



**FULL STUDY TITLE: INITIATE: INCREASED MOBILITY IN
HOSPITAL AFTER HIP FRACTURE**

SHORT STUDY TITLE: WHITE 15: INITIATE

STUDY ACRONYM: INITIATE

Study website: initiate.octr.u.ox.ac.uk

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1 Research Reference Numbers

Sponsor Protocol Number:	PID17855
Clinical Trials Unit (CTU) Reference:	CTU0389
Funder Reference(s):	NIHR150983
Ethics Reference Number:	24/YH/0113
IRAS Number:	336892
Registry:	International Standard Randomised Controlled Trial Number (ISRCTN): ISRCTN13661431
CPMS ID:	62672

2 Organisational Information

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Sponsor:	University of Oxford <i>Refer to the Key Study Contacts section for contact details.</i>
Clinical Trials Unit:	The study is managed by the Oxford Trauma and Emergency Care Group, part of: Oxford Clinical Trials Research Unit (OCTRU) Botnar Research Centre, University of Oxford, Windmill Road, Headington, Oxford, OX3 7LF
Funder:	The study is funded by National Institute for Health and Care Research (NIHR) Health Technology Assessment (HTA) Programme.
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Conflict of Interest Statement:	None of the co-applicants/protocol contributors listed above have declared a potential conflict of interest
Confidentiality Statement:	In accordance with the NIHR Open Access policy, the protocol will be published and made freely and openly accessible to all.

3 Key Study Contacts

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Trial Steering Committee (TSC) Chair:	Prof John Keating Professor of Trauma and Orthopaedics University of Edinburgh ✉ John.Keating@ed.ac.uk Other members of the TSC are detailed within a study specific TSC charter.
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4 Protocol Approval/Signatories

This protocol has been approved by the Sponsor, Chief Investigator and Lead Study Statistician. Approval of the protocol is documented in accordance with OCTRU Standard Operating Procedures.

All parties confirm that findings of the study will be made publicly available through publication without any unnecessary delay and that an honest accurate and transparent account of the study will be given; and that any important deviations and serious breaches of GCP from the study as planned in this protocol will be explained.

5 Lay Summary/Plain English Summary

What is the problem?

Each year there are 70,000 new hip fractures in the UK, with an ongoing annual cost to health and social care services of £3 billion. After this injury, mobility and independence are so badly affected that one in six people never return home. This downward spiral of immobility and dependence contributes to a quarter of people dying within one year of the injury.

National mobility targets have been set for hospitals. Firstly patients should be helped out of bed within 48 hours of receiving surgery and secondly, they should receive two hours of rehabilitation per week. Patients whose care exceeds these targets seem to recover more quickly than other patients. Consequently, patients and their carers have asked if increasing ward-based mobilising, would allow people to get back home more quickly and to continue living independently.

What are we trying to find out?

We want to find out if more ward-based mobilisation activity after hip fracture surgery allows people to get home more quickly and allow them to stay living in their own home longer.

What will we do?

We will study 22 NHS hospitals. Half the hospitals will provide more mobilisation activities through additional staff and staff training, the other half will continue with what they usually provide. Thirty days after surgery we will check if patients have been able to return to the same living arrangements as before their injury. We will compare how quickly people get back home and continue living independently between the different hospitals to see if having more mobilisation activities while in hospital after surgery is better than usual care. A few months later, we will ask patients about their quality of life, how well they can move around and how much care they received. Additionally, to explore the experiences of patients, their key supporters and key staff involved in this research we will carry out interviews when patients are discharged and again approximately 6 months later.

