model sent by the company data on file RED	-	-	-
GoWellHealth / Digital Joint School (SHI Global Ltd)	LoS reduced 33% (THR)[58] No effect onTKR AMBER	Reduced requirement for face-to-face contact (no quantified estimate) [58] RED	-	Reduction in readmissions[59] AMBER	-	-	LoS: Since the study was conducted in 2019, the NHS length of stay has decreased by approximately 25%. Results

Technology	Reduced length of stay	Reduced face-to-face physiotherapy	Reduced outpatient / GP activity	Reduced readmissions / emergency attendances	Reduced post-operative complications	Reduced medication use	EAG comments
							might not be generalisable. Reduction in Complaint: Poster from New Zealand. Reduction in readmissions: no statistical analysis Reduction in F2F time: no quantified estimate found in the cited source in the RFE.
PreActiv (Snow Squared Ltd)	2-day reduction (assumed in "economic calculator" sent by the company) Company data on file. RED	-	-	-	50% reduction assumed in "economic calculator" sent by the company) Company data on file. RED	-	-
mymobility (Zimmer Biomet)		34% reduction in patients	-	(8.2% vs. 2.5%)	-	-	Evidence supports

Technology	Reduced length of stay	Reduced face-to-face physiotherapy	Reduced outpatient / GP activity	Reduced readmissions / emergency attendances	Reduced post-operative complications	Reduced medication use	EAG comments
		requiring physiotherapy[68] Reduction from 9.75 to 5.40 in F2F sessions[36] AMBER		Reduction of emergency room visits Non-significant (p=0.056) trend for more admissions (6.7% vs. 2.5%) in the control group compared to mymobility[72] AMBER			reduction in F2F physiotherapy and ED visits in US-based studies; however, generalisability to the NHS is uncertain
Sword Thrive (Sword Health)	-	-	-	-	-	Reduced analgesic and MSK medication (US claims) RFE[100] AMBER	single-arm post-hoc analysis from a different health system.
Physitrack	4 days (p = 0.04 Observational study Australia[87]) 0.2 days (p = 0.392) Observational study Australia[78] AMBER	-	-	-	-	-	Small sample (38) of case series[87] in the study with significant reduction While the observation study shows

Technology	Reduced length of stay	Reduced face-to-face physiotherapy	Reduced outpatient / GP activity	Reduced readmissions / emergency attendances	Reduced post-operative complications	Reduced medication use	EAG comments
							non-significant result.

Abbreviations: ED, Emergency Department; F2F, face-to-face; LoS, Length of Stay; MSK, Musculoskeletal; RFE, Request for Evidence; SoC, Standard of Care; THR, Total Hip Replacement; TKR, Total Knee Replacement.

Note: RAG rating reflects EAG's subjective opinion of overall risk of bias and generalisability of claim to the decision problem: GREEN = broadly applicable. AMBER = EAG has some reservations about risk of bias or generalisability. RED = EAG is concerned the evidence behind the claim is at high risk of bias or lacks generalisability.

6.2 Early economic model

The primary purpose of this analysis was to assess whether there is a plausible argument that digital platforms used to support rehabilitation before and after primary elective hip or knee replacement surgery could represent a cost-effective use of NHS resources when compared to standard care. The EAG emphasises that this is not intended to be a definitive estimate of the cost-effectiveness of the different platforms, or to fully represent the precise clinical pathways of each, but to assess whether there is a plausible case for their cost-effectiveness. The secondary aims were to identify the likely key drivers of costs and outcomes, explore uncertainty in the available evidence, and highlight evidence gaps.

6.2.1 Learnings from previous analyses and value claims from companies

The EAG's conclusions from the review of the evidence (section 6.1) are summarised below:

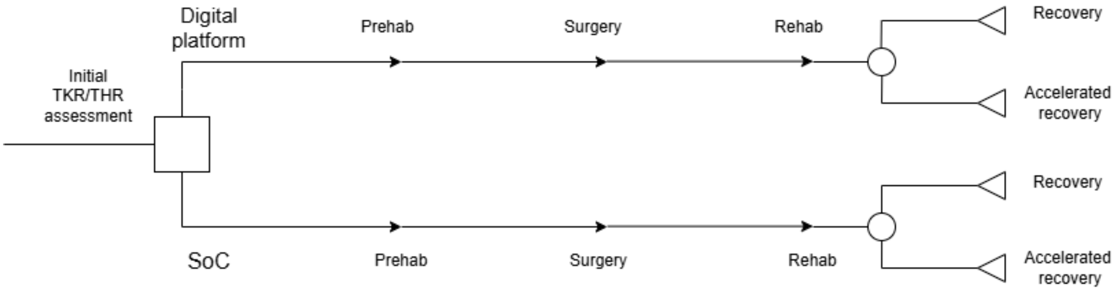
- Incremental net health or monetary benefit associated with digital rehabilitation was primarily driven by cost savings due to reductions in F2F physiotherapy costs.
- Evidence to support health gains was limited.
- Previous economic models showed high uncertainty when extrapolating outcomes over longer time horizons, and that the benefits of rehabilitation are typically realised over the short term.
- Previous analyses showed the importance of generalising evidence to the NHS setting for current standard care pathways, as results were sensitive to assumptions that disadvantaged comparators, for example engagement levels and assumptions around the number of physiotherapy sessions offered in the NHS.
- There was minimal evidence informing partial joint replacements.

Given the decision question for this analysis, a cost utility analysis was chosen for the base case, and the analysis limited to total hip and knee replacements. As no RCTs were conducted in a UK setting, UK-based observational and single-arm studies were considered informative despite their methodological limitations. These studies are more reflective of NHS rehabilitation pathways, staffing models, and digital infrastructure, and therefore provide contextually relevant evidence. Taken together, the UK evidence suggests the potential for a quality-of-life benefit associated with digital platforms vs SoC, although this is likely to be small and is highly uncertain.

Adherence and engagement with digital rehabilitation platforms was not explicitly modelled in the economic analysis, as the available evidence did not provide robust quantitative estimates to inform differential adherence parameters within the current model structure. However, estimating engagement is a recognised challenge across digital self-management technologies and represents an important source of uncertainty. If real-world adherence is lower than assumed, the anticipated reductions in physiotherapy input or length of stay may not be fully realised, which reduces the estimated cost savings.

6.2.2 Model structure

Figure 1: Schematic of EAG model structure



Abbreviations: SoC, standard of care; THR, total hip replacement; TKR, total knee replacement

The model is structured as a decision tree with a one-year time horizon, which is appropriate given the short-term nature of post-operative rehabilitation and discharge pathways. It captures the full care episode from prehabilitation through surgery, discharge and rehabilitation.

The diagram illustrates the model structure for patients undergoing surgery following initial assessment. Patients enter the model and are assigned to either digital rehabilitation or standard care, patients in each arm follow a single recovery trajectory after rehabilitation (i.e. probabilities of 1 and 0, respectively).

In the optimistic scenario, digital rehabilitation is assumed to follow accelerated recovery (i.e. faster improvement in health-related quality of life), a reduction in LoS, and a reduced number of F2F sessions.

In the pessimistic scenario, digital rehabilitation is assumed not to affect the pace of recovery or LoS. Patients therefore follow the same recovery trajectory as standard care, and the only benefit modelled is a reduction in the reduced number of F2F sessions.

Clinical expert opinion supports the assumption that increased engagement with the digital platforms in prehabilitation may facilitate reduced LoS in hospital. The model therefore facilitates capturing this.

The number of sessions is assumed to be between 4-6 according to clinical experts.

6.2.3 Resource use and cost

Resource use items in the model are the acquisition cost of the product, prehabilitation and rehabilitation sessions and length of stay post-surgery. The cost of surgery is excluded as this is common across all arms.

Two RCTs (Crawford 2021a[70]; Crawford 2021b[71]) reported healthcare utilisation within 90 days, defined as non-standard care physician visits, emergency department visits, urgent care visits, and hospital readmissions. A statistically significant reduction in emergency department visits was observed in patients undergoing knee replacement (TKA and PKR) in Crawford 2021a[70]. However, there were no statistically significant differences between intervention and standard care groups for THR in Crawford 2021b[71], or for other healthcare utilisation outcomes in either trial.. To keep this early model as parsimonious as possible, the EAG excluded any additional cost items.

Acquisition cost & other integration costs

Many of the pricing models provided by companies were based on a per trust or per centre basis. The EAG converted this to a cost per patient assuming 800 patients per year in a ‘typical’ acute trust with a catchment population of 300,000, with fixed costs allocated over a three-year time horizon:

- The latest available national data indicate that in England between April 2023 and March 2024 there were 96,000 TKR procedures and 78,000 THR procedures.[102]
- Given the population of England, this equates to 296.8 procedures per 100,000 population annually in England: (96,000 + 78,000)/58,620,000. (ONS England population data[103] mid 2024).
- For a notional acute trust with a catchment population of 300,000, this corresponds to approximately 890.4 procedures per year.
- Recognising that not all patients will be clinically suitable for or willing to engage with digital rehabilitation (e.g., due to frailty, complexity, digital access, or patient preference), applying a 90% eligibility/uptake proportion gives approximately 800 patients annually.
- Given the expected lifecycle of digital health technologies is short, upfront and integration costs were annualised over an assumed 3-year period of use and converted to per-patient costs.

The assumed price per patient is shown in Table 16. Where a range of prices was provided (e.g. based on volume) and/or it was not possible to clearly adjust to a common base of 800 patients per annum / 300,000 catchment population, the highest cost was adopted for the analysis on the basis that this is a more cautious approach (i.e. if a platform is cost-effective at the higher price it will by definition also be at a lower price).

Some platforms require additional devices, such as sensors, and all require tablet computers or mobile telephones. For consistency the EAG assumed every patient would require provision of a mobile phone or tablet (assigned a nominal cost of £200), except where the company explicitly stated that it provides the hardware within its pricing. This ensures equity for patients who do not have their own devices – the assumption is that the NHS would provide it and thus the cost is built into the analysis. Where there is an option of NHS or company provided physiotherapists, the EAG has provided two acquisition costs allowing comparison of each. A number of companies provided information on installation or integration costs, which the EAG understands to be optional. These were inconsistently reported and therefore the EAG excluded these from the analysis (Table 16).

Table 16: Cost of the technologies

Technology	Licence / software cost	Hardware cost	Assumed price per patient
BPMpathway	£300 per hospital per month	Sensor packs: £2,500 per 20 (new); £1,500 refurbished. Or tablet with a new sensor at £300 per patient	Licence: £4.50 Device: £33.38 Total: £37.88 The company offers two hardware options. The EAG selected the sensor with a tablet option to ensure equitable access, recognising that some patients may not have access to a compatible/their own tablets. Licence: £300 per month and 800 patients pa = 300*12/800 = £4.50 per patient Sensors and tablet: assumed 1 per patient and required for 4 months meaning demand for sensors and tablets = 267 patients per 4 months. Assuming 3-year lifespan of sensors and tablets equates to 300 *267/(800*3) = £33.38 per patient The EAG assumed that each sensor and tablet is used for 4 months per patient and then reused for the next patient. Over 3 years (36 months), this allows for 9 uses (36/4 = 9). The company stated that a sensor can be reused up to 10 times. Therefore, under the EAG's 3-year assumption, each sensor would be used 9 times, which is within the company's stated limit.
ForPatientApp	Basic: £6,000 per annum for hip	Tablet or mobile phone £200	Licence: £40.00 Device: £22.25

Technology	Licence / software cost	Hardware cost	Assumed price per patient
	£6,000 for knee Move Module: £10,000 per annum for hip £10,000 per annum for knee		Total: £62.25 Licence: For hip and knees, including move module and 800 patients pa: 12k+20k/800 = £40.00 per patient Tablet/phone device: assume 1 per patient required for 4 months = 267 devices (based on 800 patients pa). Assume 3-year life = 200*267/(800*3) = £22.25 per patient
getUBetter	£1,800 per 10,000 population/year Orthopaedic. Perioperative & Safe Waiting package as an add on for £900 per 10,000 population/year	Tablet or mobile phone £200	Licence: £101.25 Device: £22.25 Total: £ 123.50 Licence: based on 300,000 catchment including add-on packages = (1800 + 900) * 300,000/10,000 = 81,000 / 800 patients pa = £101.25 per patient Device cost as per ForPatientApp
Good Boost	£29.16 per patient	Tablet or mobile phone £200	Licence: £29.16 Device: £22.25 Total: £51.41 Device cost as per ForPatientApp
GoWellHealth / Digital Joint School	£29	Tablet or mobile phone £200	Licence:£29 Device: £22.25 Total: 51.25 Device cost as per ForPatientApp

Technology	Licence / software cost	Hardware cost	Assumed price per patient
Huma	Company stated range of 30$ - 130$ per patient per month (£22 to £95.40 exchange rate $1: £0.73)	Tablet or mobile phone £200	Licence: £381.60 Device: £22.25 Total: £403.85 Licence: Assuming 4 months of use by patient Device cost as per ForPatientApp
Joint Academy	£150 per patient (12-month programme) or £89 per NHS clinician/month	Tablet or mobile phone £200	Licence: £150 (£35.60) Device: £22.25 Total: £ 172.25 (£57.85) EAG has calculated two alternative costs of £172.25 and £57.85, the first where company physiotherapists are used and (in brackets) where NHS physiotherapists are used. £89 per month × 12 months = £1,068 per year. Assuming one physiotherapist sees 30 TKR/THR patients per year, £1,068 ÷ 30 = £35.60 per patient. Device cost as per ForPatientApp
moveUP	£10,000 to £25,000 annually per hospital	Tablet or mobile phone £200	Licence: £31.25 Device: £22.25 Total: £ 53.50 Licence based on 800 patients pa = £25,000/800 = £31.25 per patient

Technology	Licence / software cost	Hardware cost	Assumed price per patient
			Device cost as per ForPatientApp
mymobility	£15,000 per hospital (assumed per annum)	Tablet or mobile phone £200	Licence: £18.75 Device: £22.25 Total: £41.00 Licence based on 800 patients pa = £15,000/800 = £18.75 per patient Device cost as per ForPatientApp
myrecovery (core)	£30,000 (up to 1,000 patients and assumed per annum)	Tablet or mobile phone £200	Licence: £37.5 Device: £22.25 Total: £59.75 Licence based on 800 patients pa = £30,000/800 = £37.5per patient Device cost as per ForPatientApp
Phio	£0.50 per capita in trust of less than 500K catchment population	Tablet or mobile phone £200	Licence: £187.50 Device: £22.25 Total: £209.75 Licence: based on 800 patients pa in a trust with 300,000 catchment = £0.50 x 300,000/800 = £187.50 per patient Device cost as per ForPatientApp

Technology	**Licence / software cost**	**Hardware cost**	**Assumed price per patient**
Physitrack	£155.88 annually per practitioner (company website choosing NHS organisation option)	Tablet or mobile phone £200	Licence: £5.20 Device: £22.25 Total: £27.45 Licence based on a practitioner supervising 30 patients annually = £155.88 / 30 = £5.20 per patient Device cost as per ForPatientApp
PreActiv	£115 per patient	Tablet or mobile phone £200	Licence: £115 Device: £22.25 Total: £137.25 Device cost as per ForPatientApp
QuestPrehab	Model 1 Full Service Assuming 800 patients per year, this falls in the ≥250 patients per year tier: £150 per patient Model 2: Licensing only (NHS physiotherapists) For 800 patients per year, this also falls in the ≥250 patients per year tier: £75 per patient	Tablet or mobile phone £200	Licence: £150 (£75) Device: £22.25 Total: £172.25 (£97.25) Licence based on company provision of physiotherapists, >250 patients (i.e. 800 patients pa) = £150 per patient EAG has calculated two alternative costs of £172.25 and £97.25, the first where company physiotherapists are used and (in brackets) where NHS physiotherapists are used. Device cost as per ForPatientApp
Slider	£200 per patient per episode (up to 12 months)	Platform includes the slider device. Cost of this is	Licence: £200 Device: £22.25

Technology	Licence / software cost	Hardware cost	Assumed price per patient
		included with the licence price Tablet or mobile phone £200	Total: £222.25 Device cost as per ForPatientApp
Sword Thrive	£275 per patient	Mobile device included in the licence price	Licence: £275 Total: £275 Device cost: company provides device as part of licence cost

Abbreviations: ICS, Integrated Care System; NR, Not reported; PA, per annum; RFE, Request for Evidence.

Prehabilitation and rehabilitation sessions

Most of the EAG's clinical experts considered prehabilitation to last for 6-8 weeks, with some experts noting that longer programmes could be beneficial but are not reflective of current NHS practice. Rehabilitation was typically expected to last 6-12 weeks according to patient need, with a consistent view that TKR patients require longer and more intensive rehabilitation than THR patients. Experts broadly agreed that the clinical and resource impacts of prehabilitation and rehabilitation, whether delivered digitally or F2F, are most effective in the early post-operative period, within the first 6 weeks to 3 months, and that differences in outcomes and costs are unlikely to persist beyond 12 months, at which point recovery trajectories are expected to converge between those receiving digital rehab and those receiving SoC. Clinical experts advised the EAG that if technologies proved cost effective and were therefore available on the NHS, there would be a desire to encourage prehabilitation to start as soon as possible for maximum benefit, e.g. immediately following listing for surgery.

Prehabilitation

The EAG consulted clinical experts on the resource use associated with current standard of care prehabilitation. While several experts suggested that prehabilitation should ideally be longer and more structured than current NHS provision, they explained that prehabilitation typically consists of a single extended session with a physiotherapist, supported by written or digital educational materials. Additional exercises are expected to be performed independently by patients at home. Prehabilitation is assumed to last 8 weeks. All patients receive a 2-hour initial session with a physiotherapist and educational materials.

Based on this, the EAG assumed that prehabilitation in standard care comprised one extended physiotherapy session lasting approximately 2 hours costed at 2x £41 (PSSRU 2024[104], unit cost for physiotherapist time). The EAG assumed that prehabilitation for TKR and THR would be identical.

For the digital platform arm, the EAG assumed that the need to provide separate written educational materials would be removed, as information and guidance would already be delivered through the digital platform. Clinical experts indicated that some physiotherapist input would still be required to respond to patient queries or provide direction. Based on this, the EAG assumed that NHS physiotherapist time in the digital pathway would be reduced to 20% of that in standard care for technologies using NHS physiotherapists (Table 21). For technologies using company-provided physiotherapists, no NHS physiotherapist time was assumed for sessions delivered through the platform, with NHS input limited to sessions conducted F2F.

Table 17: Prehabilitation Costs

		SoC		Digital	
Parameter	**Unit cost**	**Quantity**	**Cost**	**Quantity**	**Cost**
F2F physiotherapy (hours)	£41.00[a]	2	£82.00	0.4[b]	£16.40
Written advice	£10.00[c]	1	£10.00	0	£0.00
Total			**£92.00**		**£16.40**

Abbreviations: F2F, face-to-face; SoC, Standard of Care.
Notes:
[a] PSSRU 2024[104]
[b] Assumption based on 80% reduction vs SoC
[c] Assumption

Rehabilitation

Clinical experts explained that rehabilitation lasts for an average of 8 weeks comprising one-to-one physiotherapy and provision of educational materials. Experts also noted that some physiotherapy sessions were undertaken in a group setting. However, for the purposes of this early model the EAG considered only F2F physiotherapy. All experts agreed that the need for rehabilitation physiotherapy is generally higher following TKR than THR. Experts reported variation between NHS trusts in the proportion of patients receiving F2F physiotherapy, with around 50% of TKR and 10% of THR patients receiving this. The remainder are assumed to receive no physiotherapy. Estimates of the number of rehabilitation sessions also varied, with most experts agreeing on a mean of around six sessions, increasing or decreasing according to individual patient need. This resulted in an expected cost per patient for post-op rehabilitation of £123.00 per patient for TKR and £24.60 for THR (Table 18).

Several technologies reported reductions in F2F physiotherapy sessions, typically 30-40% fewer sessions (Table 15). Clinical experts indicated that this was broadly consistent with their experience of using technologies within NHS trusts. All clinical experts expected some reduction in F2F physiotherapy time with the introduction of digital platforms but also agreed that approximately 50% would still require F2F sessions, especially with TKR or where patients are not progressing as expected. One clinical expert expressed uncertainty regarding the net impact on physiotherapy demand, noting that digital platforms may improve identification of patients who are struggling and would otherwise not seek physiotherapy, so potentially increasing demand for F2F input in some cases. Experts also suggested occasional input would be required from an NHS physiotherapist to support / contact patients using the digital platforms.

Accordingly, the EAG assumed a 40% reduction in F2F physiotherapy sessions in the base-case analysis from 6 to 3.6 associated with digital tools. The other 2.4 sessions were assumed to be 20% the length of a standard session (i.e. 0.2 hours * 2.4 sessions = 0.48hrs = 28.8mins) representing check-ins with patients. This was based on the EAG's summary and interpretation of the evidence provided by companies (Table 15). Some platforms provided their own physiotherapists. In these cases, they were assumed to replace this additional 'check in' time (whilst patients still receiving 3.6 NHS face to face contacts). Given the uncertainty around the magnitude of this effect, the EAG also explored a range of alternative assumptions in scenario analyses (see Section 6.2.6).

Table 18: Rehabilitation Resource Use and Costs per patient

		SoC			Digital		
Parameter	**Unit cost**	**Quantity**	**Propn**[b]	**Cost**	**Quantity**	**Propn**	**Cost**

TKR							
F2F solo physiotherapy (hours)	£41.00[a]	6[b]	50%	£123.00	3.6[c]	50%	£73.80
Additional physiotherapist support (hours)	£41.00[a]	0	-	£0.00	0.48	50%	£9.84
Total				**£123.00**			**£83.64**
THR							
F2F solo physiotherapy (hours)	£41.00[a]	6[b]	10%	£24.60	03.6[c]	10%	£14.76
Additional physiotherapist support (hours)	£41.00[a]	0	-	£0.00	0.48	10%	£1.97
Total				**£24.60**			**£16.73**

Abbreviations: F2F, face-to-face; Propn, proportion of patients availing of relevant service; SoC, Standard of Care, THR, Total Hip Replacement; TKR, Total Knee Replacement.
Notes:
[a] PSSRU 2024[104], 1 hr session
[b] Expert opinion.
[c] Assumed 40% reduction in face-to-face contact hours.
[d] Assumes remaining 2.4 contacts are 20% the length of a full session (i.e. 0.2 of an hour x 2.4 = 0.24hrs = 28.8 mins).