6 Study Synopsis

Full Study Title:	INITIATE: INCREASED MOBILITY IN HOSPITAL AFTER HIP FRACTURE	
Short Title:	WHITE 15: INITIATE	
Study Acronym:	INITIATE	
Study Design:	The INITIATE study is a multi-centre, two arm, unblinded, cluster randomised controlled trial (RCT), with embedded process and economic evaluations.	
Study Aim	To determine for patients aged ≥ 60 years, whether increasing the frequency and duration of a mobility focused intervention after hip fracture surgery increases the number of days alive and at home within 30 days of hospital admission compared to usual care.	
Study Participants/ Target Population:	Adults aged ≥ 60 years having surgery for a fracture of the hip.	
No. of study arms:	Two (2)	
Intervention(s):	Usual care with additional ward-based mobilisation activities.	
Comparator:	Usual care	
Planned Sample Size:	2310 participants from 22 clusters A minimum of 10 participants (patients, key supporters & key staff) at each research site will be recruited for the process evaluation interviews.	
Target no. of research sites:	Twenty Two (22) NHS Hospitals	
Countries of recruitment:	UK (England, Wales, Northern Ireland and Scotland)	
Planned recruitment duration:	Recruitment is expected to last for 13 months in each centre, 21 months in total.	
Duration of intervention/treatment:	Those in the intervention arm will be helped out of bed within 48 hours and receive additional ward-based mobilisation activities during their inpatient stay on the post-op hip fracture ward.	
Follow-up duration:	Each participant will be followed up for 4 months from registration. Participants in the interview study will also be followed up for their second interview at 6 months after discharge.	
	Objective	Outcome Measure

Primary objective and outcome measure:	To compare the total number of days a participant spends at home between treatment groups	Days alive and at home during the first 30 days post-hip fracture surgery (DAH30)
Secondary objectives and outcome measure:	To compare health-related quality of life between treatment groups	EuroQol EQ-5D-5L
	To compare mobility between treatment groups	modified New Mobility Score (mNMS)
	To compare basic mobility at discharge between treatment groups	Cumulated Ambulation Score (CAS)
	To compare residential status between treatment groups	UK National Hip Fracture Database Residential Status
	To compare the rate of mortality between treatment groups	Mortality as recorded in Death Notification CRFs
	To compare the rate of complications between treatment groups	Complications as recorded in medical records and bespoke participant questionnaire
	To compare the rate of falls resulting in head injury or fracture between treatment groups	Falls as recorded in medical records
	To compare the total number of days a participant spends alive and at home between treatment groups	Days alive and at home during the first 120 days post-hip fracture surgery (DAH120)
	To compare resource use and assess comparative cost-effectiveness of the treatment groups	Resource use as recorded in medical records and bespoke participant questionnaires
	To conduct a formative and summative process evaluation to determine to what extent the cluster RCT protocol is operationalised within the orthopaedic trauma units to achieve site set up targets and determine the extent to which the INITIATE intervention is adopted and embedded.	Intervention analysis and intervention adherence, on the basis of a thematic analysis of: Interviews with participants (and relative/friend/informal carer as required). Interviews and focus groups with recruitment centre staff.

	<i>Refer to the Objectives and Outcome Measures section of the main body of the protocol for full study objectives and outcome measures.</i>
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7 Abbreviations

AE	Adverse Event
AR	Adverse Reaction/Response
BRC	Biomedical Research Centre
CHI	Community Health Index
CI	Chief Investigator
CONSORT	Consolidated Standards of Reporting Trials
CPMS	Central Portfolio Management System
CRF	Case Report Form
CSP	Chartered Society of Physiotherapy
CTU	Clinical Trials Unit
DMP	Data Management Plan
DOB	Date Of Birth
DSMC	Data and Safety Monitoring Committee
GCP	Good Clinical Practice
GDPR	General Data Protection Regulation
GP	General Practitioner
HCRW	Health and Care Research Wales
HRA	Health Research Authority
HTA	Health Technology Assessment
ICC	Intra-Cluster Correlation
ICF	Informed Consent Form
ICMJE	International Committee of Medical Journal Editors
IP	Intellectual Property
IRAS	Integrated Research Application System
ISF	Investigator Site File
ISRCTN	International Standard Randomised Controlled Trials Number
mNMS	Modified New Mobility Score

NDORMS	Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences
MRC	Medical Research Council
NHFD	National Hip Fracture Database
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NIHR	National Institute for Health and Care Research
OCTRU	Oxford Clinical Trials Research Unit
PI	Principal Investigator
PIS	Patient information sheet
PPI	Patient and Public Involvement
QA	Quality Assurance
QALY	Quality-Adjusted Life Year
RCT	Randomised Controlled Trial
REC	Research Ethics Committee
REDCap	Research Electronic Data Capture
RGEA	Research Governance, Ethics & Assurance Team
SAE	Serious Adverse Event
SAP	Statistical Analysis Plan
SMS	Short Messaging Service
SOP	Standard Operating Procedure
SFQ	Site Feasibility Questionnaire
SUSAR	Suspected Unexpected Serious Adverse Response/Reaction
TIDieR	Template for Intervention Description and Replication
TMF	Trial Master File
TMG	Trial Management Group
TSC	Trial Steering Committee
VAS	Visual Analogue Scale
WHITE	World Hip Trauma Evaluation Study

8 Background Information and Rationale

8.1 What is the problem being addressed?

Annually, 70,000 people in the UK fracture their hip, which is associated with annual health and social care costs of £3 billion.^{1,2} Following surgery, one in six patients who were previously independent and living in their own home are not discharged back home.³ This downward spiral of immobility and dependence contributes to 25% of patients dying within one year.⁴

In February 2017, Iona Price published '*My Mother's Story*'. Her mother was an independent woman in her eighties when she sustained a hip fracture. She did not regain her mobility, she did not return home, and died a few months later.⁴ This is a common story, and one Iona published as a 'call to action'.

NICE hip fracture guidelines recommend mobility focused interventions are started within 48 hours of surgery.⁵ There is some evidence that this leads to greater survival and direct discharge home,⁶⁻⁸ including an analysis of 126,897 patients between 2014–2016 from the UK National Hip Fracture Database (NHFD).⁷

NICE found insufficient evidence to suggest the optimum frequency and duration for mobility focused interventions.⁵ Increasing the frequency and duration of mobilisation in the early post-operative days could lead to more rapid recovery and direct discharge home, which recent NHFD data has further supported.⁹ This is achieved through physical training effects (e.g. muscle strength), addressing psychological effects of falling (e.g. loss of confidence) and reducing the risk of immobility associated complications (e.g. pressure sores).⁵

Physiotherapists design and supervise mobility focused interventions, with a frequency of once daily, and a duration of two hours per week being the standard following hip fracture surgery.¹⁰ However, physiotherapists have a broader role in supporting education of all ward-based health care professionals to undertake mobility focused interventions with their patients during daily patient contacts.^{11,12}

Increased mobility-focused interventions, through a combination of direct physiotherapy contact and wider ward-based team education, could lead to greater survival and earlier discharge home.⁵

8.2 Why is this research important in terms of improving the health and/or wellbeing of the public and/or to patients and health and care services?

The aim of this research is to evaluate the clinical and cost-effectiveness of increasing the frequency and duration of mobility focused interventions after hip fracture surgery, compared to current usual care. This is in direct response to a NICE research recommendation (CG124, research recommendation 4) and addresses the NIHR themed call 'Complex Health and Care Needs in Older People. Patients have identified the importance of this question through a James Lind Alliance priority setting exercise, being top ranked.¹³ Its importance is also echoed internationally in the recent 2021 American clinical practice guidelines.¹⁴

From the NHS perspective, a reduction of one day in the average length of hospital stay for the 70,000 hip fracture patients admitted annually, would save £15.5 million (assuming an average bed day cost of £222). Further savings would be accrued through prevention of medical complications associated with decreased mobility, such as pneumonia, pressure ulcers and deep vein thrombosis.¹⁵

Furthermore, the financial burden on social care would be greatly reduced if more people are able to return to their previous residence, rather than requiring care home support.

8.3 Review of existing evidence — How does the existing literature support this study?

A 2011 Cochrane review evaluated interventions for improving mobility after hip fracture surgery (19 RCTs, n=1589).⁸ Of these, two trials (n=188) investigated intense vs. standard physiotherapy.^{16,17} Data pooling was not possible and the authors concluded there was insufficient evidence. The 2017 NICE guideline found two additional RCTs (n=188).^{18,19} NICE suggested that patients may benefit from more intensive protocols in the first days after surgery, but more evidence was needed.