Total cost of prehabilitation and rehabilitation sessions

Total cost of prehabilitation and rehabilitation are reported in Table 19. Note that these are only the cost of physiotherapy sessions under conventional and digital platforms and exclude any acquisition costs for the platforms (these are reported in the prior section).

Table 19: Summary costs – prehabilitation and rehabilitation

Parameter	Conventional	Digital
TKR		
Prehab	£92.00	£16.40
Rehab	£123.00	£83.64
Total	**£215.00**	**£100.04**
THR		
Prehab	£92.00	£16.40
Rehab	£24.60	£16.73
Total	**£116.60**	**£33.13**

Abbreviations: THR, total hip replacement; TKR, total knee replacement

Length of Stay

Three clinical experts considered it plausible that the use of digital platforms could lead to a reduction in LoS, with one suggesting a reduction of around one day and the other two uncertain about the magnitude of any reduction. A fourth expert did not expect any impact on length of stay, viewing digital platforms as just an alternative way of delivering existing care.

One clinical expert suggested that the impact of digital prehabilitation is not uniform across patients. It may be less impactful for those patients who are either frailer or already highly fit. This aligns with GIRFT recommendations supporting day-case pathways for fitter patients and implies that any reduction in LoS may vary between subgroups. The model applies an average effect across all patients and does not capture this variation, which adds uncertainty to the results.

Empirical evidence on the impact of digital prehabilitation and rehabilitation on LoS was limited and heterogeneous.

No RCTs reported LoS as an outcome; the evidence base comprised small observational studies, retrospective cohort analyses, pilot studies, and service evaluations. Several studies reported reductions in LoS associated with digital interventions. However, effect sizes were generally small and findings were inconsistent (seeTable 15). Statistically significant reductions of approximately 0.5 to 0.8 days were reported in some non-UK studies,[42,87] while UK evidence was mixed. One UK study[46] reported reductions that did not reach statistical significance or were subject to important limitations, including pre-post comparisons spanning the COVID pandemic.[47,58] During the pandemic, the NHS used accelerated discharge procedures to manage capacity and reduce inpatient exposure to infection. This is likely to have reduced LoS, therefore complicating any attempt to show in studies performed over this period that reduced LoS was due to the digital intervention alone.

Another study in the UK (Gray 2022[58]) analysed patients treated between January 2018 and December 2019. The study reported a statistically significant 33% relative reduction in LoS for patients undergoing THR (the absolute reduction in days was not reported). No statistically significant reduction was observed for TKR. However, the EAG noted that baseline LoS in NHS has decreased in recent years. Average THR LoS has fallen from approximately 3.6 bed days in 2020 (GIRFT data[105]) to 2.71 days using 2024-2025 HES data[106] (approximately 25% reduction). As this study reflects earlier practice, the potential headroom for further reductions in LoS under current NHS pathways may be more limited and less generalisable.

Considering the available evidence and clinical expert opinion in totality, the EAG considered a reduction in LoS to be possible, but highly uncertain. The EAG consequently assumed a small reduction in LoS of 0.5 days in the base case as a conservative estimate (Table 20) and explored a range from no reduction to a 1-day reduction in scenario analyses. Hospital LoS costs reflect post-operative inpatient bed-day costs only. Procedure related costs, including theatre time, implants, and staffing, were assumed to be identical between arms and were excluded as common costs.

Table 20: Length of Stay

		Conventional		Digital	
Parameter	**Unit cost**	**LoS**	**Cost**	**LoS**	**Cost**
NHS bed day	£352.31[a]	2.71[b]	£954.76	2.21[c]	£778.61

Abbreviations: LoS, Length of Stay.
Notes:
[a] GIRFT Orthopaedics report[105] £300 per day in 2020 inflated to 2024 costs using PSSRU[104] NHS inflation index
[b] Weighted mean LoS for joint replacement, HES 2024/25.[106] c: Assumed 0.5 day reduction

6.2.4 Health State Utilities and QALY gains

Studies reporting HRQoL outcomes between digital rehabilitation pathways and SoC reported mixed results and varied in whether a statistically significant effect was detected (Table 5). Clinical expert opinion to the EAG suggested no difference in long-term HRQoL (beyond 12 months).

Gray (2022),[58] a UK based study, reported significantly higher EQ-5D based utility of 0.070 between patients using digital platforms and receiving the NHS

SoC at 6 months after surgery. It is unclear whether this difference persists beyond 6 months, but clinical experts advised that QoL outcomes are likely to converge by around 12 months post-surgery between digital platforms and SoC.

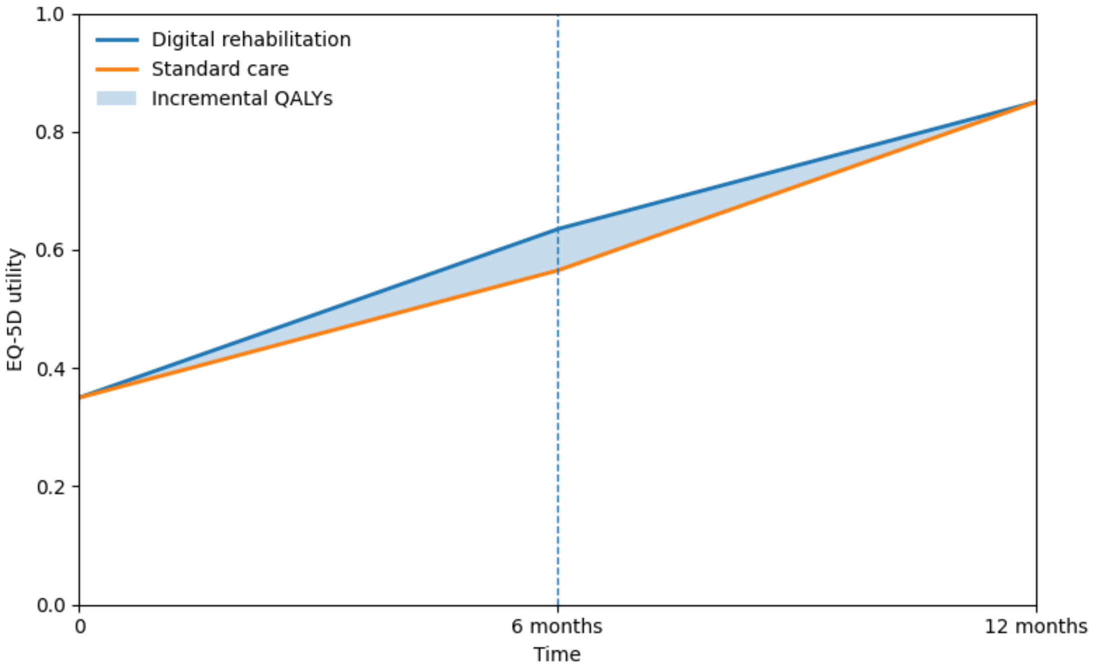
Based on this, the EAG assumed a gradual (linear) improvement in QoL in the digital platform arm from surgery to 6 months, reaching the level observed in Gray (2022).[58] After this the trajectories were assumed to converge by 12 months in line with clinical expert expectations (Figure 2).

This generated a QALY gain of 0.035 over the 12-month time horizon. The EAG considers this to be at the upper end of expectations of any gain attributable to digital rehab versus SoC. It is also highly uncertain. Therefore, the EAG explored a scenario analysis assuming zero QALY gains. This was included to represent the lower end of expectations, and the EAG did not consider digital platforms to be associated with negative incremental QALYs.

Five clinical experts advised the EAG that patients undergoing TKR have greater capacity to benefit from physiotherapy delivered via digital platforms than those undergoing THR. However, the magnitude of HRQoL gain reported in Gray et al. (2022) was larger for THR (0.114) than for TKR (0.07) which the EAG considered counterintuitive.

The EAG explored this in a scenario analysis using the THR utility gain. but given the clinical expert opinion and concerns regarding external validity, the TKR based estimate was considered more appropriate and was used in the remaining scenarios.

Figure 2: Calculation of notional QALY gains from digital vs SoC pre and rehab



Abbreviations: QALY, quality adjusted life year; SoC, standard of care

6.2.5 Summary of base case assumptions

Table 21 summarises the EAG's base case assumptions for analysis.

Table 21: Base case assumptions

Assumption	Base-case value		Justification	impact on results
	SoC	Digital		
40% reduction in F2F physiotherapy time with digital rehabilitation	6	3.6	Based on company claims, which report reductions in the range of 33-40% (for those patients receiving F2F rehab [50% TKR; 10% THR])	Moderate cost savings via reduced clinician time input Relatively higher impact on TKR due to higher assumed need for F2F physiotherapy sessions compared to THR
Half-day reduction in LoS with digital rehabilitation	2.71 days	2.21 days	Based on company claims (Table 15), supported by expert clinical opinion	High Key cost driver. Larger assumed reductions materially increase cost-effectiveness.
Physiotherapists will have to spend	-	28 mins	Based on company claims	Low-Moderate

Assumption	Base-case value		Justification	impact on results
	SoC	Digital		
20% of their saved reduction in F2F time managing cases through digital platforms				
Same percentage of cases receive F2F physiotherapy (across digital and non-digital arms)	50% TKR 10% THR	50% TKR 10% THR	Based on expert opinion of current NHS practice	Low
QALY gain with digital rehabilitation	-	0.035	Based on UK evidence (Gray 2022)[58] signalling potential short-term QoL benefit.	High A small gain in QoL in the digital rehabilitation arm has a high impact on the net monetary benefit of a digital platform

Abbreviations: F2F, face-to-face; LoS, Length of Stay; QoL, Quality of Life; SoC, Standard of Care, THR, Total Hip Replacement; TKR, Total Knee Replacement.

6.2.6 Scenarios considered

The EAG considered seven exploratory scenarios to test robustness of the results as well as to explore alternative interpretations of the data and hypotheses (Table 26).

6.2.7 Model validation

Due to the simple nature of the analysis, no formal model validation was appropriate (e.g. comparison of long-term projections with external data). The model was largely based on clinical opinion given the experts' experience of current NHS practice, although the EAG understands availability varies substantially across the NHS. In addition, deterministic checks were undertaken to verify that changes in key inputs produced results in the expected direction and magnitude, and to assess the impact of parameter uncertainty and identify those most likely to drive the cost-effectiveness of digital platforms.

One clinical expert also highlighted that the availability and intensity of pre- and post-operative physiotherapy varies substantially across NHS trusts. Differences in local workforce capacity, commissioning arrangements, and service configuration mean that standard care pathways are not uniform nationally. The base-case assumptions therefore represent a simplified and average approximation of current NHS practice, and this variation across settings represents an additional source of structural uncertainty.

6.2.8 Presentation of results

Results are presented as cost-utility analysis comparing a 'generic' digital technology with standard care. Outcomes are reported as incremental costs and incremental QALYs, the ICER, net monetary benefit and net health benefit at a willingness to pay per QALY of £20,000. The ICER is less informative as it excludes the acquisition cost of a platform. The interpretation of the incremental net monetary benefit is the 'headroom' representing the maximum acquisition cost of a generic digital platform to yield an ICER at or below £20,000 per QALY.

Subsequently, the EAG considered each product in turn as to whether the cost structure differed from the generic case, or where there was evidence of additional benefits (for example where physiotherapists were provided by the company within the price or not). Due to the lack of high-quality evidence supporting the impact of the technologies on e.g. LoS and HRQoL, the EAG presented an optimistic and pessimistic scenario for each technology.

6.3 Results

6.3.1 Base case results

In the deterministic base case, in line with QoL assumptions, the incremental QALY gain was 0.035 for TKR and THR. This resulted in an incremental NMB of £959.63 for THR, and £991.11 for TKR, respectively at a Willingness to Pay (WTP) of £20,000 per QALY compared to the current SoC (Table 22 & Table 23). This sets an upper limit for the acquisition cost per patient of the digital tools, given the base case assumptions (note the acquisition cost is as defined in section 6.2.3, and includes licence cost, mobile device etc.). Table 24 and Table 25 show a breakdown of costs for THR and TKR respectively. As this is an exploratory analysis, the results should be considered of equal validity to any of the scenario analyses described in section 6.3.2.

Table 22: Deterministic base case results THR

Technology	Costs	QALYs	ICER	INMB	INHB
SoC	£1,072	0.815			
Digital	£812	0.85	Dominant	£959.63	0.048

Abbreviations: ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; QALYs, Quality Adjusted Life Years; SoC, Standard of Care. Note: NMB & NHB calculated at a threshold of £20,000/QALY.

Table 23: Deterministic base case results TKR

Technology	Costs	QALYs	ICER	INMB	INHB
SoC	£1,171	0.815			
Digital	£879	0.85	Dominant	£991.11	0.050

Abbreviations: ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; QALYs, Quality Adjusted Life Years; SoC, Standard of Care; TKR, Total Knee Replacement.

Table 24: THR cost breakdown

	Digital			SoC			Incremental
	Quantity	Unit cost	total	Quantity	unit cost	total	
Prehabilitation							
time with physiotherapist in hours	0.4	41	£16.40	2	£41.00	£82.00	-£65.60
written information	0	£10.00	£0.00	1	£10.00	£10.00	-£10.00
LoS	2.21	£352.31	£779.35	2.71	£352.31	£955.50	-£176.15
Rehabilitation							
Percentage of THR patient referred		10%			10%		
F2F sessions	3.6	£41.00	£14.76	6.00	£41.00	£24.60	-£9.84
Physiotherapist time input in remote sessions	0.048	£41.00	£1.97	0	£41.00	£0.00	£1.97
Sum			£812.48			£1,072.10	£259.63

Abbreviations: F2F, face-to-face; LoS, Length of Stay; SoC, Standard of Care; THR, Total Hip Replacement.

Table 25: TKR cost breakdown

	Digital			SoC			Incremental
	Quantity	Unit cost	Total	Quantity	Unit cost	total	
Prehabilitation							
time with physiotherapist in hours	0.4	41	£16.40	2	£41.00	£82.00	-£65.60
written information	0	£10.00	£0.00	1	£10.00	£10.00	-£10.00
LoS	2.21	£352.31	£779.35	2.71	£352.31	£955.50	-£176.15
Rehabilitation							
Percentage of TKR patient referred		50%			50%		
F2F sessions	3.6	£41.00	£73.80	6.00	£41.00	£123.00	-£49.20
Physiotherapist time input in remote sessions	0.24	£41.00	£9.84	0	£41.00	£0.00	£9.84
Sum			£879.39			£1,170.50	£291.11

Abbreviations: F2F, Face to Face; LoS, Length of Stay; SoC, Standard of Care; TKR, Total Knee Replacement.

6.3.2 Scenario analysis results

The EAG explored scenarios relating to six parameters exploring the sensitivity of the ceiling of the estimated acquisition cost reported in section 6.3.1 above (Table 26).

Table 26: Scenario analyses

Analysis	Base case	Description
Scenario 1: Alternative number of rehabilitation sessions (SoC)	6	3, 4, and 5 sessions in the SoC arm for the percentage of patients receiving F2F rehab
Scenario 2: reduction in F2F sessions in digital tech	40%	Cost saving associated with different % reduction in F2F sessions for the percentage of patients receiving F2F rehab
Scenario 3: Reduced clinician time requirement when using the digital platform	20%	Impact of changing clinician time input in when using digital tech
Scenario 4: Reduced length of stay	0.5	Range of values 0 day, 0.2, 0.8, 1 days decrease compared to SoC (2.71 days)
Scenario 5: alternative rehabilitation need	10% THR 50% TKR	varies the proportion of patients who require F2F rehabilitation following surgery
Scenario 6: Alternative QALY assumptions	0.035	Assuming no QALY gain using digital tech
Scenario 7: Alternative scenario for THR QALY gain	0.035	Using THR utility from Gray 2022

Abbreviations: F2F, Face-to-face; QALYs, Quality Adjusted Life Years; SoC, Standard of Care.

Varying the number of SoC F2F sessions (Table 27), the percentage reduction in F2F sessions (Table 28), supplementary clinician time input for digital tools (Table 29) and the proportion of patients receiving F2F input (Table 31) had relatively modest effects on the Incremental Net Monetary Benefit (INMB), indicating these are not major determinants of the ‘headroom’ for acquisition cost.

Results were most sensitive to assumptions around the QALY gain (Table 32) and LoS (Table 30). Even with no reduction in LoS, INMB was positive (£783 for THR; £815 for TKR). In these cases, the ‘headroom’ is generated from reductions in physiotherapy resource use as well as the assumed QALY gain.

Increasing the assumed LoS reduction progressively increased NMB, reaching £1,136 (THR) and £1,167 (TKR) with a 1-day reduction, demonstrating that inpatient cost offsets are a primary driver of economic value. When no health gain from digital vs SoC was assumed (Table 32), INMB reduced substantially (£260 for THR; £291 for TKR). Using the THR utility reported in Gray (2022)[58] increased the INMB for THR to £1,400 (Table 33).

In summary, these scenario analyses on the 'generic' digital platform suggest the following:

- The INMB is interpreted as the 'headroom' / economically justified price or max cost per patient of licence, integration and provision of mobile/tablet device to generate an ICER at or below £20,000 per QALY.
- This is most sensitive to QALY gains and reductions in length of stay from digital vs SoC pre- and rehab.
- The number of F2F physiotherapy sessions and other assumptions around length of time of such contacts is of moderate sensitivity, but less so than the QALY gains and LoS.

Table 27 Alternative number of rehab sessions in SoC

	THR			TKR		
Scenario	**ICER**	**INMB**	**INHB**	**ICER**	**INMB**	**INHB**
3 F2F sessions	Dominant	£955.69	0.048	Dominant	£971.43	0.049
4 F2F sessions	Dominant	£957.00	0.048	Dominant	£977.99	0.049
5 F2F sessions	Dominant	£958.31	0.048	Dominant	£984.55	0.049

Abbreviations: F2F, face-to-face; ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; THR, Total Hip Replacement; TKR, Total Hip Replacement.

Table 28 reduction in F2F sessions due to digital platforms

	THR			TKR		
Scenario	**ICER**	**INMB**	**INHB**	**ICER**	**INMB**	**INHB**

30% reduction in F2F	Dominant	£957.66	0.048	Dominant	£981.27	0.049
50% reduction in F2F	Dominant	£961.59	0.048	Dominant	£1,000.95	0.050

Abbreviations: F2F, face-to-face; ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; THR, Total Hip Replacement; TKR, Total Knee Replacement.

Table 29 Reduced clinician time requirement

	THR			TKR		
Scenario	**ICER**	**INMB**	**INHB**	**ICER**	**INMB**	**INHB**
10% of time required for F2F session in SoC	Dominant	£968.81	0.048	Dominant	£1,004.23	0.050
30% of time required for F2F session in SoC	Dominant	£950.44	0.048	Dominant	£977.99	0.049
50% of time required for F2F	Dominant	£932.07	0.047	Dominant	£951.75	0.048

Abbreviations: F2F, face-to-face; ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; THR, Total Hip Replacement; TKR, Total Knee Replacement.

Table 30 Reduced length of stay

	THR			TKR		
Scenario	**ICER**	**INMB**	**INHB**	**ICER**	**INMB**	**INHB**
No reduction in LoS	Dominant	£783.47	0.039	Dominant	£814.96	0.041
0.2 reduction	Dominant	£853.93	0.043	Dominant	£885.42	0.044
0.8 reduction	Dominant	£1,065.32	0.053	Dominant	£1,096.81	0.055
1 day reduction	Dominant	£1,135.78	0.057	Dominant	£1,167.27	0.058

Abbreviations: F2F, face-to-face; ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; THR, Total Hip Replacement; TKR, Total Knee Replacement.

Table 31 Percentage receiving F2F sessions

	THR			TKR		
Scenario	**ICER**	**INMB**	**INHB**	**ICER**	**INMB**	**INHB**
65% receive F2F for THR, 75% TKR	Dominant	£1,002.92	0.050	Dominant	£1,010.79	0.051
20% receive F2F for THR, 50% TKR	Dominant	£967.50	0.048	Dominant	£991.11	0.050

Abbreviations: F2F, face-to-face; ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; THR, Total Hip Replacement; TKR, Total Knee Replacement.

Notes

Scenarios chosen to represent diversity in expert opinion.

Table 32 Assuming no QALY difference

	THR			TKR		
Scenario	**ICER**	**INMB**	**INHB**	**ICER**	**INMB**	**INHB**
No QALY gain	Dominant	£259.63	0.013	Infinite (division by zero)	£291.11	0.015

Abbreviations: F2F, face-to-face; ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; QALYs, Quality Adjusted Life Years; THR, Total Hip Replacement; TKR, Total Knee Replacement.

Table 33 Alternative QALY gain for THR

	THR		
Scenario	**ICER**	**INMB**	**INHB**
Alternative scenario for THR QALY gain	Dominant	£1,400.53	0.070

Abbreviations: ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; QALYs, Quality Adjusted Life Years; THR, Total Hip Replacement.

6.3.3 Product specific analyses

This section considered each product and whether it deviated from the ‘generic’ case above. If so the costs and/or outcomes were modified accordingly. The acquisition cost was then added in to this and the ICER, INMB and INHB calculated. For each technology, an optimistic and pessimistic case was presented, where the optimistic case was based on the composite effects of the claims made in support of a particular platform, irrespective of the quality or quantity of evidence (or the default analysis in the absence of any claims to suggest otherwise), whilst the pessimistic scenario assumed these were not realised. Where there was no specific evidence or claims for a particular platform the EAG defined the optimistic case as per the generic case, and a pessimistic case assuming no QoL benefit or reduction in LoS (the only benefit therefore is in the avoided F2F physiotherapy sessions).

A key element where the platforms vary is whether they rely on NHS physiotherapists or provide their own included in the acquisition cost. Specifically, PreActiv and Sword Health provide their own physiotherapists. Joint Academy, moveUP and Phio have the option to provide their own or use NHS physiotherapists, whilst the remaining platforms are intended to be used by NHS physiotherapists. Our analyses explored options where these costs were borne by the NHS and companies. In these cases the cost for the physiotherapist 'check-in' time was assumed borne by the companies.

In all cases under the optimistic assumptions, the INMB is positive, meaning all the products yield an ICER below £20,000 compared with SoC. However, under the pessimistic scenarios, Slider, GoWellHealth, Joint Academy, Phio, Huma, Sword Thrive, QuestPrehab and getUBetter exhibit negative INMB, implying their ICER is above £20,000 per QALY, whilst BPMpathway, ForPatientApp, myrecovery, Physitrack, mymobility, moveUP and Good Boost all retain positive INMBs under the pessimistic scenarios. Under these scenarios, PreActiv appears to be cost-effective only for TKR and not THR (Table 34).

Table 34: Results for product specific analyses

Technology	Assumed cost per patient	Reduction in F2F physiotherapy time	Reduction in length of stay	Length of contact with physiotherapist per remote session	Quality of life difference digital vs standard care	ICER THR, TKR	INMB THR, TKR
EAG base case	£0.00	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days)	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	--	£959.63, £991.11
BPMpathway (Optimistic)	£37.88	44% reduction (6 to 3.6 sessions)[47]	0.8-day reduction(observational study India) [42]	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant Dominant	£1,028.23, £1,062.86
BPMpathway (Pessimistic)	£37.88	44% reduction (6 to 3.6 sessions)[47] UK Poster	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominant Dominant	£46.38, £81.02
ForPatientApp (Optimistic)	£62.25	33% reduction in appointments in patients with MSK conditions	0.5-day reduction (standard care length of stay 2.71 days)	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£896.00, £921.98

Technology	Assumed cost per patient	Reduction in F2F physiotherapy time	Reduction in length of stay	Length of contact with physiotherapist per remote session	Quality of life difference digital vs standard care	ICER THR, TKR	INMB THR, TKR
ForPatientApp (Pessimistic)	£62.25	33% reduction in appointments in patients with MSK conditions	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominant Dominant	£19.84, £45.82
Slider (Optimistic)	£222.25	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F) EAG base case	1-day reduction (non-significant)[46]	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£945.02, £913.53
Slider (Pessimistic)	£222.25	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F) EAG base case	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominated, Dominated	-£107.29, -£138.78
myrecovery (Optimistic)	59.75	40% reduction (approximately 6 to 2.4 sessions delivered digitally) EAG base case	Hip: 3.6 vs 4.1 days; Knee: 3.7 vs 4.7 days[49] (0.5 and 1 day) UK observational service evaluation	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£899.88 , £1,107.52

Technology	Assumed cost per patient	Reduction in F2F physiotherapy time	Reduction in length of stay	Length of contact with physiotherapist per remote session	Quality of life difference digital vs standard care	ICER THR, TKR	INMB THR, TKR
myrecovery (Pessimistic)	59.75	40% reduction (approximately 6 to 2.4 sessions delivered digitally)	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominant, Dominant	£23.72, £55.21
GoWellHealth/ (Optimistic)	£51.25	40% reduction (approximately 6 to 2.4 sessions delivered digitally) EAG base case	LOS reduced 33% (THR)[58] (observational study UK) Assumed similar reduction for TKR	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£1,047.29, £1,078.78
GoWellHealth (Pessimistic)	£51.25	40% reduction (approximately 6 to 2.4 sessions delivered digitally) EAG base case	Assumed no reduction in LoS for TKR as in the study	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominant, Dominant	£32.22, £63.71
Physitrack (Optimistic)	£27.45	40% reduction (approximately 6 to 2.4 sessions delivered digitally) EAG base case	0.49 days (p = 0.04 Observational study Australia[87])	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£928.65, £960.14

Technology	Assumed cost per patient	Reduction in F2F physiotherapy time	Reduction in length of stay	Length of contact with physiotherapist per remote session	Quality of life difference digital vs standard care	ICER THR, TKR	INMB THR, TKR
Physitrack (Pessimistic)	£27.45	40% reduction (approximately 6 to 2.4 sessions delivered digitally) EAG base case	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominant, Dominant	£56.02, £87.51
mymobility (Optimistic)	£41.00	45% reduction (approximately from 6 to 3.3 sessions delivered 3.3 F2F)[36]	0.5-day reduction (standard care length of stay 2.71 days)	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£919.53 £954.66
mymobility (Pessimistic)	£41.00	45% reduction (approximately from 6 to 3.3 sessions delivered 3.3 F2F)[36]	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominant, Dominant	£43.38 £78.50
Joint Academy (Optimistic) (NHS physiotherapists)	£57.85	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days)	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£901.78 £933.26
Joint Academy (Pessimistic) (Company provided physiotherapists)	£172.25*	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	Company provided physiotherapists	0	Dominated, Dominated	-£70.41 -£31.05

Technology	Assumed cost per patient	Reduction in F2F physiotherapy time	Reduction in length of stay	Length of contact with physiotherapist per remote session	Quality of life difference digital vs standard care	ICER THR, TKR	INMB THR, TKR
Phio (Optimistic)	£209.75	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days)	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£749.88, £781.36
Phio (Pessimistic)	£209.75	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominated, Dominated	-£126.28, -£94.79
Huma (Optimistic)	£403.85	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days)	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	£4,120.67, £3,221.02	£555.78, £587.26
Huma (Pessimistic)	£403.85	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominated, Dominated	-£320.38, -£288.89
Sword Thrive (Optimistic)	£275.00	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days)	Company provided physiotherapists	0.035	Dominant, Dominant	£702.99, £742.35

Technology	Assumed cost per patient	Reduction in F2F physiotherapy time	Reduction in length of stay	Length of contact with physiotherapist per remote session	Quality of life difference digital vs standard care	ICER THR, TKR	INMB THR, TKR
Sword Thrive (Pessimistic)	£275.00	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	Company provided physiotherapists	0	Dominated, Dominated	-£173.16, -£133.80
PreActiv (Optimistic)	£137.25	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days)	Company provided physiotherapists	0.035	Dominant, Dominant	£840.74, £880.10
PreActiv (Pessimistic)	£137.25	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	Company provided physiotherapists	0	Dominated, Dominant	-£35.41, £3.95
QuestPrehab (Optimistic)	£97.25	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£880.74, £920.10
QuestPrehab (Pessimistic)	£172.25*	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	Company provided physiotherapists	0	Dominated, Dominated	-£70.41, -£31.05

Technology	Assumed cost per patient	Reduction in F2F physiotherapy time	Reduction in length of stay	Length of contact with physiotherapist per remote session	Quality of life difference digital vs standard care	ICER THR, TKR	INMB THR, TKR
getUBetter (Optimistic)	£123.50	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£836.13, £867.61
getUBetter (Pessimistic)	£123.50	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominated, Dominated	-£40.03, -£8.54
moveUP (Optimistic)	£53.50	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£906.13, £937.61
moveUP (Pessimistic)	£53.50	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominant, Dominant	£29.97, £61.46
Good Boost (Optimistic)	£51.41	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	0.5-day reduction (standard care length of stay 2.71 days	20% of standard care clinician time (approximately from 60 to 12 minutes)	0.035	Dominant, Dominant	£908.22, £939.70

Technology	Assumed cost per patient	Reduction in F2F physiotherapy time	Reduction in length of stay	Length of contact with physiotherapist per remote session	Quality of life difference digital vs standard care	ICER THR, TKR	INMB THR, TKR
Good Boost (Pessimistic)	£51.41	40% reduction (approximately from 6 to 3.6 sessions delivered 3.6 F2F)	No reduction	20% of standard care clinician time (approximately from 60 to 12 minutes)	0	Dominant, Dominant	£32.06, £63.55

Abbreviations: EAG, External Assessment Group; F2F, face-to-face; ICER, Incremental Cost-Effectiveness Ratio; INHB, Incremental Net Health Benefit; INMB, Incremental Net Monetary Benefit; MSK, musculoskeletal; THR, Total Hip Replacement; TKR, Total Knee Replacement.

* In the pessimistic scenario, the EAG used the company-provided physiotherapist price, as this was associated with lower cost savings for these techs

6.4 Summary and interpretation of the economic evidence

Overall, under optimistic scenarios, all technologies yield an ICER below £20,000 per QALY (i.e. a positive incremental net monetary benefit) compared with SoC for both THR and TKR.

Under pessimistic scenarios, Slider, Phio, Huma, Joint Academy, Sword Thrive, QuestPrehab and getUBetter yield ICERs above £20,000 for both THR and TKR.

The evidence base is such that the EAG is not in a position to determine whether the optimistic or pessimistic scenarios are more likely: they represent extremes with reality in between these. However, BPMpathway, ForPatientApp, myrecovery, Physitrack, mymobility, moveUP, GoWellHealth and Good Boost represent lower risk investments for NHS patients as they remain cost-effective under the pessimistic scenarios; PreActiv is of borderline risk in this regard with the incremental net monetary benefit close to zero (negative for THR and positive for TKR). Phio is priced on a per site cost, and communications to the EAG stated that it can be used in all MSK conditions, not just THR or TKR. According to the company, total use in a trust of 300,000 patients would be expected at 2640 patients, reducing the price per patient to £56.82 rather than the EAG’s calculation of £187.50. Thus if (and only if) Phio is deployed across all MSK conditions in a trust, it may represent a more cost-effective investment than suggested. However, evaluation of platforms’ use in MSK conditions is beyond the scope of this analysis.

The EAG draws attention to the fact that the results are based on only pairwise analysis vs SoC. The acquisition cost of the technologies varies and there is currently no evidence to establish whether the higher cost of some platforms is justified by greater effects in terms of outcomes / patient health related quality of life, particularly as the features vary between technologies.

The EAG noted that integration costs were described as optional by some companies and were unclear in others and therefore excluded these from the analysis.

The results are most sensitive to assumptions regarding any health gain attributable to digital prehabilitation and rehabilitation over conventional F2F, and reductions in LoS following surgery. Clinical expert advice to the EAG noted that prehabilitation is sometimes delivered as a group session, although this has decreased since the pandemic. Group physiotherapy sessions will reduce the cost per patient of SoC and therefore reduce the maximum economically justified price / headroom for digital platforms (that is, make them less cost-effective at current prices). As stated earlier, the EAG's clinical experts also expressed doubts as to whether length of stay will indeed fall, one stating that "long, effective prehabilitation of more than 3 months 'may' impact this". How much of this would be attributable to digital platforms over and above SoC is also unknown. Whilst there is empirical evidence suggesting a reduction in length of stay, these are not based on prospective randomised controlled trials.

The EAG's base case assumes a QALY gain of 0.035 over a time horizon of one year attributable to digital vs SoC prehabilitation and rehabilitation. This was based on hypothetical extrapolation of retrospective observational data showing an EQ-5D utility difference of 0.07 at 6 months from one digital platform.[107] The EAG considers this to be optimistic and is doubtful that digital platforms will lead to any meaningful health benefit to patients over and above that provided by face to face approaches; further data are required to confirm or refute the health gains. This has a large impact on the results as the 0.035 QALY gain increases the economically justified price by up to £700 (0.035 * £20,000).

The EAG's analysis did not explicitly model adherence, with the implied starting point being uptake of prehabilitation, with assumed proportions of patients subsequently requiring and undertaking rehabilitation. Increases in engagement are likely to increase NHS costs due to additional physiotherapy activity that would otherwise not have been undertaken but may lead to reduced LoS and/or quality of life gains for patients. This is likely to be cost-effective vs no pre/rehabilitation as current face to face provision of pre/rehabilitation is considered cost-effective vs no provision.

7 Integration into the NHS

The following information was adapted from the RFI documents supplied by the technology manufacturers.

BPMpathway (270 Vision Ltd) is available in the NHS, most recently used by Leeds Teaching Hospitals NHS Trust. The company state that there are no significant technological barriers to uptake. To date, hospitals using BPMpathway software have set up standalone databases to store recovery results to the patient files. The company state that it would, however, be relatively straightforward to integrate the software into Patient Management Record (PMR) systems if required. The company provide onsite training to clinicians and have telephone and email support available should they have further questions or problems.

ForPatientApp (B. Braun Medical Ltd) is available on the NHS. Nottingham University Hospital is currently using the ForPatientApp as part of the Pheno4U clinical trial, looking at its use in knee replacement surgeries. The app can only be used if the patient is registered for the app by the hospital, and the company works in partnership with NHS organisations to support them to implement pathway changes that suit the needs of their patient population. Firewall changes may be required to allow connection between customer devices and the application server, although the app can be downloaded from Google Play and App Store onto any mobile device – no additional software is required. Onsite product training is available with tutorial support for both staff and patients.

getUBetter (getUBetter Ltd) is available on the NHS. It is currently available across 17 Integrated Care Systems. It is available across the care pathway and provided at the first opportunity to patients who seek help for an MSK injury or condition. The company states that the app integrates relevant local population content, and local treatments and services, enabling self-referral or automated referral to resources such as physiotherapy, mental health support, smoking cessation programmes, and other programmes. No major changes to facilities or infrastructure are needed to adopt the technology.

Good Boost (Good Boost Wellbeing Ltd) is available on the NHS and being used to signpost patients to local leisure centres/ community centres to access Good Boost programmes. This is currently taking place in South Wales, South London, Shropshire and St. Helen’s. The technology fits into the clinical care pathways as a prevention option, a complement to a treatment plan or as a discharge plan into self-management in the community. No system changes are required for adoption. No additional training is required.

GoWellHealth (SHI Global Ltd) is available to the NHS. It has been used since 2016 as a perioperative digital tool to support surgical pathways. The work within the NHS was carried out at South Tees Hospitals NHS Foundation Trust between 2017 and 2024. The digital pathway in GoWellHealth is mapped directly onto the clinical pathway that NHS teams use, meaning that the patient journey view in GoWellHealth is another representation of the existing NHS clinical pathway, rather than a separate or competing route. In terms of infrastructure, Trusts just need a secure browser and internet access for staff, while patient onboarding can be done by staff during appointments. The company provide short initial training (1–2 hours) for multi-disciplinary orthopaedic teams.

Huma (Huma Therapeutics Ltd) is available to the NHS. It has been previously deployed across multiple NHS Trusts for various use cases; however, it is not currently in active use. The technology can be integrated into existing NHS clinical care pathways for both pre- and post-operative rehabilitation following hip and knee replacement surgeries. It is primarily used across secondary care and community rehabilitation settings, supporting both hospital-led and remotely managed recovery programmes. As a cloud-based platform, it requires minimal system modifications and can be deployed without disrupting current processes. Short onboarding sessions and digital guides for clinicians can typically be delivered in around 45 minutes and can be completed remotely or in person.

Joint Academy (Artho Therapeutics Ltd and Artho Therapeutics AB) is available to the NHS. It is not currently used by any Trusts, although is due to [redacted]

[redacted] Programmes can either replace F2F services or complement them in a hybrid programme. No changes to facilities or software are needed, as the app is designed to slot into existing pathways, minimising training and support required. Physiotherapists who use the app are provided with mandatory induction training and follow-up training once they start seeing patients.

moveUP (moveUP NV) is available to the NHS. The technology is not currently in use in the NHS, though it has been piloted in a private setting. The platform is designed to support shared care pathways between different services, to facilitate collaborative decision-making and continuity of care. The platform integrates with hospital Electronic Patient Record systems. moveUP requires minimal technical system changes for NHS adoption. The cloud-based platform operates through web browsers for healthcare professionals and mobile applications for patients, requiring no additional NHS infrastructure investment. The training investment is modest, with most healthcare professionals achieving competency within 2-3 hours of structured training.

mymobility (Zimmer Biomet) is available on the NHS. The technology currently has 14,325 patients enrolled across 12 hospitals. Patients need to be enrolled by dedicated hospital staff. Hospitals require a project team and collaborate with Zimmer Biomet during implementation, in which they decide what features to switch on (such as messaging, Range of Motion, WalkAI, Exception reporting), what PROMS to collect and when, which exercise protocols to include, and how education provision should be customised. The platform integrates with hospital Electronic Patient Record systems. Staff training from Zimmer Biomet is provided as part of the implementation process, along with post-training support and reviews. There is dedicated customer support for patients/hospitals.

myrecovery (Healthcare Outcomes Performance Company (HOPCo) Ltd) is available on the NHS. It is currently in use across multiple Trusts and Integrated Care Systems. The app is used to digitise pre-operative assessments, deliver patient education, and monitor recovery following procedures such as hip and knee replacement. Patients access the app via smartphone or web browser to complete clinical surveys, view educational content, and share activity data. The platform fits into the perioperative and rehabilitation pathways for orthopaedic and other surgical patients – it requires minimal system change for adoption. A range of user guides, onboarding materials, and in-app tutorials is available to support adoption – backed by a Customer Success team.

Phio Access, Phio Engage and Phio Collect (EQL Ltd) are available on the NHS and used across 13 NHS Trusts. The technology is implemented in a variety of settings. It can replace or supplement F2F rehabilitation options, according to the use case and individual needs. The company states that no system changes are needed for adoption, as it is already deployed in the NHS. Onboarding and training for physiotherapists is provided to both EQL clinical services staff (internal providers) and customer clinical staff (external providers) via a clinical onboarding team.

Physitrack (Physitrack PLC) did not provide an RFI, although the company's website suggests that it is in use across over 60 NHS Trusts, across a range of patient pathways.

PreActiv (Snow Squared Ltd) is available on the NHS. It is in use across multiple Trusts for surgical prehabilitation and rehabilitation. PreActiv integrates into existing NHS perioperative care pathways, primarily within secondary care, with patients engaging remotely from home. Deployment is adaptable to local service structures. Adoption requires minimal system change, as the platform is designed to integrate with existing perioperative systems. Training for NHS adoption is structured and designed to integrate smoothly with existing clinical workflows – training sessions are usually 30–45 minutes and can be delivered in person or virtually.

QuestPrehab (C Digital Healthcare Ltd) is available on the NHS. It is currently in use at two Trusts, with additional Trusts in discussion with the company. The platform is designed to fit into existing NHS clinical care pathways by supporting current processes and pre- and rehabilitation services, without requiring duplication or major changes to infrastructure. It is used in various care settings, including perioperative, oncology, and surgical wards.

Physiotherapists benefit from training in patient onboarding and remote monitoring. Training can also cover patient engagement strategies.

Slider (AI Rehab Ltd) is available on the NHS. While it is not currently used in the NHS, the company have done a real-world validation study at the Robert Jones and Agnes Hunt Hospital and a pilot study at the Woodend Hospital in Aberdeen. The platform can be used in a variety of places in the pathway, including pre-operative, post-operative and later rehabilitation, and in various settings. The system has a minimal IT footprint, but some setup is required. Onboarding is provided as 30–45 min super-user sessions for physiotherapy teams. Refresher sessions and a troubleshooting crib sheet is available.

Sword Thrive (Sword Health) is available on the NHS. It is used across two Integrated Care Systems and one foundation trust, and in use as part of a multi-site RCT in a further four foundation trusts. The app can integrate into various points of NHS MSK pathways, offering benefits at different stages of care, with options for direct referral from primary care and self-referral. NHS Trusts adopting Sword Thrive would need to do some system changes, including redesigning clinical pathways and integrating their existing IT systems with the platform. No training is required for staff members. However, the company can facilitate a walkthrough the system and would be on hand to respond to any queries.

8 Evidence gap analysis

8.1 Ongoing studies

In total, fifteen ongoing, in scope studies were identified from company RFEs and the evidence review (Table 35). These were for: Joint Academy (2 studies), QuestPrehab (1 study), moveUP (3 studies), PreActiv (1 study), Slider (2 studies), Sword (1 study), mymobility (1 study), myrecovery (1 study), Phio Engage (1 study), getUBetter (1 study), Good Boost (1 study). Of those studies for which sufficient information was available, three studies were evaluating the technology for rehabilitation, four for prehabilitation, and three for both (note that in two of these, it was unclear). One study evaluating mymobility was outside of the NICE scope as it was conducted with healthy volunteers but was included in the table as it was seeking to evaluate joint-specific outcomes.

How these ongoing studies may fill the current gaps in the evidence base (as described in section 8.2) is discussed in section 8.2.1.