In 2017, the Chartered Society of Physiotherapy commissioned a '*Physiotherapy Hip Fracture Sprint Audit*'. The aim was to capture an understanding of the UK ward-based physiotherapy management of patients with hip fracture. Data were collected on duration, frequency and type of physiotherapy offered between 1st May 2017 and 30th June 2017. Data were collected on 5,395 patients and linked with the NHFD data set.⁹ Associations between the frequency and the duration of ward-based physiotherapy and discharge from hospital was found. The odds ratio of discharge for ≥ 2 -hour versus < 2 -hour physiotherapy was 1.33 (95% CI 1.12–1.57).⁹

An updated systematic review was conducted for the 2021 American clinical practice guidelines.¹⁴ Two further RCTs were identified (n=265).^{6,20} In one trial, 92 participants were randomised in an Australian institution and found intensive rehabilitation (three sessions per day) to be safe and reduced hospital length of stay by more than ten days, compared to once daily standard care (Control median 35 days, IQR 19-50; Intervention median 24, IQR 16-32; P=0.01).⁶ In the second trial, 173 participants were randomised, in a single hospital in Switzerland, into 4 groups to evaluate vitamin D dose (800 and 2000 units) and 30 minutes of additional physiotherapy during hospitalisation, compared to standard care (30 minutes per day). It found a reduced rate of falls in the additional physiotherapy group by 25% (95% CI: 1%, 44%) at 12 months.²⁰ Despite having small samples in non-UK settings, these studies provide evidence for the need to investigate further.

Establishing if increasing the frequency and duration of a mobility focused intervention compared to usual care is clinically and cost-effective is long overdue. This was first recommended by NICE in 2011 and again in their updated guidance in 2017, it was a number one priority in a 2018 James Lind Alliance priority setting partnership and echoed in 2021 international clinical guidelines. This question has remained unanswered for over a decade, despite repeated professional and patient calls for action.

9 Objectives and Outcome Measures

NB Any reference made in this protocol to 'home' must be interpreted as the residence the participant was residing at prior to their hip fracture.

9.1 Aim

The aim of the study is to determine whether a usual care rehabilitation strategy or usual care with an additional mobility focused intervention is superior for patients aged ≥ 60 years, after hip fracture surgery.

9.2 Primary objective

The primary objective: To compare the DAH30 between participants receiving a mobility focused intervention after hip fracture surgery compared with participants receiving usual care.

The primary outcome: DAH30²¹ — days alive and at home up to 30 days post-hip fracture surgery.

Objective	Outcome measure	Time point(s) of evaluation of this outcome measure	Data required	Source data (including location)
To compare the total number of days a participant spends alive and at home between treatment groups	DAH30	Up to 30 days post-hip fracture surgery	Residential status pre-injury Original discharge date Further admission, and discharge data for 30 days post-surgery. Place of discharge. Residential status at 30 days	Participant questionnaire. Medical records.

9.3 Secondary objectives

The secondary objectives are:

To compare health-related quality of life between treatment groups at 30 and 120 days post-surgery.

To compare mobility between treatment groups at discharge, 30 and 120 days post-surgery.

To compare residential status between treatment groups at discharge, 30 and 120 days post-surgery.

To compare the rate of mortality between treatment groups up to 120 days post-surgery.

To compare the rate of complications between treatment groups up to 120 days post-surgery.

To compare the rate of falls resulting in head injury or fracture between treatment groups up to discharge or 30 days post-surgery, whichever occurs soonest.

To compare the total number of days a participant spends alive and at home between treatment groups up to 120 days post-hip fracture surgery.

To compare resource use and assess comparative cost-effectiveness (expressed in terms of incremental cost per QALY gained) between groups in the first 120 days post-surgery from an NHS and personal social service perspective.