Table 35: Ongoing studies and their relevance to the decision problem

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
BPMpathway (1 study)			
Accelerometry and Rehabilitation After Knee Replacement Study (ARK) NCT05412940[a]	Intervention: BPMpathway wearable sensor: Match to scope. Comparator: standard care. Unclear if matched to scope. Population: People having primary TKR: full match to scope. Prehabilitation or rehabilitation: Unclear. Outcomes: OKS and satisfaction: full match to scope.	01/12/2023	The company noted that the study manuscript is scheduled for completion in January 2026. Unclear but potentially conducted in UK
Joint Academy (2 studies)			
Protocol: Not published Linked reference: NA *Molecular signatures of endocannabinoid induced pain relief in humans: lifestyle interventions, systemic and localised changes.*	Intervention: Exercise (n=15). Unclear if this includes the technology Comparator: Maltodextrin + standard care (n=13). Unclear match to scope. Participants: TKR with osteoarthritis. Full match to scope Prehabilitation or rehabilitation: Unclear Setting: Full match to scope Outcomes: Full match to scope Design: RCT	NR; data expected mid-January 2027	Unable to identify a clinicaltrials record for this. Not clearly stated that the technology was used in the exercise arm and, if so, how this was used Appears to be conducted in UK.
Protocol: NR Linked reference: Nero et al 2021[108] *Digitally delivered first-line osteoarthritis treatment improves equal access to care in urban and rural areas of Sweden 2019-2020*	Intervention: 'Digital treatment'. Unclear if matched to scope. Comparator: 'physical treatment'. Unclear if matched to scope Participants: Unclear if knee or hip replacement but possibly both. Participants had osteoarthritis. Unclear if matched to scope.	NR; data analysis will begin "in 2026"	Study using registry data. Unclear study design,

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
	Prehabilitation or rehabilitation: Unclear Outcomes: NR. Unclear if matched to scope Study design: NR		
QuestPrehab (1 study)			
Protocol: NR Linked reference: NA *Enhancing Functional Recovery and Surgical Readiness in Primary Orthopaedic Joint Surgery Patients through Digital Prehabilitation: A GIRFT Aligned Pilot*	Intervention: QuestPrehab. Match to scope Comparator: None Participants: elective primary hip or knee replacement. Prehabilitation or rehabilitation: prehabilitation Outcomes: Functional capacity, HRQoL, resource use, costs, engagement and adherence Study design: 1-arm feasibility pilot study	Data expected Jan 2027	Appears to be conducted in the UK.
moveUP (3 studies)			
Protocol: NCT04628468 Linked reference: NA *Patient Reported Outcome Measures (PROMs) in Rehabilitation With or Without the Possible Use of a Mobile Application After Primary Knee or Hip Arthroplasty*	Intervention: moveUP. Match to scope Comparator: Physical physiotherapy Participants: Primary knee or hip replacement. Match to scope Prehabilitation or rehabilitation: rehabilitation Outcomes: functional outcomes, HRQoL, app performance, mortality. Match to scope. Study design: RCT	Data expected May 2026	
Protocol: NR Linked reference: NA *Amphia Ziekenhuis Breda - CZ/VGZ Digital Rehabilitation Pilot for Hip and Knee Arthroplasty Amphia Ziekenhuis, The Netherlands*	Intervention: moveUP Comparator: in-person physiotherapy Participants: Hip and knee replacement Prehabilitation or rehabilitation: rehabilitation Outcomes: function, pain, costs Study design: Observational pilot study	Data expected end 2026	

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
Protocol: NCT06780319 Linked reference: NA *DIGIHIP - Rééducation numérique après une arthroplastie de la hanche : un essai contrôlé randomisé (Digital rehabilitation after hip arthroplasty: a randomized controlled trial)*	Intervention: Tele-education. Unclear if matched to scope. Comparator: standard rehabilitation with physiotherapist Participants: hip replacement Prehabilitation or rehabilitation: rehabilitation Outcomes: timed up and go test Study design: RCT	Data expected March 2026	
PreActiv (1 study)			
Protocol: NR Linked reference: NA *Service evaluation and post-market surveillance of digital prehabilitation for hip and knee arthroplasty at the Royal United Hospitals Bath (RUH).*	Intervention: NR Comparator: NR Participants: hip or knee replacement Prehabilitation or rehabilitation: prehabilitation Outcomes: NR Study design: NR, service evaluation	Service evaluation to take place quarterly during 2026, with final evaluation released for publication in January 2027	No information on whether this study would be relevant to the NICE scope. Appears to be conducted in UK
Slider (2 studies)			
Protocol: NR; not yet registered Linked reference: NA *A pilot study investigating augmented exercise performance and adherence in patients undergoing total knee arthroplasty. Brooks Rehabilitation Hospital, University of Florida, USA*	Intervention: Slider Comparator: standard physiotherapy Participants: Preop and postop patients having total knee replacements for osteoarthritis; relevant to NICE scope Prehabilitation and rehabilitation: unclear but potentially both Outcomes: NR Study design: Observational pilot study	August 2026	Unclear if ongoing. Stated that registration not complete but data to be available in eight months.
Protocol: NR; not yet registered Linked reference: NA	Intervention: Slider; relevant to NICE scope. Comparator: Standard physiotherapy	June 2027	Unclear if ongoing. Stated that registration not complete.

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
Effectiveness of Slider® in Monitoring and Enhancing Physiotherapy Outcomes for Patients with Osteoarthritis of the Knee: A Randomized Controlled Trial.	Participants: Preop and postop patients having total knee replacements for osteoarthritis Prehabilitation or rehabilitation: Unclear but possibly both. Outcomes: NR Study design: RCT		Study to be conducted in UK
Sword Thrive (1 study)			
Protocol: NR Linked reference: NA *Measuring the impact of a remote perioperative optimisation programme on functional outcomes in elective lower limb arthroplasty: a randomised controlled trial*	Intervention: Sword Thrive; unclear if relevant to NICE scope Comparator: standard hospital care; relevant to NICE scope Participants: adults listed for elective knee and hip arthroplasty; relevant to NICE scope Prehabilitation or rehabilitation: both Outcomes: Oxford Hip and Knee scores; relevant to NICE scope Study design: RCT; relevant to NICE scope	Data expected October 2027	Conducted in the UK
mymobility (1 study)			
Protocol: NCT06863428 Linked reference: NA *mymobility Knee ROM Validation Study*	Intervention: mymobility; relevant to NICE scope Comparator: none; partial relevance to scope Participants: healthy volunteers; not relevant to NICE scope Prehabilitation or rehabilitation: not relevant as healthy volunteers Outcomes: Joint-specific function Study design: single arm observational	Data expected December 26	Not relevant to NICE scope; healthy volunteers
myrecovery (1 study)			
Protocol: Linked reference:	Intervention: myrecovery; relevant to NICE scope	Data expected in 2026	Unclear relevance to NICE scope.

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
Prospective and retrospective observational study and service evaluation embedded within routine care	Comparator: mixed; studies will include uncontrolled designs, historical controls, and comparison with standard care Participants: NR Prehabilitation or rehabilitation: NR Outcomes: NR Study design: service evaluation at multiple sites		Appears to be conducted in the UK.
Phio Engage (1 study)			
Protocol: NR Linked reference: NA *A Pragmatic Retrospective Study Assessing the Impact of Phio Engage Digital Exercise and Education On The Management of Patients with Non-Traumatic Joint Disease*	Intervention: Phio Engage; relevant to NICE scope Comparator: none Participants: mild and moderate hip and knee arthritis with potential for surgery; partial/unclear match to scope Prehabilitation or rehabilitation: prehabilitation Outcomes: NR Study design: single-arm, retrospective	Data expected early/mid 2027	Unclear relevance to NICE scope as unclear how many participants would require hip or knee replacement. Conducted in the UK
getUBetter (1 study)			
Protocol: NR Linked reference: NA *Implementing a digital self-management tool within an orthopaedic knee pathway: a mixed-methods feasibility study*	Intervention: getUBetter; relevant to NICE scope Comparator: none Participants: people that have knee osteoarthritis; partial/unclear match to scope Prehabilitation or rehabilitation: prehabilitation Outcomes: usability, safety, patient-reported outcomes, qualitative data Study design: single-arm pilot	Data expected March 2026	Unclear if study is ongoing. Unclear match to scope; unclear how many participants would require knew replacement. Study to be conducted in the UK

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
Good Boost (1 study)			
Protocol: NR Linked reference: NA *A randomised controlled feasibility trial of Good Boost+ for adults on knee replacement waiting*	Intervention: Good Boost Comparator: standard physiotherapy and self-management Participants: people waiting for knee replacement surgery Prehabilitation or rehabilitation: NR Outcomes: NR Study design: RCT	Data expected summer 2027	Unclear if ongoing. Appears to be at least partially based in the UK

Abbreviations: ARK, Accelerometry and Rehabilitation After Knee Replacement Study; HRQoL, Health Related Quality of Life; NA, Not Applicable; NR, Not Reported; RCT, Randomised Controlled Trial; ROM, Range of Movement; RUH, Royal United Hospitals Bath; TKR, Total Knee Replacement.

Note:

[a] https://clinicaltrials.gov/study/NCT05412940

[b] https://swordhealth.com/newsroom/sword-health-acquires-surgery-hero-to-accelerate-global-growth-and-expand-its-presence-in-the-uk

8.2 Evidence gap analysis

8.2.1 Clinical evidence

An overview of the included evidence available for each of the outcomes in the NICE scope is provided in Table 36; this includes RCTs as well as retrospective and prospective controlled trials, and single arm trials (where included). Controlled studies were only available for six technologies listed in the NICE scope: BPMPathway, GoWellHealth, mymobility, Physitrack, Slider and Sword Thrive. Controlled studies represent more useful evidence than single-arm studies, as it is more feasible to determine whether outcomes are associated with the effectiveness of the intervention (as opposed to other factors, such as natural recovery after surgery). However, the control arm in the controlled trials was often different to the usual care people would receive in the NHS. This limited the generalisability of the evidence.

Outcomes for each technology were rated as 1) green when data had been reported for more than one study, at least one of which was a randomised or quasi-randomised controlled trial, 2) amber in instances where they were reported in more than one study or a single randomised or quasi-randomised study, and 3) red when outcomes were either not reported or just reported in one, non-randomised study.

Most data were available for HRQoL, mobility and functional performance, joint-specific function, adherence and compliance, pain and user satisfaction and acceptability. Most HRQoL measures used were generic measures (EQ-5D or SF-12/-36), which is informative for cost effectiveness analysis, though other population-specific measures were used in some studies. An array of different joint-specific function and mobility outcomes were measured across studies; while these measures were validated and frequently used in research and/or clinical practice, variation on measures over studies would limit opportunities for pooling data across studies.

There was little (≤3 studies) evidence for confidence in recovery and self-management, escalation, psychological outcomes, return to usual activities, early identification of concerns and adverse effects.

Table 36: Evidence gap analysis: number of included studies for each outcome in the NICE scope

	BPMPathway	ForPatientApp	Good Boost	GoWellHealth	Joint Academy	moveUP	mymobility	myrecovery	Phio	Physitrack	PreActiv	Slider	Sword Thrive	Total
HRQoL	3 (1 q-RCT) GREEN	0 RED	1 RED	2 (1 RCT) GREEN	0 RED	4 AMBER	3 (3 RCTs) GREEN	0 RED	0 RED	2 (1 RCT) GREEN	0 RED	1 RED	2 (2 q-RCTs) GREEN	18
Pain	1 RED	1 RED	1 RED	1 (1 RCT) AMBER	1 RED	3 AMBER	1 (1 RCT) AMBER	0 RED	0 RED	2 (1 RCT) GREEN	0 RED	0 RED	2 (2 q-RCTs) GREEN	13
Joint-specific function - knee	3 (1 q-RCT) GREEN	0 RED	1 RED	1 RED	0 RED	2 AMBER	1 (1 RCT) AMBER	0 RED	0 RED	1 RED	0 RED	1 RED	0 RED	10
Joint-specific function - hip	0 RED	0 RED	1 RED	1 RED	0 RED	1 RED	1 (1 RCT) AMBER	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	4
Function and participation in daily life	0 RED	1 RED	0 RED	1 (1 RCT) AMBER	0 RED	3 AMBER	0 RED	0 RED	0 RED	1 RED	0 RED	0 RED	2 (2 q-RCTs) GREEN	8
Confidence in recovery and self-management	0 RED	0 RED	0 RED	1 (1 RCT) AMBER	0 RED	0 RED	0 RED	0 RED	0 RED	1 (1 RCT) AMBER	0 RED	0 RED	0 RED	2
Healthcare use	0 RED	0 RED	0 RED	1 RED	0 RED	2 AMBER	2 (2 RCTs) GREEN	1 RED	0 RED	0 RED	0 RED	0 RED	0 RED	6
Escalation	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0

	BPMPathway	ForPatientApp	Good Boost	GoWellHealth	Joint Academy	moveUP	mymobility	myrecovery	Phio	Physitrack	PreActiv	Slider	Sword Thrive	Total
Mobility and functional performance	3 (1 q-RCT) GREEN	1 RED	0 RED	0 RED	1 RED	3 AMBER	5 (4 RCTs) GREEN	0 RED	0 RED	0 RED	0 RED	2 AMBER	2 (2 q-RCTs) GREEN	17
Psychological outcomes	0 RED	1 RED	0 RED	0 RED	0 RED	0 RED	1 (1 RCT) AMBER	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	2
User satisfaction and acceptability	1 RED	1 RED	0 RED	1 (1 RCT) AMBER	0 RED	2 AMBER	3 (2 RCTs) GREEN	0 RED	1 RED	0 RED	1 RED	2 AMBER	2 (2 q-RCTs) GREEN	13
Return to usual activities	0 RED	0 RED	0 RED	0 RED	0 RED	1 RED	2 (1 RCT) GREEN	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	3
Adherence/compliance	4 (1 q-RCT) GREEN	0 RED	0 RED	0 RED	0 RED	0 RED	1 RED	0 RED	1 RED	0 RED	1 RED	1 RED	2 (2 q-RCTs) GREEN	9
Interaction	1 RED	0 RED	0 RED	0 RED	1 RED	0 RED	1 RED	0 RED	0 RED	0 RED	0 RED	0 RED	2 (2 q-RCTs) GREEN	5
Early identification of concerns	0 RED	0 RED	0 RED	0 RED	0 RED	1 RED	0 RED	0 RED	0 RED	0 RED	0 RED	1 RED	0 RED	2
Adverse events	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	0 RED	1 RED	2 (2 q-RCTs) GREEN	3

Abbreviations: HRQoL, Health Related Quality of Life; q-RCT, quasi-randomised controlled trial; RCT, randomised controlled trial.
Note: Outcomes for each technology were rated as 1) GREEN when data had been reported for more than one study, at least one of which was a randomised or quasi-randomised controlled trial, 2) AMBER in instances where they were reported in more than one study or a single randomised or quasi-randomised study, and 3) RED when outcomes were either not reported or just reported in one, non-randomised study.

Table 37: Overview of evidence available for technologies included in the NICE scope

	BPMPathway	ForPatientApp	Good Boost	GoWellHealth	Joint Academy	moveUP	mymobility	myrecovery	Phio	Physitrack	PreActiv	Slider	Sword Thrive
N studies	4	1	1	3	2	4	4	1	1	3	1	3	2
Study design	1 q-RCT, 2 controlled and 1 single arm	single arm	Single arm	1 RCT, 1 retro, 1 single arm	Single arm (2)	Single arm (4)	RCT (2), single arm (2)	Retro cohort	Single arm	RCT, retrospective cohort (2)	Single arm	Cohort (1) single arm (2)	q-RCT (2)
Population	TKR	TKR	Both	THR (1), both (2)	Both	Both (3), TKR (1)	TKR (5), THA (1), both (3)	Both	Both	TKR	Both	TKR	TKR (2), THR (1)
Prehabilitation or rehabilitation	4 rehabilitation and 1 both	Rehabilitation	Rehabilitation	Both	Prehabilitation	Rehabilitation	Both (7), prehabilitation (2)	Both	Both	Both (1), prehabilitation (1), rehabilitation (2)	Prehabilitation	Both (1), prehabilitation (1), rehabilitation (1)	Rehabilitation
Comparator	Conventional physio (1), home-based rehab (2), health education manual	none	none	Standard care (2) and none (1)	None	None	Traditional physio (3), usual care (3), none (3)	Usual care	None	Usual care	None	Usual care (1)	Home-based physiotherapy

	BPMPathway	ForPatientApp	Good Boost	GoWellHealth	Joint Academy	moveUP	mymobility	myrecovery	Phio	Physitrack	PreActiv	Slider	Sword Thrive
	(1), none (1)												
Outcomes	HRQoL, pain, joint-specific function, functional performance and mobility, compliance, LoS, user satisfaction (single arm), inpatient physio (single arm)	Pain, functional performance, anxiety, participation in daily life, user satisfaction	Pain, joint function, quality of life	HRQoL, pain, function, participation in daily life, confidence in recovery and self-management, user satisfaction, length of stay, readmission	Pain, functional performance, engagement	HRQoL, pain, functional performance, participation in daily life, user satisfaction, unplanned consultations, return to activities	HRQoL, pain, functional performance, healthcare use, mobility, pain, user satisfaction, return to activity, anxiety, compliance, costs	Readmission, ED attendance, length of stay	User satisfaction, compliance	HRQoL, pain, participation in daily life, length of stay, confidence in recover and self-management, physiotherapy review,	User satisfaction, compliance	HRQoL, pain, joint-specific function, functional performance, user satisfaction, hospital stay, adverse events, inpatient physiotherapy	HRQoL, pain, functional performance, participation in daily life, user satisfaction, compliance, adverse events
Longest follow-up	12 months	3 months	3 months	6 months	3 months	6 months	12 months	NR	3 months	12 months	NR	6 weeks	6 months

Abbreviations: ED, Emergency Department; HRQoL, Health Related Quality of Life; LoS, Length of Stay; q-RCT, Quasi-randomised controlled trial; RCT, Randomised Controlled Trial, THR, Total Hip Replacement; TKR, Total Knee Replacement.

Ongoing studies were identified for two technologies that had no evidence identified by the evidence review: QuestPrehab and getUBetter. Only limited details of the ongoing studies were available and it was unclear whether they will contribute significantly to the evidence base. The QuestPrehab study is aligned to the GIRFT programme and aims to report on functional capacity, HRQoL, resources use, costs, engagement and adherence. However, it is a single arm feasibility study. The getUBetter study is similarly a single-arm pilot and it was unclear whether they would be recruiting people who are scheduled for hip or knee joint replacement.

For the remaining technologies, ongoing studies were identified as likely to address key evidence gaps for seven technologies: BPMpathway, Good Boost, Joint Academy, moveUP, Phio, Slider and Sword Thrive. RCTs are currently underway for four technologies that had no controlled evidence included in the review (Good Boost, Joint Academy, moveUP, Slider) The Good Boost trial appears to be at least partially based in the UK and may have a comparator arm that is relevant to NHS care.

Ongoing studies will provide evidence for the effectiveness of two technologies for prehabilitation where only rehabilitation evidence was identified in the review (moveUP and Sword Thrive). Evidence comparing moveUP with standard physiotherapy will also be available from ongoing studies, whereas this was not identified from studies included in the evidence review. As outcomes and follow-up to be assessed in ongoing studies were not clearly reported in all cases, it is possible that further evidence gaps will be addressed by ongoing studies.

8.2.2 Economic evidence

The main limitation is the lack of generalisable RCT evidence with associated economic evaluations that examine whether there is any benefit to digital platforms other than reducing F2F physiotherapy sessions. While a few studies raise the hypothesis that the closer monitoring provided by some of the technologies may help to detect infections or adverse events sooner, this benefit is currently purely hypothetical and has not yet been tested. For example, a study of the Slider technology (Sampath & Aktas 2024[43]) observed a potential for early detection of infection due to monitoring, but it was an incidental finding and so hypothesis-raising rather than hypothesis-testing.

The most sensitive parameter affecting the cost-effectiveness of the platforms was the assumed QALY gain from digital platforms over SoC prehabilitation and rehabilitation. The second most sensitive parameter was LoS following the index procedure. Reductions in frequency of F2F physiotherapy sessions is less of a key determinant and is also moderately less uncertain, although good quality evidence from routine data sources would assist in verifying claims. Addressing QALY gains and LoS differences requires good quality prospective comparative data, ideally from randomised controlled trials. Health related quality of life measurement (e.g. EQ-5D) is required for 12 months post-surgery or longer.

Finally, the EAG notes the wide variation in per patient costs of the platforms. There is currently an absence of head-to-head studies comparing one digital platform with another to establish whether this price difference is justified in terms of added benefit of one over another. As is expected in an Early Use Assessment, the evidence landscape tends to be dominated by cohort studies and small pilots that are not powered to detect statistically significant differences.

8.3 Key areas for evidence generation

The following are the keys areas for consideration regarding ongoing evidence generation.

Evidence from studies conducted in the UK was very limited, both in terms of number of studies as well as the outcomes these reported on. Large comparative studies, preferably prospective, assessing a core set of outcomes (see below) are required.

Outcome heterogeneity and the need for a defined outcome set: For several of the frequently reported outcomes, measurement of outcomes was highly heterogeneous. Across seventeen studies, HRQoL was measured using six different instruments (SF-12, SF-36, ONS4, EQ-5D, HOOS/KOOS

QoL subscale, AQoL-8D); joint-specific function was measured using four different instruments for hip replacements (HOOS, OHS, FJS and the Patient-Specific Functional Scale) across four studies and six different instruments for knee replacements (KOOS, OKS, KSS, HSS, FJS and the Patient-Specific Functional Scale) across ten studies; pain was measured using four different instruments (VAS, Pain DETECT, HOOS/KOOS pain subscale, NRS) across thirteen studies. Joint ROM was measured using eleven metrics related to ROM or joint flexion, extension or abduction across ten studies. This heterogeneity in measurement limits comparisons across interventions within these outcomes. As reported by another study[109] in this topic area, high variability in collected outcome measures highlights the need for a core outcome set. Such high variability limits comparison and prevents pooled numeric – or narrative – analysis.[110] The need for such a core outcome set has also been acknowledged by the rheumatology community, as is reflected in ongoing work as part of the COMET Initiative. Researchers conducting primary studies should push for this work to be completed and select outcomes informed by such initiatives.

A focus on the following outcomes: As noted in Section 8.2.2, the most sensitive cost-effectiveness parameter was QALY gain from digital platforms over SoC, followed by LoS. These are essential data points to collect in future evidence generation activities. Health related quality of life tools such as EQ-5D-5L and disease specific measures should be collected for at least 6 months post-surgery, and ideally for 12 or more. Data for reductions in frequency of F2F physiotherapy sessions is available, although further evidence would be beneficial. The EAG also considered time to recovery to be an important PROM that could inform HRQoL and would also be a potentially significant driver of costs and resources. No studies included in the clinical review reported on this outcome. It is recommended that future studies measure this as a means of standardised, and relatively objective, comparison.

The need for comparative data, ideally UK-based RCTs: Addressing the most important missing outcomes – such as QALY gains (ideally using EQ-5D to support economic modelling) and LoS differences – requires good quality prospective comparative data, ideally from randomised controlled trials. Furthermore, the evidence base for comparative studies conducted in the UK was very limited, both in terms of number of studies as well as the outcomes these reported on. Large comparative studies, preferably prospective, assessing a core set of outcomes (see above) are required.

Trials with a suitable follow-up: The ideal follow-up length in a decision model is one that is long enough to capture all differences in cost and outcomes. The more data available to inform that, the less is it necessary to rely on extrapolations. Following clinical expert advice, the EAG would suggest that minimum follow-up should be six months, with a target follow-up of at least 12 months.

Head-to-head trials would allow meaningful comparisons between interventions: The current landscape only includes comparative studies between a digital intervention and SoC (although this may vary substantially between trials). However, to identify meaningful differences in effectiveness and cost-effectiveness between technologies, head-to-head trials are required. This would allow NICE and the NHS to identify those cases where price differences between technologies are justified.

Better and more detailed description of comparator arms: The EAG encountered considerable variability in the comparator arms of included studies. Not only were comparators often very different from study to study – which is understandable, and mostly due to the country and health-system setting of the trial – but there was also variation in the detail of reporting. As with all complex interventions, it is important that studies describe interventions and comparators in sufficient detail to ensure fair comparisons can be made across studies.

Prehabilitation, rehabilitation and the combination of the two: The evidence base for prehabilitation only was very sparse. This limited the EAG's ability to isolate the clinical effects of this portion of the intervention, which, in turn, limited the potential to assess the cost-effectiveness of prehabilitation alone. The variability of assessment and reporting, with some studies evaluating prehabilitation and rehabilitation and others assessing only one of these components, introduced further heterogeneity and limited comparison across studies. Future studies should assess the entire intervention, from prehabilitation to rehabilitation, but the effect of prehabilitation on outcomes assessed in the days following surgery, such as length of stay in hospital, should be reported.

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10 Appendices

Appendix A Search strategies

Appendix B Excluded studies

Appendix C PRISMA

Appendix A Search strategies

The following databases were searched, as described in the protocol:

- MEDLINE (Ovid)
- Embase (Ovid)
- Cochrane Central Register of Controlled Clinical Trials (CENTRAL) (Cochrane Library)
- Cochrane Database of Systematic Reviews (Cochrane Library)
- CEA Registry (Tufts)
- The WHO International Clinical Trials Registry Platform (ICTRP)
- The US National Library of Medicines registry (Clinicaltrials.gov)
- Medicines and Healthcare products Regulatory Agency (MHRA) field safety notices and the Manufacturer and User Facility Device Experience (MAUDE) database will be searched for adverse events.
- Relevant clinical guidelines from NICE, Scottish Intercollegiate Guidelines Network (SIGN) and International Network of Agencies for Health Technology Assessment (INAHTA)
- Manufacturer websites

Medline
Date Run: 11 Dec 2025

#	Searches	Results
1	("BPM Pathway" or BPMpathway or [redacted]ti,ab,kw,in,ci.	5
2	ForPatientApp.ti,ab,kw,in,ci.	0
3	Kemtai.ti,ab,kw,in,ci.	0
4	getUBetter.ti,ab,kw,in,ci.	2

5	("Good Boost" or "Aqua Move" or "Move Together" or "We Are Undefeatable").ti,ab,kw,in,ci.	296
6	(GoWellHealth or "Go Well Health").ti,ab,kw,in,ci.	0
7	(huma or medopad).ti,ab,kw,in,ci.	2221
8	"joint academy".ti,ab,kw,in,ci.	576
9	moveUP.ti,ab,kw,in,ci.	15
10	mymobility.ti,ab,kw,in,ci.	6
11	("Myrecovery" or "msk.ai").ti,ab,kw,in,ci.	2
12	Phio.ti,ab,kw,in,ci.	238
13	Physitrack.ti,ab,kw,in,ci.	10
14	(PreActiv or MyPreHub).ti,ab,kw,in,ci.	0
15	(QuestPrehab or Craetus or "Kent and Medway Prehab").ti,ab,kw,in,ci.	6
16	Slider.ti,ab,kw,in,ci.	1148
17	("Sword Thrive" or "Digital Care Programme" or "Digital Therapist").ti,ab,kw,in,ci.	9
18	or/1-17	4534
19	"270 Vision".ti,ab,kw,in,ci.	1
20	Braun.ti,ab,kw,in,ci.	21712
21	"SHI Global".ti,ab,kw,in,ci.	2
22	"Artho Therapeutics".ti,ab,kw,in,ci.	0
23	"Zimmer Biomet".ti,ab,kw,in,ci.	2715
24	("Healthcare Outcomes Performance Company" or HOPCo or "Future Health Works").ti,ab,kw,in,ci.	12
25	EQL.ti,ab,kw,in,ci.	35
26	"Snow Squared".ti,ab,kw,in,ci.	0
27	"C Digital Healthcare".ti,ab,kw,in,ci.	0
28	"AI Rehab".ti,ab,kw,in,ci.	17
29	"Sword Health".ti,ab,kw,in,ci.	50
30	or/19-29	24491
31	osteoarthritis/ or hip osteoarthritis/ or knee osteoarthritis/	87378
32	exp knee replacement/ or exp hip replacement/ or arthroplasty/	10495
33	(gonarthrosi* or coxarthrosi*).ti,ab.	2812
34	((hip* or knee*) adj3 (osteoarthr* or arthroplast* or surg* or replace* or operation* or operate*)).ti,ab,kw.	140382
35	or/31-34	198177
36	exp "Physical and Rehabilitation Medicine"/ or Preoperative Exercise/ or physical therapy modalities/	94401
37	(rehab* or prehab*).ti,ab,kw.	265227
38	((before* or after* or pre* or post*) adj5 (surg* or replace* or operat*) adj5 (physio* or physical-therap* or exercis* or strength* or mobilit* or train*)).ti,ab,kw.	14386
39	or/36-38	326772
40	35 and 39	11016

41	Mobile Applications/	16236
42	exp Internet/	109592
43	exp Cell Phone/	27155
44	exp Computers, Handheld/	16625
45	Medical Informatics Applications/	2556
46	Therapy, Computer-Assisted/	7075
47	(app or apps).ti,ab.	56878
48	(online or web or internet or digital*).ti.	174713
49	((online or web or internet or digital*) adj3 (based or application* or intervention* or program* or therap*)).ab.	102552
50	(phone* or telephone* or smartphone* or cellphone* or smartwatch*).ti.	32563
51	((phone* or telephone* or smartphone* or cellphone* or smartwatch*) adj3 (based or application* or intervention* or program* or therap*)).ab.	21825
52	(mobile health or mhealth or m-health or ehealth or e-health or emental or e-mental).ti.	11187
53	((mobile health or mhealth or m-health or ehealth or e-health or emental or e-mental) adj3 (based or application* or intervention* or program* or therap*)).ab.	8217
54	(mobile* adj3 (based or application* or intervention* or device* or technolog*)).ti,ab.	29106
55	or/41-54	422933
56	40 and 55	363
57	30 and 40	68
58	18 and 35	52
59	or/56-58	**461**

Embase

Date Run: 11 Dec 2025

#	Searches	Results
1	("BPM Pathway" or BPMpathway or [redacted]).ti,ab,kw,in,ci.	8
2	ForPatientApp.ti,ab,kw,in,ci.	0
3	Kemtai.ti,ab,kw,in,ci.	1
4	getUBetter.ti,ab,kw,in,ci.	5
5	("Good Boost" or "Aqua Move" or "Move Together" or "We Are Undefeatable").ti,ab,kw,in,ci.	349
6	(GoWellHealth or "Go Well Health").ti,ab,kw,in,ci.	0
7	(huma or medopad).ti,ab,kw,in,ci.	619
8	"joint academy".ti,ab,kw,in,ci.	693
9	moveUP.ti,ab,kw,in,ci.	16
10	mymobility.ti,ab,kw,in,ci.	10

11	("Myrecovery" or "msk.ai").ti,ab,kw,in,ci.	3
12	Phio.ti,ab,kw,in,ci.	276
13	Physitrack.ti,ab,kw,in,ci.	26
14	(PreActiv or MyPreHub).ti,ab,kw,in,ci.	1
15	(QuestPrehab or Craetus or "Kent and Medway Prehab").ti,ab,kw,in,ci.	8
16	Slider.ti,ab,kw,in,ci.	1268
17	("Sword Thrive" or "Digital Care Programme" or "Digital Therapist").ti,ab,kw,in,ci.	11
18	or/1-17	3294
19	"270 Vision".ti,ab,kw,in,ci.	2
20	Braun.ti,ab,kw,in,ci.	40345
21	"SHI Global".ti,ab,kw,in,ci.	35
22	"Artho Therapeutics".ti,ab,kw,in,ci.	0
23	"Zimmer Biomet".ti,ab,kw,in,ci.	705
24	("Healthcare Outcomes Performance Company" or HOPCo or "Future Health Works").ti,ab,kw,in,ci.	8
25	EQL.ti,ab,kw,in,ci.	60
26	"Snow Squared".ti,ab,kw,in,ci.	0
27	"C Digital Healthcare".ti,ab,kw,in,ci.	0
28	"AI Rehab".ti,ab,kw,in,ci.	25
29	"Sword Health".ti,ab,kw,in,ci.	40
30	or/19-29	41217
31	osteoarthritis/ or hip osteoarthritis/ or knee osteoarthritis/	183191
32	exp knee arthroplasty/ or exp hip arthroplasty/ or arthroplasty/	130201
33	(gonarthrosi* or coxarthrosi*).ti,ab.	3403
34	((hip* or knee*) adj3 (osteoarthr* or arthroplast* or surg* or replace* or operation* or operate*)).ti,ab,kw.	184314
35	or/31-34	331394
36	rehabilitation care/ or telerehabilitation/ or preoperative exercise/ or rehabilitation/	158361
37	(rehab* or prehab*).ti,ab,kw.	385728
38	((before* or after* or pre* or post*) adj5 (surg* or replace* or operat*) adj5 (physio* or physical-therap* or exercis* or strength* or mobilit* or train*)).ti,ab,kw.	22050
39	or/36-38	442557
40	35 and 39	19108
41	exp mobile application/	38631
42	internet/	136493
43	exp mobile phone/	68636
44	text messaging/	12429
45	personal digital assistant/	2075
46	computer assisted therapy/	4972
47	(app or apps).ti,ab.	82924

48	(online or web or internet or digital*).ti.	203434
49	((online or web or internet or digital*) adj3 (based or application* or intervention* or program* or therap*)).ab.	142098
50	(phone* or telephone* or smartphone* or cellphone* or smartwatch*).ti.	39862
51	((phone* or telephone* or smartphone* or cellphone* or smartwatch*) adj3 (based or application* or intervention* or program* or therap*)).ab.	32324
52	(mobile health or mhealth or m-health or ehealth or e-health or emental or e-mental).ti.	13028
53	((mobile health or mhealth or m-health or ehealth or e-health or emental or e-mental) adj3 (based or application* or intervention* or program* or therap*)).ab.	9999
54	(mobile* adj3 (based or application* or intervention* or device* or technolog*)).ti,ab.	39480
55	or/41-54	561817
56	40 and 55	638
57	30 and 40	70
58	18 and 35	90
59	or/56-58	**764**

Cochrane Library
Date Run: 12 Dec 2025
ID Search Hits
#1 ("BPM Pathway" OR BPMpathway or [redacted]) 2
#2 ForPatientApp 0
#3 Kemtai 0
#4 getUBetter 0
#5 ("Good Boost" or "Aqua Move" or "Move Together" or "We Are Undefeatable") 8
#6 (GoWellHealth or "Go Well Health") 1
#7 (huma or medopad) 68
#8 "joint academy" 4
#9 moveUP 7
#10 mymobility 4
#11 ("Myrecovery" or "msk.ai") 2
#12 Phio 2
#13 Physitrack 46
#14 (PreActiv or MyPreHub) 0
#15 (QuestPrehab or Craetus or "Kent and Medway Prehab") 0
#16 Slider 137
#17 ("Sword Thrive" or "Digital Care Programme" or "Digital Therapist") 15
#18 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 296
#19 "270 Vision" 0
#20 Braun 3103
#21 "SHI Global" 0

#22 "Artho Therapeutics" 0
#23 "Zimmer Biomet" 80
#24 ("Healthcare Outcomes Performance Company" or HOPCo or "Future Health Works") 0
#25 EQL 156
#26 "Snow Squared" 0
#27 "C Digital Healthcare" 0
#28 "AI Rehab" 0
#29 "Sword Health" 2
#30 #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 3340
#31 [mh ^osteoarthritis] OR [mh ^"hip osteoarthritis"] OR [mh ^"knee osteoarthritis"] 11512
#32 [mh "knee replacement"] OR [mh "hip replacement"] OR [mh ^arthroplasty]371
#33 (gonarthrosi*:ti,ab OR coxarthrosi*:ti,ab) 772
#34 ((hip*:ti,ab OR knee*:ti,ab) NEAR/3 (osteoarthr*:ti,ab OR arthroplast*:ti,ab OR surg*:ti,ab OR replace*:ti,ab OR operation*:ti,ab OR operate*:ti,ab)) 35566
#35 #31 OR #32 OR #33 OR #34 39113
#36 [mh "Physical and Rehabilitation Medicine"] OR [mh ^"Preoperative Exercise"] OR [mh ^"physical therapy modalities"] 11696
#37 (rehab*:ti,ab OR prehab*:ti,ab) 58156
#38 ((before*:ti,ab OR after*:ti,ab OR pre*:ti,ab OR post*:ti,ab) NEAR/5 (surg*:ti,ab OR replace*:ti,ab OR operat*:ti,ab) NEAR/5 (physio*:ti,ab OR physical-therap*:ti,ab OR exercis*:ti,ab OR strength*:ti,ab OR mobilit*:ti,ab OR train*:ti,ab)) 4585
#39 #36 OR #37 OR #38 67445
#40 #35 AND #39 4490
#41 [mh ^"Mobile Applications"] 2736
#42 [mh Internet] 7055
#43 [mh "Cell Phone"] 3890
#44 [mh "Computers, Handheld"] 1757
#45 [mh ^"Medical Informatics Applications"] 44
#46 [mh ^"Therapy, Computer-Assisted"] 1575
#47 (app:ti,ab OR apps:ti,ab) 14890
#48 (online:ti OR web:ti OR internet:ti OR digital*:ti) 23009
#49 ((online:ab OR web:ab OR internet:ab OR digital*:ab) NEAR/3 (based:ab OR application*:ab OR intervention*:ab OR program*:ab OR therap*:ab)) 26177
#50 (phone*:ti OR telephone*:ti OR smartphone*:ti OR cellphone*:ti OR smartwatch*:ti) 8074
#51 ((phone*:ab OR telephone*:ab OR smartphone*:ab OR cellphone*:ab OR smartwatch*:ab) NEAR/3 (based:ab OR application*:ab OR intervention*:ab OR program*:ab OR therap*:ab)) 10852
#52 ("mobile health":ti OR mhealth:ti OR m-health:ti OR ehealth:ti OR e-health:ti OR emental:ti OR e-mental:ti) 3423
#53 (("mobile health":ab OR mhealth:ab OR m-health:ab OR ehealth:ab OR e-health:ab OR emental:ab OR e-mental:ab) NEAR/3 (based:ab OR

application*:ab OR intervention*:ab OR program*:ab OR therap*:ab)) 3504
#54 (mobile*:ti,ab NEAR/3 (based:ti,ab OR application*:ti,ab OR intervention*:ti,ab OR device*:ti,ab OR technolog*:ti,ab)) 9047
#55 #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 68360
#56 #40 AND #55 269
#57 #30 AND #40 14
#58 #18 AND #35 26
#59 #56 OR #57 OR #58 304

CDSR Hits = 1

CENTRAL Hits = 303

CEA Registry (Tufts)

Date Run: 12 Dec 2025
article.title:("hip" AND "replacement") ***Hits = 31***
article.title:("knee" AND "replacement") ***Hits = 77***
article.title:("hip" AND "arthroplasty") ***Hits = 54***
article.title:("knee" AND "arthroplasty") ***Hits = 56***

INAHTA

Date Run: 12 Dec 2025

((((hip* or knee*) adj3 (osteoarthr* or arthroplast* or surg* or replace* or operation* or operate*)))[Title] OR (exp knee replacement/ or exp hip replacement/ or arthroplasty/)[mh]) AND (rehab* or prehab* or physio* or physical-therap* or exercis* or strength* or mobilit* or train*)

Hits = 55

ICTRP

Basic search box

Date Run: 16 Dec 2025

Search	In scope protocols
BPM Pathway or BPMpathway or [redacted]	0
ForPatientApp	0
Kemtai	0
getUBetter	0
"Good Boost", "Aqua Move", "Move Together", "We Are Undefeatable"	0

GoWellHealth, "Go Well Health"	1 (duplicate)
huma and hip, huma and knee, medopad	0
"joint academy"	5 (duplicates)
moveUP	3 (duplicates)
mymobility	1 (duplicate)
myrecovery, msk.ai	0
Phio	0
Physitrack, PhysiApp	1 (duplicate)
PreActiv, MyPreHub	0
QuestPrehab, Craetus, "Kent and Medway Prehab"	0
Slider and hip, slider and knee	0
“Sword Thrive”, "Digital Care Programme", "Digital Therapist"	0

Clinical trials.gov

Intervention/treatment search box

Date Run: 17 Dec 2025

Search	**In scope protocols**
BPM Pathway or BPMpathway or [redacted]	0
ForPatientApp	0
Kemtai	0
getUBetter	0
"Good Boost", "Aqua Move", "Move Together", "We Are Undefeatable"	0
GoWellHealth, "Go Well Health"	1 (duplicate)
huma, medopad	0
"joint academy"	4 (duplicates)
moveUP	3 (duplicates)
mymobility	1 (duplicate)
myrecovery, msk.ai	0
Phio	0
Physitrack, PhysiApp	0
PreActiv, MyPreHub	0
QuestPrehab, Craetus, "Kent and Medway Prehab"	0
Slider and hip, slider and knee	0
“Sword Thrive”, "Digital Care Programme", "Digital Therapist"	0

Medicines and Healthcare products Regulatory Agency (MHRA)

Field safety notices

Date Run: *22 Dec 2025*

Search	**In scope records**
BPM Pathway or BPMpathway or [redacted]	0
ForPatientApp	0
Kemtai	0
getUBetter	0
"Good Boost", "Aqua Move", "Move Together", "We Are Undefeatable"	0
GoWellHealth, "Go Well Health"	0
huma, medopad	0
"joint academy"	0
moveUP	0
mymobility	0
Myrecovery, msk.ai	0
Phio	0
Physitrack, PhysiApp	0
PreActiv, MyPreHub	0
QuestPrehab, Craetus, "Kent and Medway Prehab"	0
Slider and hip, slider and knee	0
“Sword Thrive”, "Digital Care Programme", "Digital Therapist"	0

Manufacturer and User Facility Device Experience (MAUDE) database

Simple search

Date Run: *22 Dec 2025*

Search	**In scope records**
BPM Pathway or BPMpathway or [redacted]	0
ForPatientApp	0
Kemtai	0
getUBetter	0
"Good Boost", "Aqua Move", "Move Together", "We Are Undefeatable"	0
GoWellHealth, "Go Well Health"	0
huma, medopad	0
"joint academy"	0
moveUP	0
mymobility	0
Myrecovery, msk.ai	0
Phio	0
Physitrack, PhysiApp	0
PreActiv, MyPreHub	0
QuestPrehab, Craetus, "Kent and Medway Prehab"	0
Slider and hip, slider and knee	0

“Sword Thrive”, "Digital Care Programme", "Digital Therapist"	0

Appendix B Excluded studies

Authors	Title	Reason
Bak, S-Y et al.	A Nurse-Led App-Based Home Exercise Program After Total Knee Arthroplasty: A Quasi-Experimental Study.	Wrong technology manufacturer
Bini, SA & Mahajan, J	Clinical outcomes of remote asynchronous telerehabilitation are equivalent to traditional therapy following total knee arthroplasty: A randomized control study.	Wrong technology manufacturer
Blasco, JM et al.	Effectiveness of using a chatbot to promote adherence to home physiotherapy after total knee replacement, rationale and design of a randomized clinical trial	Wrong technology manufacturer
Bradbury, T et al.	A Remote Physical Therapy Program Demonstrates Similar Outcomes Compared to In-Person, Supervised Physical Therapy After Same-Day Discharge Total Knee Arthroplasty: A Randomized Clinical Trial.	Wrong technology manufacturer
Brownlow, M et al.	Effects of Joint Approach: a strength focussed, multidisciplinary online prehabilitation program, on pain and function in long-waiter knee arthroplasty patients	Wrong technology manufacturer
Czyzewska, A et al.	Effectiveness of preoperative telerehabilitation immediately before total hip replacement for patients suffering severe hip osteoarthritis	Intervention out of scope
Davidovitch, R et al.	Home Health Services Are Not Required for Select Total Hip Arthroplasty Candidates: Assessment and Supplementation With an Electronic Recovery Application.	Wrong technology manufacturer
Doiron-Cadrin, P et al.	Feasibility and preliminary effects of a tele-prehabilitation program and an in-person prehablitation program compared to usual care for total hip or knee arthroplasty candidates: a pilot randomized controlled trial.	Wrong technology manufacturer
Dutta, S et al.	Rehabilitation Techniques Before and After Total Knee Arthroplasty for a Better Quality of Life.	Intervention out of scope
Fleischman, A et al.	2018 John N. Insall Award: Recovery of Knee Flexion With Unsupervised Home Exercise Is Not Inferior to Outpatient Physical Therapy After TKA: A Randomized Trial.	Wrong technology manufacturer
Garland, L et al.	Introducing a specified on-line multimodal prehabilitation approach for total knee replacement surgery candidates using data from the COVID-19 pandemic: An exploratory field-based, pre-post, mixed methods implementation pilot study.	Wrong technology manufacturer