To conduct a formative and summative process evaluation to determine to what extent the cluster RCT protocol is operationalised within the orthopaedic trauma units to achieve site set up targets and determine the extent to which the INITIATE intervention is adopted and embedded.

Objective	Outcome measure	Time point(s) of evaluation of this outcome measure	Data required	Source data (including location)
To compare health-related quality of life between treatment groups	EQ-5D-5L	Pre-injury*, 30 days and 120 days post-surgery	EQ-5D-5L	Participant/proxy.
To compare mobility between treatment groups	modified New Score Mobility (mNMS)	Pre-injury*, 30 days and 120 days post-surgery	mNMS	Participant/proxy.
To compare basic mobility at discharge between treatment groups	Cumulated Ambulation Score (CAS).	Discharge	CAS	Medical records.
To compare residential status between treatment groups	UK National Hip Fracture Database Residential Status	Pre-injury*, discharge, 30 days and 120 days post-surgery	UK National Hip Fracture Database Residential Status	Participant/proxy. Medical records.
To compare the rate of mortality between treatment groups	Mortality rate	Up to 120 days post-surgery.	Date of death	Death notification. Proxy. Hospital records.

To compare the rate of complications between treatment groups	Rate of complications	Up to 120 days post-surgery	Complications related to hip fracture surgery and trial intervention.	Participant/proxy. Medical records.
To compare the rate of falls resulting in head injury or fracture between treatment groups	Rate of falls	Up to discharge or 30 days whichever occurred soonest.	Falls resulting in head injury or fracture	Medical records.
To compare the total number of days a participant spends alive and at home between treatment groups	DAH120	Up to 120 days post-hip fracture surgery	Residential status at 30 days, Residential status at 120 days, Further admission, and discharge data for 120 days post-surgery.	Participant questionnaire. Medical records.
To compare resource use and assess comparative cost-effectiveness of the treatment groups	Incremental costs-effectiveness ratio expressed as incremental cost per quality-adjusted life year (QALY) gained	Up to 120 days post-surgery	Patient Reported Outcomes regarding NHS, personal social service costs and out of pocket expenses. Hospital data on treatments and attendance. Health-related quality of life	Participant/proxy. Medical records.

To conduct a formative and summative process evaluation to determine to what extent the cluster RCT protocol is operationalised within the orthopaedic trauma units to achieve site set up targets and determine the extent to which the INITIATE intervention is adopted and embedded.	Intervention analysis and intervention adherence, on the basis of a thematic analysis of: Interviews with participants (and relative/friend/informal carer as required). Interviews and focus groups with recruitment centre staff.	Up to 180 days post-surgery	Interview transcription/recordings	Participant/Carer/Hospital Staff
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* pre-injury scores are collected retrospectively at the time of study registration

9.4 Exploratory objectives/additional mechanistic objectives outcomes

There are no additional exploratory/mechanistic objectives/outcomes in this study.

9.5 Outcome tools

DAH30: DAH30 is a patient-centric, PPI approved, scientifically robust outcome with prognostic importance. It is a composite of duration of initial length of stay postoperatively, readmission(s) to hospital, discharge to previous residence or admission elsewhere (e.g., residential care) and mortality. DAH30 is an integer between 0 and 30 which reflects, out of the 30 days following surgery, the total number of those days that the participant spends alive and at their pre-injury residence. DAH30 is derived by subtracting from 30 the duration of initial length of stay following hip fracture surgery, as well as the duration of any further readmissions (to hospital or elsewhere) in the first 30 days. If a participant never returns to their previous residence or dies at any point within the first 30 days, they will be assigned a score of 0.

DAH120: The DAH120 is defined in the same way as the DAH30 but the 30 days are replaced by 120 days.

EQ-5D-5L: The EQ-5D-5L is a validated, general health-related quality of life questionnaire consisting of five dimensions (mobility, self-care, usual activities, pain/discomfort and anxiety/depression) each with five levels, the responses to which will be converted into multi-attribute utility scores using an established algorithm.¹⁰ A second component of the EQ-5D-5L comprises a Visual Analogue Scale (VAS) measuring health from 0 (worst imaginable health state) to 100 (best imaginable health state).