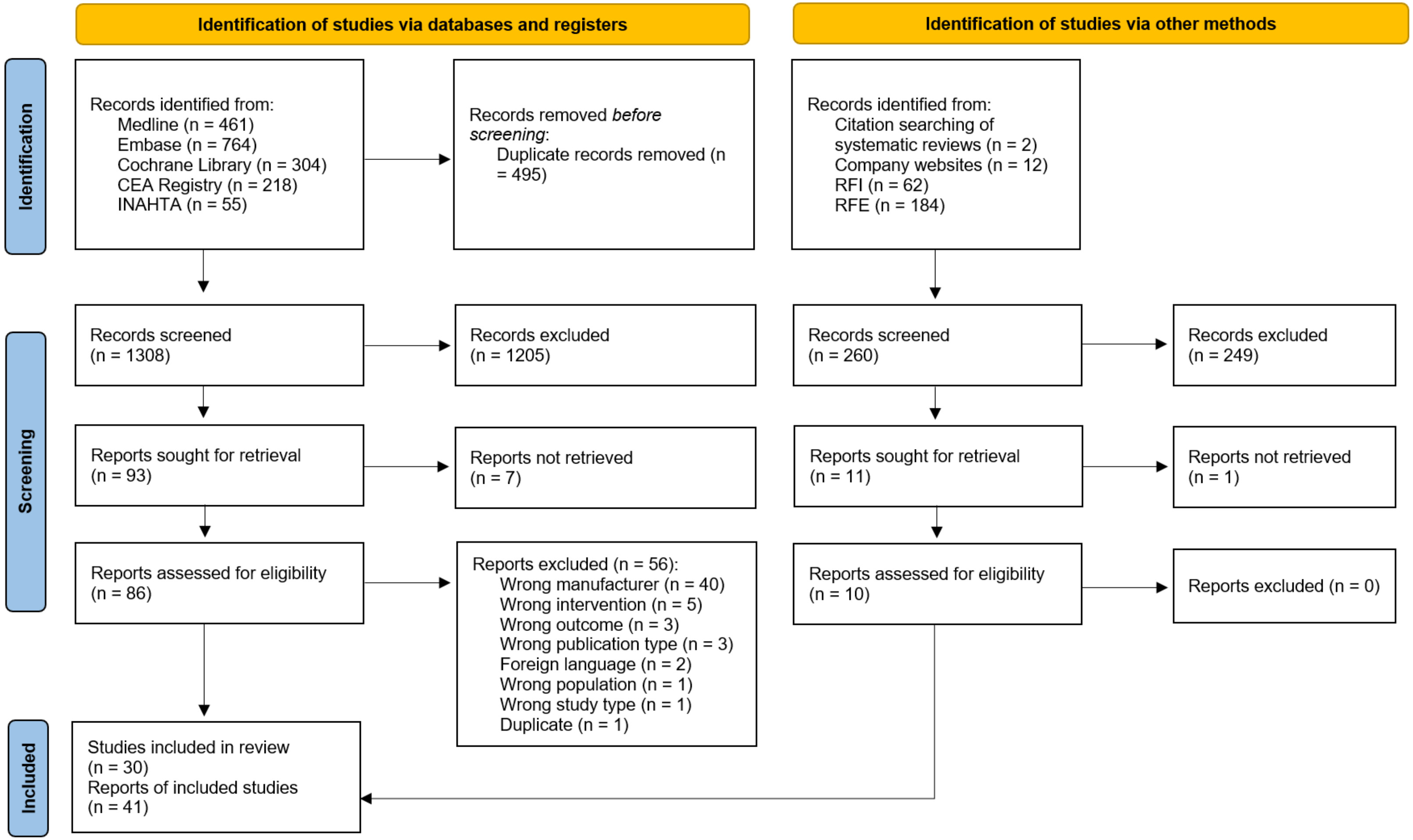
Glinkowski, W et al.	Internet-based outpatient telerehabilitation for patients following total hip arthroplasty - A case control study	Outcomes out of scope
Groot, L et al.	Rationale and design of the PaTIO study: PhysiotherApeutic Treat-to-target Intervention after Orthopaedic surgery	Intervention out of scope
Gross, AE et al.	Commentary on an article by Trevor G. Russell, MD, et al.: "internet-based outpatient telerehabilitation for patients following total knee arthroplasty. A randomized controlled trial"	Publication type out of scope
Han, SH et al.	A Pilot Study on the Efficacy of an App-Based Rehabilitation Counselling Program after Total Knee Arthroplasty.	Wrong technology manufacturer
Hardt, S et al.	Improved early outcome after TKA through an app-based active muscle training programme-a randomized-controlled trial.	Wrong technology manufacturer
Hickmann, E et al.	Digital Health Empowerment in Surgery: Exploring Total Hip Arthroplasty as a Model for Transformation.	Publication type out of scope
Hong, M et al.	Postoperative Outcomes of a Digital Rehabilitation Program After Total Knee Arthroplasty: Retrospective, Observational Feasibility Study.	Wrong technology manufacturer
Hoogland, J et al.	Feasibility and Patient Experience of a Home-Based Rehabilitation Program Driven by a Tablet App and Mobility Monitoring for Patients After a Total Hip Arthroplasty.	Wrong technology manufacturer
Husselbee, R et al.	Evaluating impact of getUBetter, a digital self-management support tool, deployed to 14,500 patients on a community MSK physiotherapy waiting list	Population out of scope
Juhl, CB et al.	Effectiveness of technology assisted exercise compared to usual care in total hip arthroplasty	Wrong technology manufacturer
Juhl, CB et al.	Effectiveness of technology assisted exercise compared to usual care in total knee arthroplasty	Wrong technology manufacturer
Klement, MR et al.	Web-Based, Self-Directed Physical Therapy After Total Knee Arthroplasty Is Safe and Effective for Most, but Not All, Patients.	Wrong technology manufacturer
Klement, MR et al.	Web-Based, Self-Directed Physical Therapy After Total Hip Arthroplasty Is Safe and Effective for Most, but Not All, Patients.	Wrong technology manufacturer
Knapp, PW et al.	Quantifying Patient Engagement in Total Joint Arthroplasty Using Digital Application-Based Technology	Wrong technology manufacturer
Kuan, WYH et al.	PMS17 Usability Testing of a Patient Engagement Digital Platform for TOTAL Knee Arthroplasty (TKA) Patients in JAPAN	Wrong technology manufacturer

Lebleu, J et al.	Digital monitoring and rehabilitation after knee arthroplasty: a longitudinal cohort study	Duplicate
Linedale, E et al.	Development of a feasible and acceptable digital prehabilitation pathway to improve elective surgical outcomes.	Wrong technology manufacturer
Minshull, C et al.	Effects of strength focussed, multidisciplinary online prehabilitation on pain and function in long waiter (&gt52 weeks) knee arthroplasty patients; the joint approach programme	Wrong technology manufacturer
Moffet, H et al.	Patient Satisfaction with In-Home Telerehabilitation After Total Knee Arthroplasty: Results from a Randomized Controlled Trial	Wrong technology manufacturer
Osterloh, J et al.	The effect of a digital-assisted group rehabilitation on clinical and functional outcomes after total hip and knee arthroplasty-a prospective randomized controlled pilot study.	Wrong technology manufacturer
Prvu Bettger, J et al.	Effects of Virtual Exercise Rehabilitation In-Home Therapy Compared with Traditional Care After Total Knee Arthroplasty: VERITAS, a Randomized Controlled Trial	Wrong technology manufacturer
Pua YH et al.	Cost and outcomes of Hospital-based Usual cAre versus Tele-monitor self-directed Rehabilitation (HUATR) in patients with total knee arthroplasty: A randomized, controlled, non-inferiority trial	Wrong technology manufacturer
Ramkumar, PN et al.	Remote Patient Monitoring Using Mobile Health for Total Knee Arthroplasty: Validation of a Wearable and Machine Learning-Based Surveillance Platform.	Wrong technology manufacturer
Russell, T et al.	Low-bandwidth telerehabilitation for patients who have undergone total knee replacement: preliminary results.	Intervention out of scope
Russell, T et al.	Internet-based outpatient telerehabilitation for patients following total knee arthroplasty: a randomized controlled trial.	Wrong technology manufacturer
Sadiq, S et al.	Effect of Lifestyle Modification Through Web-Based Telerehabilitation Monitoring Combined With Supervised Sensorimotor Training After Total Knee Arthroplasty: Randomized Controlled Trial.	Wrong technology manufacturer
Salehinia, R et al.	Effect of a Self-Care Application on Pain and Motor Rehabilitation Following Total Knee Arthroplasty	Language out of scope
Shim, GY et al.	Postoperative rehabilitation using a digital healthcare system in patients with total knee arthroplasty: a randomized controlled trial.	Wrong technology manufacturer
Straat, A et al.	Variation and Slower-Than-Recommended Recovery of Daily Life Activities Following Knee Arthroplasty With a Personalized eHealth	Wrong technology manufacturer

	Program: Results of the ACTIVE Trial Intervention Cohort	
Tousignant, M et al.	A randomized controlled trial of home telerehabilitation for post-knee arthroplasty.	Wrong technology manufacturer
Tousignant, M et al.	Patients' satisfaction of healthcare services and perception with in-home telerehabilitation and physiotherapists' satisfaction toward technology for post-knee arthroplasty: an embedded study in a randomized trial.	Wrong technology manufacturer
Tsang, B et al.	Improving Patient Care Pathway in Knee Arthroplasty: Delivery of Information via a Web Based Resource System [Abstract]	Outcomes out of scope
Valle, C et al.	[Prehabilitation before total knee arthroplasty].	Language out of scope
Vesterby MS et al.	Telemedicine support shortens length of stay after fast-track hip replacement: A randomized controlled trial	Wrong technology manufacturer
Wang, J et al.	The effectiveness of extended care based on Internet and home care platform for orthopaedics after hip replacement surgery in China.	Wrong technology manufacturer
Wang, Q et al.	The effectiveness of a mobile application-based programme for rehabilitation after total hip or knee arthroplasty: A randomised controlled trial.	Wrong technology manufacturer
Wang, Q et al.	Patient Engagement in Mobile Technology-Based Rehabilitation for Arthroplasty: A Scoping Review.	Study design out of scope
Wang, X et al	Participatory health through behavioural engagement and disruptive digital technology for postoperative rehabilitation: protocol of the PATHway trial.	Wrong publication type
Wanless, B.	Implementation of a web-based and smartphone based exercise prescription program in MSK Physiotherapy	Outcomes out of scope
Wijnen, A et al.	Effectiveness of a Home-Based Rehabilitation Program After Total Hip Arthroplasty Driven by a Tablet App and Remote Coaching: Nonrandomized Controlled Trial Combining a Single-Arm Intervention Cohort With Historical Controls.	Wrong technology manufacturer
Williams, E et al.	Patient perspectives and numerical evaluation of a COVID secure hybrid rehabilitation programme following knee replacement surgery	Wrong technology manufacturer
Wu, KA et al.	Daily physical activity following unicompartmental knee arthroplasty: A pilot study	Intervention out of scope
Zhao, R et al.	A Smartphone Application-Based Remote Rehabilitation System for Post-Total Knee	Wrong technology manufacturer

	Arthroplasty Rehabilitation: A Randomized Controlled Trial.	
Zhou, R et al.	Effectiveness of Inertial Measurement Unit Sensor-Based Feedback Assistance in Telerehabilitation of Patients with Diabetes after Total Knee Arthroplasty: A Randomized Controlled Trial	Wrong technology manufacturer
Zhou, Y et al.	Mobile-based in-home telerehabilitation compared with in-hospital face-to-face rehabilitation for elderly patients after total hip arthroplasty in China's level 1 trauma center: a noninferiority randomized controlled trial.	Wrong technology manufacturer

Appendix C PRISMA



NICE Health Tech Programme

HTE10069 Digital platforms to support rehabilitation before and after hip or knee replacement surgery

Any confidential sections of the information provided should be underlined and highlighted. Please underline all confidential information, and separately highlight information that is ‘commercial in confidence’ in blue and all that is ‘academic in confidence’ in yellow

Redacted External Assessment Report (EAR) – Collated comments table:

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
1	270 Vision Ltd	11	Table 1: Description of technologies	It appears that the summary information that has been extracted for inclusion in this section has varied significantly between products. It is not clear how it was decided how to select information for the description but despite BPMpathway having functions listed for other products, these functions have not been listed in the summary table. This is to the detriment of the product as it implies these functions are lacking and introduces the risk of bias. We propose adding wording used around functionality included for the other products to ensure a fair comparison. This will be supplied separately.	It was not clear from the comment what functions were missing from Table 1 (no extra information has been supplied separately by the company). After the EAG reviewed the BPMpathway row in Table 1 it appeared to be described appropriately. However, the EAG would be happy to include additional information if this were provided. At present, no changes have been made to the report.
2	270 Vision Ltd	30	Table 2: Evidence landscape	Cooper DM, Bhuskute N, Hepworth C, Walsh G. ‘The Economic Impact of a Pilot Digital Day-Case Pathway for Knee Arthroplasty in a U.K. Setting’ JBJS Open Access. 2023;8(1) listed as #33 in section 9 ‘References’ has been **omitted** Sadozai 202147 (linked to Cooper 2022) should be listed under conference abstracts.	Thank you for your comment. Cooper 2023 is an economic impact study and so is not included in Table 2, which covers the clinical evidence. No changes have been made to the report.
3	270 Vision Ltd	32	Table 3: Description of key studies in the evidence base	Cooper DM, Bhuskute N, Hepworth C, Walsh G. ‘The Economic Impact of a Pilot Digital Day-Case Pathway for Knee Arthroplasty in a U.K. Setting’ JBJS Open Access. 2023;8(1) listed as #33 in section 9 References has been **omitted.**	Thank you for your comment. Cooper 2023 is an economic impact study and so is not included in Table 3, which covers the clinical evidence. No changes have been made to the report.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
4	270 Vision Ltd		Pain	The application prompts patients to report pain using the Wong-Baker FACES Pain Rating Scale via the app. Incidence points QoM Cooper 2022	That BPMpathway allows the reporting of pain is already stated in Table 1 of the report and the pain outcome reported in Malhotra (unpublished) was included in Table 7. No changes have been made to the report.
5	270 Vision Ltd	89	Confidence in recovery and self-management	Relevant data is included in 'TABLE III Participant Feedback from the Post-Trial Questionnaire - Patient feedback' included in Cooper DM, Bhuskute N, Walsh G. Exploring the Impact and Acceptance of Wearable Sensor Technology for Pre- and Postoperative Rehabilitation in Knee Replacement Patients: A U.K.-Based Pilot Study. JB JS Open Access. 2022 Apr 27; 7(2):e21.00154. Reference to this study has been **omitted.**	In the review protocol, the confidence in recovery and self-management outcome specifically stated measures that would be acceptable, such as the Canadian Occupational Performance Measures, PAM-13, MSK-HQ self-efficacy items, or Arthritis self-efficacy scale. However, much of what was reported in 'TABLE III Participant Feedback from the Post-Trial Questionnaire - Patient feedback' was reported in the *User satisfaction and acceptability* section of the EAG report and was therefore included in the report. No changes have been made to the report.
6	270 Vision Ltd	92	Table 9: Joint range of motion	Cooper DM, Bhuskute N, Walsh G. Exploring the Impact and Acceptance of Wearable Sensor Technology for Pre- and Postoperative Rehabilitation in Knee Replacement Patients: A U.K.-Based Pilot Study. JB JS Open Access. 2022 Apr 27; 7(2):e21.00154 reports in detail ROM over time in both pre- and postoperative phases and relationship between participant ROM, as measured on the participant's final day of rehabilitation, and overall compliance with the prescribed exercise regimen (p £ 0.01; R2 = 0.373). Reference to this study has been **omitted.**	In the *Mobility and functional performance tests* section of the report, it was stated that Cooper 2022 reported range of motion as an outcome. However, Table 9 only reported single arm from *for technologies with no comparative evidence* for any of the clinical outcomes. No changes have been made to the report.
7	AI Rehab Ltd	23		At present we only support knee physiotherapy. We do not hips at present but plan to introduced support for hips in Q4 2026	Thank you for the update. Edit made.
8	Sword Health	194	7	Since the initial EVA submission, Sword Thrive has gone live across 2x ICSs and 1x foundation trust (commercial deployments) and is in active use. It is also in use as part of a multi-site RCT across 4x foundation trusts.	Thank you for this updated information. We have added it to the report
9	SHI Global / GoWellHealth	8	Executive summary – quality	The phrase 'signal of benefit' may understate SHI's UK comparative evidence. The South Tees / digital joint school material submitted by SHI reports statistically significant	The EAG does not consider this to be a matter of factual inaccuracy. The referenced

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
			and relevance of the clinical evidence	associations with improved EQ-5D and Oxford Hip/Knee Scores, with shorter THR length of stay in adjusted analysis. A fairer summary would acknowledge statistically significant associations while retaining caution about non-randomised design and residual uncertainty. Refs: Impact of a digital joint school poster EBPOM 2021; BOA Annual Congress 2019 Abstract; 20251202 SHI Global Ltd Company Information – easy read version; HTE10069 Final EAR.	study is retrospective in design. No changes have been made to the report.
10	SHI Global / GoWellHealth	136	5.6.2 Secondary outcomes – user satisfaction and acceptability	The EAR under-represents the additional South Tees patient-experience evidence submitted by SHI. Survey material showed 78% easy to access, 92% understandable, 86.27% helped understand why joint replacement was needed, 70% helped understand alternatives, 86% helped understand risks/possible complications, 74.51% felt more part of the process, 74.51% would prefer an online programme next time, and 76.47% would recommend it. A brief note would better reflect the submission. Refs: South Tees Patient Survey Summary bar graphs GWH Q1to16; HTE10069 Final EAR.	The EAG reported what it considered to be a representative sample of the *Satisfaction Survey Results* presented in Saunders 2020. No changes have been made to the report.
r11	SHI Global / GoWellHealth	150	Table 15 – GoWellHealth / Digital Joint School (pathway standardisation)	The EAR under-represents pathway standardisation. The South Tees abstracts describe GoWellHealth as improving and standardising the content, timing, structure and delivery of perioperative information; the BOA abstract adds that staff and patient engagement helped standardise pathways. SHI also explained the value for larger/teaching services with rotating staff. A short note that GoWellHealth was submitted as a pathway-standardisation tool which may support more consistent and safer delivery by reducing unwarranted variation would better reflect the evidence and GIRFT direction. Refs: BASK 2019 Conference Abstract; BHS Annual Scientific Meeting 2019 Abstract; BOA Annual Congress 2019 Abstract; Impact of a digital joint school poster EBPOM 2021; 20251202 SHI Global Ltd Company Information – easy read version; GIRFT Outpatient operational guide, Module 2: Standardising follow-up protocols (Feb 2026).	GoWellHealth may support pathway standardisation through improvements in the consistency and delivery of perioperative information and patient engagement. However, the evidence presented is limited to conference abstracts and survey data, with no robust quantitative linkage to clinical outcomes. The extent to which this translates into reduced unwarranted variation or improved clinical and economic outcomes remains uncertain. No changes have been made to the report.
12	SHI Global / GoWellHealth	150	Table 15 – GoWellHe	The EAR could more clearly acknowledge alignment with GIRFT follow-up redesign. SHI submitted GoWellHealth as supporting structured recovery, safety-netting, patient messaging, PROM	The EAG does not consider this to be a matter of factual inaccuracy. No changes have been made to the report.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
			alth / Digital Joint School (follow-up / PIFU alignment)	capture and routine follow-up tasks. GIRFT guidance supports a single post-surgical review with PIFU/MDT follow-up for patients meeting milestones, with virtual delivery where appropriate. SHI is not claiming a precise number of consultant appointments avoided, but the platform is well aligned to this model and may reduce routine consultant-led follow-up demand while not replacing clinically necessary review. Refs: 20251202 SHI Global Ltd Company Information – easy read version; BOA Annual Congress 2019 Abstract; Impact of a digital joint school poster EBPOM 2021; GIRFT Ambulatory Hip and Knee Replacement Guide (Mar 2023); GIRFT Clinically-led Orthopaedics Outpatient Guidance (Jul 2023); GIRFT Outpatient operational guide, Module 2 (Feb 2026).	
13	SHI Global / GoWellHealth	150	Table 15 – GoWellHealth / Digital Joint School (broader operational/workforce effects)	The GoWellHealth row appears narrower than the evidence submitted by SHI. In addition to length of stay and readmissions, SHI submitted broader multidisciplinary/workflow effects including reduced duplication of routine teaching, a 20-minute reduction in pre-assessment nurse time, a 50% reduction in occupational therapist time, pathway standardisation, structured asynchronous communication handling, and supporter/family-facing readiness. Even if not used as model inputs, a short narrative note that these broader pathway effects were submitted would more fairly reflect the evidence. Refs: 20251202 SHI Global Ltd Company Information – easy read version; BOA Annual Congress 2019 Abstract; 20260311 Support roles and economic impact.	Thank you for your comment. However, we were unable to identify the stated reductions in pre-assessment nurse time (20 minutes) and occupational therapist time (50%) from the BOA 2019 abstract or other documents in the company submission. Length of stay and readmissions were supported by sources shared with the EAG or available in the published literature (e.g. Gray et al. 2022; BOA 2019 abstract)
14	SHI Global / GoWellHealth	150	Table 15 – Reduced requirement for face-to-face contact	The phrase 'Reduced requirement for face-to-face contact (no quantified estimate)' risks implying absence of relevant resource-use evidence. SHI did not submit one blanket physiotherapy reduction parameter. SHI submitted a hybrid 'therapy as required' pathway: routine teaching digitised, uncomplicated patients largely self-managed, targeted early review, and additional physiotherapy for those who need it, with effects also falling across other staff groups. It may be fairer to note that no single parameter was suitable for direct model entry rather than implying no relevant pathway/resource evidence.	The EAG acknowledges that GoWellHealth provided a narrative suggesting a reduction in face-to-face contact. However, no quantitative estimates were identified in the cited source (page 8 of RFE). The EAG considers such evidence necessary. No changes have been made to the report.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				Refs: 20260128 SHI Global Ltd Physiotherapist Time Request; 20251202 SHI Global Ltd Company Information – easy read version.	
15	SHI Global / GoWellHealth			Please see additional document sent GoWellHealth: ***Supplementary note to accompany the HTE10069 comments table***	Thank you for supplying the supplementary note. The economic analysis in an EUA is not designed to be a definitive estimate of cost-effectiveness. We also consider that the potential benefits described in the note (such as improved audit trails, improved standardisation of care etc) would likely extend across all technologies. Given the absence of a clear evidence base to support the potential benefits described, we have not made any changes to the report
16	Good Boost	14	Table 1. Description of Technologies	Preparation content before surgery Please re-phrase: “Structured prehabilitation through exercises, joint-specific education and behaviour-change support, including self-management strategies.” to Structured prehabilitation through joint-specific exercises, education and behaviour-change support, including self-management strategies.	Thank you for the suggestion – edit made.
17	Good Boost	14	Table 1. Description of Technologies	Healthcare Professional Involvement Please re-phrase: “Physiotherapist specifies targets and exercises. Dashboard for clinician overview of aggregate outcomes (not individual patient data). Two-way direct communication with the Good Boost clinical team of physiotherapists”	Thank you for the suggestion. We have edited the text to better match this updated description.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				to "Physiotherapist/ facilitator can specify targets and exercises Dashboard shows overview of aggregate outcomes (not individual patient data) that can be accessed and reviewed by MSK/Ortho teams. Patient's have access to their own activity and outcome data, and have the ability to share this data as a PDF or CSV file. Two -way direct communication with Good Boost team of health professionals including Physiotherapists"	
18	Joint Academy UK	17	Table 1. Healthcare professional involvement	Please add: Adhoc calls can be initiated by the patient or physiotherapist as needed throughout the treatment. Information regarding risk mitigation measures provided in company request and evidence request noted that calls outside of the initial, 6 week and discharge can be initiated if needed.	Thank you for the comment. The EAG considered that the adhoc calls to be adequately encompassed by this statement: "Two-way communication through a chat system for ongoing support, guidance and exercise modifications." However, an additional line stating that these calls can be made at any point prior to discharge from active rehabilitation has been added.
19	Joint Academy UK	17	Table 1. Interaction with the device (tailoring, feedback)	Other interactions to be added: Patients receive education along with interactive quizzes. If they get an answer incorrect, the app feeds this back and provides the specific education again.	Thank you for your comment. We have added that education and interactive quizzes are included.
20	EQL Ltd (Phio)	9	Executive Summary	"There was little or no evidence informing the economic analyses for…..Phio"; for clarity, this statement should be more specific and transparently state this is in relation to the particular population defined for the evaluation and that information applicable to general MSK usage - as appropriate for a tool designed for use across MSK problems (not being limited to the population defined in this evaluation) - was provided but not considered suitable for inclusion.	Thank you for your comment. We have added 'in relevant populations'.
21	EQL Ltd (Phio)	20	Table 1	Access to Phio is via a mobile device i.e. phone or tablet	Thank you for this update. Edit made.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
22	EQL Ltd (Phio)	20	Table 1	Interaction with the device: statement not currently accurate and may be misleading; please modify as below: The structured programme is progressed according to individual progress. Difficulty level can be adjusted by the person using the technology within pre-defined safety limits, or more extensively by the clinician.	Thank you for your comment. The information in the report is an accurate representation of that provided in the RFI document. We have made minor edits to add new comments provided here.
23	EQL Ltd (Phio)	127	5.5.2	We request the term "wrong population"(referring to the two single-arm studies) be removed and replaced with "population was relevant but not specific enough in terms of the population defined for this evaluation". This more accurately reflects that people going on to have knee/hip joint replacement surgery would be included within the wider population of people who have hip/knee osteoarthritis, by definition.	Thank you for your comment. We use the term 'wrong population' as it is one of the criteria for exclusion – (full list of reasons for exclusion can be seen in Appendix B). Expert advice agreed that OA populations should be considered out of scope. However, in the introduction to the section we have added 'but closely related' to make the point being suggested. i.e. "Table 13 lists effectiveness studies for Phio and myrecovery that were in out-of-scope *(but closely related)* populations."
24	EQL Ltd (Phio)	131	Table 13	Reason for exclusion of 'A pragmatic retrospective study….' : Request similar wording update as per comment 4	See response to comment #23
25	EQL Ltd (Phio)	131	Table 13	Reason for exclusion of 'A novel retrospective pilot study….': Request similar wording update as per comment 4	See response to comment #23
26	EQL Ltd (Phio)	140	6.1.1	"Where a product is omitted, the EAG identified no relevant data. A large quantity of economic evidence was provided…However, all pertained to MSK conditions in general and not to THR or TKR. The EAG considered that the most transferrable evidence was estimates of reduction in physiotherapy appointments." This statement has been made in relation to other technologies, but for some reason the similarly applicable, transferable evidence provided by EQL Ltd has not been acknowledged or included. Information provided by EQL ltd illustrated a Reduction in face-to-face time and reduced Out Patient/GP (primary care) activity; see ref. 4 supplied in RFE - release of 1240 clinical hours; ref. 5 - £17k cash release, 2400 hours clinical time saved in f2f; ref 11	Thank you for your comment. A parity statement has been added for Phio on value claims to ensure consistency with other technologies. However, this has not been extended to cost-saving calculations presented in RF11, as these were based on hypothetical assumptions and derived from a different population (general MSK)

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				projected savings in economic model - from avoided PC/Physio appointments - based on assumptions but to be ratified as data set grows). We request that a parity statement and/or clarification is added.	
27	EQL Ltd (Phio)	148	Table 15	Phio entry - no data included. See Comment 7 for request.	Table amended, as noted above.
28	EQL Ltd (Phio)	155	6.2.2	Additional input to patients - for Phio Engage the main means of direct communication between Clinician and person using the technology is not in-person/telephone input, but direct chat in-app. This is available ad hoc (office hours) on demand (initiated by user or clinician), and not limited to a traditional 'appointment' or 'session' structure. More information about this has been provided in supplementary information provided to NICE on 30/01/26 (request for further information on physiotherapist time).	Thank you for your comment. However, this section reflects clinical expert descriptions of standard care rather than how digital platforms deliver care. It has been edited for clarity.
29	EQL Ltd (Phio)	160	Table 16	The cost represented for Phio here (and used in subsequent calculations) is inaccurate and we request is updated to provide a faithful representation. The technology is designed for use by a wider population of MSK users and is based on a population health model. Therefore, cost is dependent on *total usage* (by all MSK users) and not calculable based on hip/knee arthroplasty users *only*, as this artificially raises the cost. Whilst the evaluation is looking at only a sub-group of users, the cost would still be distributed across *all* users in that population, affecting the cost to each user, including those in this population. Previous evaluation has identified a 0.88% utilisation rate (all MSK). If we apply that to the stated population of 300K, at the cost of £0.50 (based on a population under 500k), that calculates as: (300,000x£0.50)/2640 = **£56.82 pp**, as opposed to the £187.50 stated and used in further calculations. **We request the figure of £187.50 is corrected to £56.82.**	Thank you for your comment. The use of apps outside of joint replacement is out of scope of this analysis. However, the EAG has added comments to the discussion (sect 6.4) highlighting that Phio may be more cost-effective than suggested if it is used across multiple indications.
30	EQL Ltd (Phio)	184	Table 33	Phio (optimistic) assumed cost per patient **£209.75 should be amended to £79.07** (technology £56.82 + assumed device	See response to comment #29

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				cost), and further value/risk calculations based on the incorrect figure adjusted accordingly.	
31	EQL Ltd (Phio)	186	Table 33	Phio (pessimistic) assumed cost per patient **£209.75 should be amended to £79.07** (technology £56.82 + assumed device cost), and further value/risk calculations based on the incorrect figure adjusted accordingly.	See response to comment #29
32	EQL Ltd (Phio)	188	6.4	Phio is not included in the lower risk investments listed - this may need to be revised in view of comments 10-12 above.	See response to comment #29
33	EQL Ltd (Phio)	200	Table 34	Phio: "Unclear relevance to NICE scope as unclear how many participants would require hip or knee replacement." This was not stated explicitly, as it was considered to be implicit that rates would be within expected normal parameters, according to symptoms and impact i.e. in the range of 10-46% within 5 years of diagnosis. https://www.nice.org.uk/guidance/ng226/chapter/Recommendations#referral-for-joint-replacement https://www.oarsijournal.com/article/S1063-4584(19)31088-X/fulltext#:~:text=Results,%25)%20for%20otherwise%20average%20patients https://boneandjoint.org.uk/Article/10.1302/0301-620X.104B7.BJJ-2021-1766.R1#:~:text=adjusted%20Cox%20regression.-,Results,among%20those%20with%20hip%20OA.	Thank you for your comment. We recognise that people with non-traumatic joint disease will be much more likely than the general population to require hip or knee joint replacement in the future. However, the population of interest for this appraisal were people *listed* for primary elective hip or knee replacement surgery. Therefore, the EAG considered the relevance of this study to be of unclear relevance. No changes have been made to the report.
34	EQL Ltd (Phio)	200	Table 24	Confirm the location is UK.	Thank you for confirming this. Table updated.
35	Healthcare Outcomes Performance Company Ltd	19		Preparation content before surgery: (should clarify that content is procedure- and pathway-specific) "myrecovery provides procedure- and pathway-specific education tailored to the patient, alongside personalised exercise guidance and lifestyle advice. This includes prehabilitation programmes focused on improving strength and mobility, and supporting smoking cessation and weight management."	Thank you for your comment. We have added that the content is procedure and pathways specific.
36	Healthcare Outcomes	19		Recovery content after surgery: Add: "Objective activity tracking (e.g. steps per day via Apple Health, Google Fit or Samsung Health)"	Thank you for your comment. We have added activity tracking

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
	Performance Company Ltd				
37	Healthcare Outcomes Performance Company Ltd	19		Length of treatment: “Change to: For hip and knee replacement, myrecovery typically supports patients from preoperative preparation through postoperative recovery and into longer-term follow-up. Preoperative preparation often begins several weeks before surgery, and the platform can also support waiting list management, meaning some patients may be invited to engage many months before they are given an operation date. A key component of many pathways is the collection of 1-year PROMs, and many patients will also continue to complete annual review PROMs in the years that follow. As a result, engagement may extend well beyond the immediate recovery phase, depending on the provider’s pathway design and follow-up requirements.”	Thank you for your comment. A summary of this has been added.
38	Healthcare Outcomes Performance Company Ltd	19		Access: Change to: “Phone, tablet & web app (i.e. via browser)”	Thank you for your comment. This has been added.
39	Healthcare Outcomes Performance Company Ltd	19		Healthcare professional involvement: Add: “Optional: Two-way messaging with the care team”	Thank you for your comment. This has been added.
40	Healthcare Outcomes Performance Company Ltd	19		Interaction: Add: “App inputs, including passively collected objective activity data such as daily step counts, are available to the care team in near real-time through the healthcare professional dashboard, supporting remote progress and recovery tracking.”	Thank you for your comment. This has been added.
41	Healthcare Outcomes Performance Company Ltd	160		£30000 (up to 1,000 patients and assumed per annum) Change to: “£30,000 (up to 1,000 patients, per annum)”	Thank you for your comment. This has been amended.
42	Healthcare Outcomes Performance Company Ltd	89		Starkey 2020 is incorrect, it should say: “Starkey, 2025”	Thank you. Corrected.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
43	Healthcare Outcomes Performance Company Ltd	135		Starkey 2020 is incorrect, it should say: "Starkey, 2025"	Thank you. Corrected.
44	Healthcare Outcomes Performance Company Ltd	125	5.5/5.5.2	Says myrecovery has "some evidence presented in the report but no effectiveness evidence" and places it under "technologies for which there is no in-scope evidence of effectiveness." More representative wording would be: ""myrecovery has limited in-scope comparative evidence, but no in-scope patient-reported or functional effectiveness evidence."	Thank you for your comment. While not a factual inaccuracy as such, we agree that you suggested wording adds extra clarity.
45	Healthcare Outcomes Performance Company Ltd	53		To say "no comparative data" is not fully accurate, more accurate wording would be: that there are comparative data, however, that this is a non-randomised comparison with likely selection bias	Thank you for your comment. The comment that there was no comparative data has been deleted.
46	ZimmerBiomm et	19	Table 1	Please update and correct details on our technology • Duration of protocol post op, the protocol can be **+ 3 Years (**not limited to 180) • Education, daily tasks, video guided exercises - **Assessments** - PROMS, Pain assessments • **Patient Web Experience (**PWE) can be used on PC, iPad, Laptop • **Escalation** - Exception reporting proactive healthcare on gait, pain, • Symptom updates - **videos** can also be shared via messaging • **Telemedicine -** available	Thank you for this update. We have added any new information provided.
47	ZimmerBiomm et	25	3	Is referral to surgical consultation only based on OKS??	The EAG agreed that this was an over-simplification of the decision process clinicians go through. This has been removed from the report.
48	ZimmerBiomm et	31	Table 2	There are several important studies for mymobility missing from this summary, including the one from Rossi et al, 2024 which was done in an European population.	Rossi was initially excluded at title/abstract screening. However, the EAG notes that there are some satisfaction scores in the full text (that were not mentioned in the abstract) that could be included – hence we have included Rossi for those outcomes.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
49	Nadine Jamous, ZimmerBiommet	45	Table 3	Crawford 2021 Study There is an error in the paper and the correct ID for the study in clinicaltrials.gov is NCT03737149 The data presented in the paper are only from US population despite data was collected from USA, Italy, Netherlands and Australia	Thank you for this correction. Edit made.
50	ZimmerBiommet	45	Table 3	Crawford 2021 Study Participation and Setting: The paper only refers to 452 patients	Thank you for this correction. Edit made.
51	ZimmerBiommet	45	Table 3	Crawford 21 Intervention and Comparator: please see comments above where do these numbers come from?	Thank you for this correction. Edits made.
52	ZimmerBiommet	47	Table 3	Tripuraneni 2021 study Outcomes measures and follow ups: 6 and 12 months data are also reported for KOOS and HRQoL	These outcomes are reported in our description of the related Alexander 2023 paper.
53	ZimmerBiommet	47	Table 3	Tripuraneni 2021 EAG comments without stratifying but data is reported per subgroups: The low-compliance group showed significantly less improvement in KOOS, JR scores from preoperative levels at 3 and 6 months vs. control group. For the high compliance group there was no difference in KOOS, JR and EQ-5D-5L scores at 12 months vs. control group.	Compliance with the intervention was not a subgroup of interest and the EAG prioritised the outcome reported in the full trial population where it was available. No changes have been made to the report.
54	ZimmerBiommet	48	Table 2	DeMik 2024 the correct ID for the study in clinicaltrials.gov is NCT03737149	The methods page of the paper states clinicaltrials.gov identifier: NCT20182103. However, it looks like this is an error in the original paper and we have changed the number to NCT03737149
55	ZimmerBiommet	48	Table 2	DeMik 2024 Intervention & comparator please delete *formal in-person physiotherapy three times per week for four weeks following surgery* as it is not mentioned in the paper	The EAG took this from Crawford 2021 where it stated: “While there was no standardization of protocols, all participating sites engaged in rapid recovery pathways and nearly universally prescribed physiotherapy following surgery for three times per week for four weeks.” No changes have been made to the report.
56	ZimmerBiommet	49	Table 2	Crawford 2021 Intervention & comparator please delete *This typically included formal in-person physiotherapy three times per week for four weeks following surgery* as the author states ‘The control group (198 patients) completed each institution’s	Thank you for the comment. This statement has been edited in line with the company’s suggestion.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				standard of care protocol around the perioperative and postoperative period. While there was no standardization of protocols, nearly all participating sites prescribed PT following surgery. Specific PT protocols were dictated with the site-specific therapy programme. Instructional and educational content was site-specific'.	
57	ZimmerBiomm et	50	Table 2	Miller 2024 Intervention & comparator please delete the following as paper does not explicitly state it: *This typically included formal in-person physiotherapy three times per week for four weeks following surgery.*	Thank you for the comment. While we understood that the participants having knee replacement did typically have formal in-person physiotherapy three times per week for four weeks following surgery, it was unclear what people having hip replacement received. This has been edited to a less certain statement in line with the previous edits.
58	ZimmerBiomm et	51	Table 2	Miner 2024 Outcomes Measures & Follow up: PROMs are also reported and stratified per pandemic period	As stated in Table 3, the EAG did not report the KOOS score reported in Minder 2024 because that score was reported at a later timepoint in Alexander 2023. Outcomes stratified by pandemic period were not a subgroup analysis of interest for this appraisal. No changes have been made to the report.
59	ZimmerBiomm et	52	Table 2	Booth 2023 166 patients is the number reported in the paper. The 106 is the number of patients of total knee.	Thank you for your comment. We are both correct as there is an error in the paper's methods section where it reports that "There were 106 patients who completed the survey". This is where we got our number from. The correct number is indeed 166. Edit made.
60	ZimmerBiomm et	62	5.1	*This broad inclusion strategy allowed the evidence base to reflect the full range of available research on digital platforms for pre- and post-operative rehabilitation in hip and knee replacement.* Please note partial knee as well.	Edit made.
61	ZimmerBiomm et	65	5.3.1	*Two RCTs (Alexander 2023,67 Crawford 2021b72) reported HRQoL for mymobility using EQ-5D-5L.* Please note Ref 71 is missing from here which concerns TKA, Ref 72 is on THA. Both collect EQ-5D-5L	Thank you for your comment. We reported the EQ-5D-5L findings in Ref 72 from the associated Alexander 2023 paper (which had a longer timepoint).

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
62	ZimmerBiommet	69	Table 5	The table has no column for procedures and that may be easier to visualise. The reference associated to Crawford 2021b is 72 which has THA aswell as TKA. Ref 71 is for TKA only.	Thank you for your comment. As noted above, we report the TKA findings for this trial from the associated Alexander 2023 paper (which had a longer timepoint).
63	ZimmerBiommet	89	5.3.1 Healthcare Use	Crawford 2021 a and b For TKA and PKA, the paper reports that There were significantly more patients requiring emergency room visits(8.2% vs. 2.5%) and a non-significant (p=0 .056) trend for more admissions (6.7% vs. 2.5%) in the control group compared to mymobility. For THA: Postoperative PT use was significantly lower in the treatment group (34%) than in the control group (5 5.4%; p = 0.001). The authors conclude: The use of the smartphone care management system demonstrated similar early outcomes to those achieved using traditional care models, along with a significant decrease in PT use	Thank you for your comment. The relevant section of the report (Section 5.3.1) has been edited to note the statistically significant benefit of mymobility in reducing emergency department visits in people who have had a knee arthroplasty.
64	ZimmerBiommet	90	Mobility and functional performance tests	*Tripuraneni 2021 reported results by intervention subgroups of higher (≥90%) and lower (< 90%) compliance.* Please detail the compliance..in reference with?	Thank you for your comment. Have added more detail here.
65	ZimmerBiommet	91	Mobility and functional performance tests	*Two RCTs (DeMik 202468, Crawford 2021a71) reported on single-leg stance (SLS) for mymobility.* SLS is also reported in Ref 72 in THA and shows a significant difference at 3 months. Please incorporate in the sentence.	This was reported in the narrative in the Mobility and functional performance tests Section of the EAG's report. No changes have been made to the report.
66	ZimmerBiommet	106	Table 10	Can you please add to the table Rossi et al a study in the Italian population. In summary the paper shows: 100% of patients found mymobility easy to use from registration onward. • 93.3% reported feeling more informed since using mymobility. • 75% said that the Education feature was the most valuable. • 87.5% claimed success in achieving rehab goals. • 93.3% felt a reduction in surgical anxiety through normal mymobility usage. • There is an existing need to further integrate the recruitment process and create a more comprehensive patient experience journey within mymobility.	Thank you for highlighting this paper. Three of the relevant outcomes have been added to Table 10.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
67	ZimmerBiomm et	116	Return to Usual Activity	Alexander 2023 showed that the mymobility group returned to walking without an assistive device significantly sooner than the control group (23.1 ± 17.1 vs. 28.5 ± 23.2 days)	Thank you for the addition. This has been added to the narrative.
68	ZimmerBiomm et	133	5.6.1	*The evidence was also mostly from participants who had undergone TKR and PKR, with limited evidence for THR.* Can you please state that Crawford at al, 2021a provides evidence on THR	Thank you for your comment. Crawford 2021a reports on knee (for a number of outcomes we have use the results from the associated paper Alexander 2023) while 2021b reports on the hip. No changes have been made to the report.
69	ZimmerBiomm et	144	6.1.1	*Limited information was provided in the poster but it appears not to have been a randomised study design.* The following study was not included and can fit easily on this section Lonner JH, Naidu-Helm A, VanAndel DC,Anderson MB, Ditto R, Redfern RE, and ForanJ **Smartphone-Based Care Platform Versus Traditional Care in Primary Knee Arthroplasty in the United States: Cost Analysis** uHealth and mHealth. 2025, doi:10.2196/46047 The authors state: app has the potential to reduce post-operative costs without negatively impacting outcomes resulting in improved value for knee arthroplasty patients.	Thank you for your comment. We agree that this paper could be included and we have updated the relevant section.
70	ZimmerBiomm et	151	Table 15	Although we have not provided claims per sae but the evidence from the studies show for <u>Reduced face to-face physiotherapy</u> from **Alexander** et al: Significantly more patients in the controlcohort required physical therapy visits compared to the mymobility cohort (94.6% vs. 60.6%). <u>For Reduced readmissions /emergency attendances</u> From **Lonner** paper: The cost reduction was attributed mainly to the reduction in PT visits, where the total number of visits in the control arm was 1,736 vs. 799 in the treatment group and from **Crawford** paper There were significantly more patients requiring emergency room visits (8.2% vs. 2.5%) and a non-significant (p=0.056) trend for more admissions (6.7% vs. 2.5%) in the control group compared to mymobility.	Thank you. We agree that such additions would add further clarify. We have consequently updated the relevant section.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
71	ZimmerBiommet	151	Table 15	Could we please add an abstract which is was presented this month at the AAOS **Use of a Smart Implantable Device combined with a Digital Care Management Platform Associated with Fewer Complications and Healthcare Utilization Following Primary Total Knee Arthroplasty** William J. Long, Chidananda Samal, Niraj Parikh, James Young, Mike B. Anderson, Taylor Osborn, Malcolm W. Sinclair	Thank you for highlighting this new abstract. Unfortunately, we cannot at this stage add new evidence published since the completion of the report (to ensure fairness across all companies).
72	ZimmerBiommet	192	mymobility	We suggest the following changes to reflect our technology: **mymobility** (Zimmer Biomet) is available on the NHS. The technology currently has 14,325 patients (THR/TKR) enrolled across 12 hospitals. Patients need to be enrolled by dedicated hospital staff. Hospitals require a project team and collaborate with Zimmer Biomet on implementation of plan, in which they decide what features to switch on (i.e. messaging, Range of Motion, WalkAI, Exception reporting) and what PROMS to collect and when, advise on customisation of education and video guided exercise protocols. The platform integrates with hospital Electronic Patient Record systems. Staff training from Zimmer Biomet is provided as part of the implementation process, along with post-training support and reviews. There is dedicated customer support for patients/hospitals.	Thank you for these extra details. We have edited this section accordingly
73	Snow Squared Ltd t/a PreActiv	28-29, 31, 125-126, 129, 138, 206-208	Table 2, Table 12, 5.5, 5.5.1, 5.6.2, Table 36, References - 88	**Comments:** The report refers to the PreActiv feasibility study as unpublished or cites non-peer reviewed sources. Since completion of the EAR (25 February 2026), this study has now been published in a peer-reviewed journal (BMC Perioperative Medicine). **Suggested correction:**	We have noted in the report that the study has since been published after the completion of the report.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				Please update the study status and reference to reflect the published article: Emery A, Allam R et al. (2026). The feasibility of implementing and evaluating individualised digital prehabilitation prior to major elective surgery in adults aged ≥ 50 years: the PreActiv intervention Perioperative Medicine. **Table 12 only references the blog.** Please cite the published study.	
74	Snow Squared Ltd t/a PreActiv	28-29, 31, 125-126, 138, 206-208	4.3, Table 2, 5.5, 5.5.1, Table 36	**Comment:** The report classifies the PreActiv feasibility study as **out of scope** because it included a mixed major elective surgery population. However, the company submission indicated that **a proportion of participants were patients awaiting hip or knee arthroplasty,** which falls directly within the NICE scope. Specifically, **34% of participants in the feasibility study were awaiting hip or knee arthroplasty.** An **orthopaedic subgroup breakdown was provided in the company submission,** including outcomes relevant to the population of interest. Currently, the report groups PreActiv with technologies whose evidence relates to clearly out-of-scope populations (for example oncology or general musculoskeletal cohorts), and the report **does not acknowledge that a proportion of the PreActiv study population falls directly within scope.** In addition, the report does not summarise any findings from the orthopaedic subgroup that were provided in the company submission. This may give the impression that no evidence relevant to the NICE scope was available, whereas **a subgroup of participants within the study were directly within scope and relevant outcomes were reported for this subgroup.** **Suggested correction:** If the study remains classified as out of scope for formal evidence synthesis due to its mixed surgical cohort, the company requests that the report clarifies that:	Thank you for this clarification. The feasibility study (and accompanying blog post with the hip and knee subgroup analysis) has been added to the evidence base throughout the report.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				- The feasibility study population **included patients awaiting hip and knee arthroplasty (34%),** which is within the NICE scope. - An **orthopaedic subgroup analysis was provided in the company submission.** The company also requests that the report includes a **brief descriptive summary of outcomes reported for the orthopaedic subgroup,** for example: - **93% session completion** - **Improvements in functional capacity (50–100%)** - **VO_2peak increased by 4%** - **Peak cycling resistance increased by 10%** - **Reduction in patient-reported anxiety scores** Including this clarification would ensure the report accurately reflects that **evidence relevant to the NICE scope was available within the study population**, even if the overall study design remains classified as mixed population.	
75	Snow Squared Ltd t/a PreActiv	22	Table 1 – Description of technologies	**Comment**: The report refers to PreActiv as an “app”. This wording may imply a mobile phone only application. **Suggested correction:** PreActiv is a web based digital platform (“web app”) accessible via smartphone, tablet or desktop browser and does not require installation through an app store. **Suggested wording:** “PreActiv is a web based digital prehabilitation and rehabilitation platform accessible via smartphone, tablet or computer.” **Table 1, page 22 suggested correction:** Access to include ‘online’.	Thank you for your comment. We have updated table 1 to include ‘online and any instances where we have described PreActiv as an ‘app’ we have changed to ‘platform’.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
76	Snow Squared Ltd t/a PreActiv	22	Table 1 - Description of technologies	**Comment:** The current description does not fully reflect the service model described in the company submission. **Suggested corrections:** Length of treatment – prehabilitation courses are built to treatment dates and so can be any length of time. In the pricing, patients are provided with 12 weeks of prehabilitation and 6 weeks of rehabilitation but courses can be extended for prehabilitation beyond this timeframe making full use of their waiting time. There is no time limit. Health professional involvement – programmes adapt in real-time after each session using proprietary algorithms and dynamic logic. PreActiv programmes include support from a multidisciplinary team where required and programmes can be manually adjusted. Patients may interact with members of a multidisciplinary team including: • Physiotherapists • Health coaches • Exercise physiologists • Doctors (where clinically indicated) • Technical support staff	Thank you for supplying this extra detail. Because of the confines of space, table 1 can only offer a summary – however, we have updated the information provided where possible.

Economic Model – Collated comments table:

Comment	Stakeholder	Description of problem	Description of proposed amendment	Result of amended model or expected impact on the result (if applicable)	EAG Response
1	SHI Global / GoWellHealth	The EAR currently redacts the GoWellHealth licence cost because SHI's earlier public estimate was expressed only as "in the £20s per patient per month", which did not provide a specific publishable technology cost. SHI has now provided a specific public price for NICE use: **£29 per patient per perioperative episode, excluding VAT**. This is a one-off episode price, not a monthly charge. The standard episode includes perioperative education and timed pathway content, questionnaires and PROM capture, routine asynchronous patient messaging, clinician dashboard and standard reporting, patient access to review relevant materials up to 12 months post-op, and PROM collection at 6 and 12 months post-op. It does not include hardware/device provision, bespoke EPR/integration work, bespoke pathway build beyond standard configuration, or optional premium analytics/change-management services.	Use **£29 per patient per perioperative episode (excluding VAT)** as the public GoWellHealth licence cost in the report and model. Treat this as the specific technology cost for the platform, rather than extrapolating from the earlier monthly wording. If the EAG wishes to retain a separate device-cost assumption, that should remain a distinct modelling assumption rather than part of the GoWellHealth licence price.	This would allow the committee to discuss GoWellHealth's licence cost in public and would materially improve transparency. It is also likely to present the platform cost more accurately than the earlier proxy created from a monthly estimate.	The EAG welcomes this change in the company's pricing model and has updated the analysis accordingly. However, the EAG notes this does not represent a factual inaccuracy, but a revision to the company's pricing approach submitted in the RFE.
2	SHI Global / GoWellHealth	The EAR/model assumes universal provision of a mobile phone or tablet. Among UK adults aged 65+, Ofcom's 2024 data show 67% already have a smartphone. For GoWellHealth this may overstate acquisition cost. Refs: HTE10069 Final EAR; 20251202 SHI Global Ltd Company Information – easy read version; South Tees Patient Survey Summary bar graphs GWH Q1to16. https://www.ofcom.org.uk/siteassets/resources/documents/research-and-data/online-	Run a GoWellHealth-specific sensitivity with targeted device provision only for patients who genuinely need NHS-supplied hardware, or state explicitly that universal device provision is a conservative simplifying assumption for this technology.	Likely to reduce acquisition cost and improve fairness of comparison.	The EAG included provision of a device due to risk of digital exclusion. Specifically, if an intervention were only to be cost effective amongst those who provided their own device, those who did not own a device would be excluded. No edit made.

		research/online-nation/2024/online-nation-2024-report.pdf?v=386238			
3	SHI Global / GoWellHealth	The model uses generic digital-platform rehabilitation assumptions, including a generic reduction in face-to-face physiotherapy and additional short check-in time. SHI's submission described a hybrid 'therapy as required' pathway with different THR/TKR assumptions, no routine in-person joint school, brief pre-op oversight, targeted early review and different proportions needing additional physiotherapy. Refs: 20260128 SHI Global Ltd Physiotherapist Time Request; 20251202 SHI Global Ltd Company Information – easy read version; HTE10069 Final EAR.	State that base-case rehabilitation assumptions are generic and do not fully represent the submitted GoWellHealth pathway; preferably add THR/TKR scenario analyses using SHI's submitted assumptions and mean NHS physiotherapy time ranges.	Direction of effect is uncertain, but fidelity and fairness would improve materially.	The EAG states clearly (sect 6.2) that the model is not intended to be a definitive estimate of the cost-effectiveness of the different platforms, but to assess whether there is a case for them to be plausibly cost-effective given current evidence. Text modified in 6.2 to further emphasise this.
4	SHI Global / GoWellHealth	The model appears to capture physiotherapy and length of stay but not wider pathway-level effects submitted by SHI. These include reduced pre-assessment nurse time, reduced occupational therapist time, reduced duplication of routine teaching, asynchronous communication handling, auditable communication/content history, pathway standardisation, supporter/family readiness, and support for GIRFT-aligned follow-up models that may release routine consultant clinic capacity. SHI is not asking that all of these be monetised now, but if not parameterised the report should make clear what was submitted and excluded. Refs: 20251202 SHI Global Ltd Company Information – easy read version; 20260128 SHI Global Ltd Physiotherapist Time Request; HPH-MHJ- Final Report 14082020; 20260311 Support roles and economic impact; GIRFT Outpatient operational guide, Module 2 (Feb 2026).	If not modelled, add an explicit narrative statement that wider multidisciplinary, supporter/family, consultant-capacity and governance benefits were submitted but are not captured in the model. Optional scenario analyses could explore selected pathway-wide offsets where the EAG considers parameters sufficiently robust.	Would improve interpretation of results and clarify that cost-effectiveness findings may be conservative for a pathway-wide platform; supporter/family effects may warrant prospective NHS study rather than base-case monetisation.	See response to comment 3.
5	Joint Academy UK	Page 159 Joint Academy is increasingly licensing the	*Current:* *£150 per patient (12-month programme)*	The costing is cheaper where company	Thank you for your comment.

		platform. The cost for NHS licensing use is flexible upon contractual agreements. The price model: Higher volumes of patients referred results in reduced per patient costs for NHS. The 30 patients per year seems to be an underestimation capacity assumption for a digital asynchronous platform. On orthopaedic wards, physiotherapists have caseloads upwards of 12 per day. Other services evaluated are based on license costs e.g. 800 patients. Where did the assumption of 30 patients per annum using the Joint Academy platform come from? Joint Academy has no hardware cost, accordingly, an assumptive cost of £200/ £22.50 is incorrect. The benefit of joint Academy is that patients can download the app (software) on their phone and use it at any time. There is no need for the NHS to supply tablets or phones to patients. The advantage is that patients do not need to carry more devices and specifically, they do not need to learn to use a new device. However, if patients don't have a suitable device, they are not able to use the technology and are referred elsewhere.	*Or £89 per NHS clinician/month* *Tablet or mobile phone £200* *Licence: £150 (£35.60)* *Device: £22.25* *Total: £ 172.25 (£57.85)* *EAG has calculated two alternative costs of £172.25 and* *£57.85, the first where company physiotherapists are used and* *(in brackets) where NHS physiotherapists are used.* *£89 per month × 12 months = £1,068 per year.* *Assuming one physiotherapist sees 30 TKR/THR patients per year, £1,068 ÷ 30 = £35.60 per patient.* Amendments/corrections £150 per patient (12-month programme) Or £89 per NHS clinician/month Tablet or mobile phone - £0 no hardware cost to the NHS. E.g. using 800 patients £89 per month x 12 month	physiotherapists are used and (in brackets) where NHS physiotherapists are used. £150 per patient (12-month programme) Or £89 per NHS clinician/month Tablet or mobile phone - £0 no hardware cost to the NHS. E.g. if using 800 patients £89 per month x 12 month = £1068 per year. per patient cost: 1068/800 = £1.335 Licence: £150 (£1.335) Device: £0 Total: £ 150 (£1.335)	The EAG notes that other platforms assume approximately 800 patients per trust, as pricing model here is based on a clinician licence. Dividing the annual licence cost by 800 implicitly assumes that all cases within a trust are managed by a single physiotherapist. While physiotherapists may see upwards of 12 patients per day, their workload spans multiple conditions. Therefore, the key consideration is the average number of TKR/THR patients managed per physiotherapist per year. The EAG included provision of a device due to risk of digital exclusion. Specifically, if an intervention were only to be cost effective amongst those who provided their own device, those who did not own a device would be excluded. Consequently, no edits have been made to the report.

			= £1068 per year. per patient cost: 1068/800 = £1.335 Licence: £150 (£1.335) Device: £0 Total: £ 150 (£1.335)		
6	Healthcare Outcomes Performance Company Ltd	"Licence based on 800 patients pa plus £5 per assessment = £30,000/800 + £5 = £42.50 per patient" Pre-assessment survey workflow is out of scope for meaningful comparison (but would be £2 per assessment at 800 patients)	We also note that the estimated cost is presented on an undiscounted basis, and that myrecovery is frequently provided as part of an orthopaedic implant package without any additional direct cost to the NHS. £37.50 per patient cost (£59.25 total)	THR: Dominant, INMB £23.72 TKR: Dominant, INMB £55.21.	Thank you for your comment. The Pre-assessment cost has been removed and the EAG has updated the analysis accordingly
7	Snow Squared Ltd t/a PreActiv	The model includes assumptions about physiotherapist input. PreActiv programmes include support from a multidisciplinary team including physiotherapists, health coaches, exercise physiologists, and tech support as needed. This support is included within the service acquisition cost, rather than representing additional NHS staff time.	Please make it clear that PreActiv provides all these features as part of the core service and acquisition cost.	PreActiv expects the amendment to improve the ICER.	The comment refers to the description of the 'generic' platform. This assumption is not applied in the PreActiv product specific analysis. Please see table 34.

Use Diagnostics Advisory Committee Interests Register

Topic: HTE10069 Digital platforms to support rehabilitation before and after hip or knee replacement surgery

NICE's declaration of interest policy can be accessed here

Name	Role with NICE	Type of interest	Description of interest	Interest arose	Interest declared	Interest ceased	Comments
Professor Tom Clutton-Brock	Standing Committee Member (Chair)	Financial Interests	None	n/a	1 October 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	1 October 2025	n/a	No further action
		Indirect interests	None	n/a	1 October 2025	n/a	No further action
Matthew Stevenson	Standing Committee Member	Financial Interests	None	n/a	1 October 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	1 October 2025	n/a	No further action
		Indirect interests	None	n/a	1 October 2025	n/a	No further action
Kate Xu		Financial Interests	None	n/a	8 October 2025	n/a	No further action

	Standing Committee Member	Non-financial professional and personal interests	None	n/a	8 October 2025	n/a	No further action
		Indirect interests	None	n/a	8 October 2025	n/a	No further action
Brian Shine	Standing Committee Member	Financial Interests	None	n/a	28 October 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	28 October 2025	n/a	No further action
		Indirect interests	None	n/a	28 October 2025	n/a	No further action
John Cairns	Standing Committee Member	Financial Interests	Advising Pierre Fabre on non-small-cell lung cancer submission.	August 2024	28 October 2025	October 2024	Declare and participate
			Advising Johnson & Johnson Innovative on multiple myeloma submission	May 2025	28 October 2025	May 2025	Declare and participate
			Advice to BeiGene on economic modelling of a treatment for small cell lung cancer	October 2024	28 October 2025	September 2025	Declare and participate
			Advice to Johnson & Johnson Innovative on a treatment for generalized myasthenia gravis	October 2025	28 October 2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	None	n/a	28 October 2025	n/a	No further action

		Indirect interests	None	n/a	28 October 2025	n/a	No further action
André Nunes	Standing Committee Member	Financial Interests	None	n/a	28 October 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	28 October 2025	n/a	No further action
		Indirect interests	None	n/a	28 October 2025	n/a	No further action
Ruth Ajayi	Standing Committee Member	Financial Interests	None	n/a	28 October 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	28 October 2025	n/a	No further action
		Indirect interests	None	n/a	28 October 2025	n/a	No further action
Rashmi Kumar	Standing Committee Member	Financial Interests	None	n/a	28 October 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	28 October 2025	n/a	No further action
		Indirect interests	None	n/a	28 October 2025	n/a	No further action

Sam Creavin	Standing Committee Member	Financial Interests	None	n/a	28 October 2025	n/a	No further action
		Non-financial interests	Get u Better is available as part of local referral pathways but I have no financial interest	n/a	18 March 2026	Ongoing	Declare and participate
		Non-financial professional and personal interests	None	n/a	28 October 2025	n/a	No further action
		Indirect interests	None	n/a	28 October 2025	n/a	No further action
Patrick McGinley	Standing Committee Member	Financial Interests	I provide paid, ad hoc advice to MTechAccess on NHS funding flows. The work involved covers none of the technologies or companies involved in this evaluation.	Jan 2020	3 Nov 2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	I am a Trustee and Hon treasurer to Association for the study of Obesity (SO)	Oct 2020	3 Nov 2025	Ongoing	Declare and participate
		Indirect interests	None	n/a	3 Nov 2025		No further action
Keith Abrams	Standing Committee Member	Financial Interests	No reply				Committee papers not provided
		Non-financial professional and personal interests	No reply				Committee papers not provided
		Indirect interests	No reply				Committee papers not provided

Dr Joy Allen	Standing Committee Member	Financial Interests	Employee of Roche Diagnostics	Aug 2021	2 Dec 2025	Present	Declare and participate
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Michael Morton	Standing Committee Member	Financial Interests	None	n/a	2 Dec 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Neil Hawkins	Standing Committee Member	Financial Interest	I am a director a company that provides consultancy regarding health technology assessment to pharmaceutical and biotech companies. No services have been provided to any of the potential stakeholders that I have been made aware of or in respect to the technologies being assessed	2019	2 Dec 2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Alex Novak		Financial Interests	None	n/a	2 Dec 2025	n/a	No further action

	Standing Committee Member	Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Andrew Renehan	Standing Committee Member	Financial Interests	None	n/a	2 Dec 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Farai Goromonzi	Standing Committee Member	Financial Interests	None	n/a	3 Feb 2026	n/a	No further action
		Non-financial professional and personal interests	None	n/a	3 Feb 2026	n/a	No further action
		Indirect interests	None	n/a	3 Feb 2026	n/a	No further action
Prof Toby Smith	Professional Expert	Financial Interests	Paid Employment: University of Warwick (Principal: Academic)	01.10.2022	6 Oct 2025	Current	Declare and participate
			Paid Employment: Spire Norwich (Principal: Clinical)	01.05.2025	6 Oct 2025	Current	Declare and participate
			Paid Employment: Norfolk and Norwich University Hospital (Clinical)	01.05.2010	6 Oct 2025	01.05.2025	Declare and participate

		Non-financial professional and personal interests	Co-Applicant for OPAL (Trial Investigating Pre- and Post-Operative Return to Work after Arthroplasty: NIHR133880)	01.06.2022	6 Oct 2025	Current	Declare and participate
		Indirect interests	Nil	n/a	6 Oct 2025	n/a	No further action
Prof Paul Baker	Professional Expert	Financial Interests	Private Practice (Orthopaedics related to hip and knee replacement surgery)	Dec-23	6 Oct 2025	Ongoing	Declare and participate
			BD International – Paid to facilitate round table expert group relating to the use of Povoidoine lavage during joint replacement surgery	Single event 11th October 2025	6 Oct 2025	No other activity planned with this commercial company.	Declare and participate
		Non-financial professional and personal interests	Involvement in the GoWellHealth study and the knee and hip replacement guideline. We used GWH in the Trust for a few years but stopped >3 years ago. I was the clinician leading that work at the time. I have not had any professional contact with the GWH team in the last 3 years, so the interest is historic and not ongoing. I was never paid for any of the work I did with GWH.	August 2019	17 March 2026	March 2024	Declare and participate
		Non-financial professional and personal interests	Chief Investigator for the OPAL trial (NIHR HTA) – Occpuational Advice for Patients undergoing Arthroplasty of the Lower Limb. This is not a direct trial of a digital rehab pathway but is testing a broader occupational advice intervention aimed at supporting return to work after hip and knee replacement	Jul-22	6 Oct 2025	Trial end date 31st Jan 2027	Declare and participate
		Indirect interests	Nil	n/a	6 Oct 2025	n/a	No further action

Richard Fallows	Professional Expert	Financial Interests	Nil	n/a	29 Oct 2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	29 Oct 2025	n/a	No further action
		Indirect interests	Project Clinical Lead for NHSE Digital Innovation and Adoption funds awarded to projects in STW	From 2019	29 Oct 2025	Last project funding completed April 25	Declare and participate
			Bidding on further digital funding options throughout 25-26 via NHSE and Health Innovation	Oct-25	29 Oct 2025	Ongoing	Declare and participate
Dr Abayomi Salawu	Professional Expert	Financial Interests	"Director of Brain Recovery Zone. A health tech company that created the BRZ Virtual Reality Acquired Brain Injury app"	2020 (ongoing)	17 Oct 2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	Clinical use and evaluation of rehabilitation technology and Equipment such as Virtual reality rehabilitation tools (BRZ, Cureosity, Cyberith)	2020 (ongoing)	17 Oct 2025	Ongoing	Declare and participate
			Clinical use of Digital health tech platform (Kemtai): Clinical evaluation as part of work role	2022 (ongoing)	17 Oct 2025	Ongoing	Declare and participate
			Rehabilitation Technology HUNOVA robotic rehabilitation and physiotherapy system. Acquired through NIHR grant	2023 (ongoing)	17 Oct 2025	Ongoing	Declare and participate
			GEO Robotic gait trainer: Clinical evaluation with poster publication	2016	17 Oct 2025	2017	Declare and participate
			Smart Gravity and Walker View gait analysis and rehabilitation system: Clinical evaluation programme	2018	17 Oct 2025	2018	Declare and participate

			GripAble: Gamified mobile platform for assessment and training of hand and arm functions. Used in a clinical study to evaluable the sue of the device in patients undergoing upper limb spasticity management	2022	17 Oct 2025	2023	Declare and participate
		Indirect interests	Nil	n/a	17 Oct 2025	n/a	No further action
Nicola Underdown	Professional Expert	Financial Interests	Nil	n/a	21 Oct 2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	21 Oct 2025	n/a	No further action
		Indirect interests	Nil	n/a	21 Oct 2025	n/a	No further action
David Isaac	Professional Expert	Financial Interests	Nil	n/a	24 Oct 2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	24 Oct 2025	n/a	No further action
		Indirect interests	Nil	n/a	24 Oct 2025	n/a	No further action
Adrian Chudyk	Professional Expert	Financial Interests	Nil	n/a	21 Oct 2025	n/a	No further action
		Non-financial professional and	I am a member of Funding Panel for Health Innovation West Midlands North Expert Panel Review. One of the candidates is utilizing Myrecovery app pertinent to this review	01/10/2025	21 Oct 2025	21/10/2025	Declare and participate

		personal interests	I work in the Impact Accelerator Unit at Keele University where my role focuses on implementation of research outcomes including interventions in musculoskeletal medicine	03/01/2015	21 Oct 2025	Present	Declare and participate
		Indirect interests	Nil	n/a	21 Oct 2025	n/a	No further action
Gareth Gault	Lay (Patient) Expert	Financial Interests	Nil	n/a	10 Nov 2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	10 Nov 2025	n/a	No further action
		Indirect interests	Nil	n/a	10 Nov 2025	n/a	No further action
Rosie Hill	Lay (Patient) Expert	Financial Interests	Nil	n/a	13 Nov 2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	13 Nov 2025	n/a	No further action
		Indirect interests	Nil	n/a	13 Nov 2025	n/a	No further action
Claire Jowett	Lay (Patient) Expert	Financial Interests	Nil	n/a	24 Nov 2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	24 Nov 2025	n/a	No further action

Indirect interests	Nil	n/a	24 Nov 2025	n/a	No further action

Standing Committee DOIs to be checked again when MS form for the committee meeting is completed.