Mobility: The modified New Mobility Score (mNMS)¹⁶ is a multi-component instrument that was developed originally to measure mobility in older adults with hip fracture in post-acute and community settings.²³ The instrument assesses ambulation inside the home, outside the home and

whilst shopping. A score of 0-3 points is given for each component, resulting in a total score of 0-9 points. The mNMS is used to assess level of mobility pre-injury and 30 and 120 days post-surgery.

Basic mobility at discharge: The Cumulated Ambulation Score (CAS) is an instrument assessing mobility in an indoor situation only²² and will be used to measure mobility at discharge. The CAS will be completed by hospital staff using participants' medical records.

Mortality: Qualitative work with patients who sustain hip fractures identified mortality as an important metric.²³ This will be recorded by recruitment centres at discharge from the medical records, or at any point during follow-up.

Residential status: Changes in residential status provide a marker for the patients' independence through their hip fracture recovery and is one of the recommended core outcomes for trials assessing interventions in hip fractures.²⁴ It will be reported by participants or their proxy using an ordinal scale as per the NHFD: (1) own home/sheltered housing, (2) residential care, (3) nursing care, (4) rehabilitation unit – hospital bed in the current trust, (5) rehabilitation unit – hospital bed in another trust, (6) rehabilitation unit – NHS funded care home bed, and (7) acute hospital.

Complications: All complications up to 120 days from the diagnosis of the hip fracture will be recorded, including falls and fall-related injuries.

Health and social care resource use: Health and social care resource use will be measured in the participant questionnaires for the purposes of the economic evaluation. The cost consequences following discharge, including NHS and personal social service costs and patients' out-of-pocket expenses will be recorded via a short questionnaire at 120 days. Patient self-reported information on service use has been shown to be accurate in terms of the intensity of use of different services.¹¹

9.6 Choice of primary outcome/justification for the follow-up period

The primary outcome is days at home up to 30 days post-hip fracture surgery (DAH30). Home is defined as the pre-injury residence.

DAH30 was chosen in collaboration with the PPI representatives of the research team as a scientifically robust outcome with prognostic importance. It is a composite of duration of initial length of stay postoperatively, readmission(s) to hospital, discharge to previous residence or admission elsewhere (e.g. residential care) and mortality. Patients have identified 'returning to their previous residence as quickly as possible' as a top priority in the recovery from a hip fracture.

9.7 Use of core outcome sets (COS)

This study will use the UK Core Outcome Set for patients with hip fracture.²⁴

10 Study Design and Setting

INITIATE is a multi-centre, two arm, unblinded, cluster randomised controlled trial (RCT) with embedded process and economic evaluations.

The study will recruit 2310 patients (1155 in each of 2 groups) who have received surgery for a fracture of the hip, from approximately 22 NHS hospitals in the UK. Recruitment centres will be cluster randomised to either provide more ward-based mobilising activities after fracture surgery on the post-op hip fracture ward or to continue with what they usually provide (standard care).

A study flow chart is provided in Appendix 1 – Study Flow Chart.

10.1 Recruiting centres

The recruitment centres will primarily be chosen from an existing hip fracture research network, the 'World Hip Trauma Evaluation' (WHiTE). These sites will be NHS hospitals and have worked with the research team previously and have appropriate research infrastructure. If insufficient centres can be enrolled through the WHiTE network, additional centres may be sought.

Site enrolment will take on a staggered approach with the initial 8 sites being enrolled during the initial 6 months of recruitment. The remaining 14 sites will be enrolled approximately 6-8 months later.

Refer to section 28 for information on identification and management of sites.

10.2 Collection of outcome data and follow-up assessments

The intention is to conduct this project as a predominantly paperless study. Participant information will be presented in electronic format, if required a paper version of the information can be made available, and consent decisions and baseline information will be recorded on an electronic tablet in the hospital setting.

30 days after hip fracture surgery, the local research team will review the participant's medical record including discharge summaries.

Follow-up contacts at 30 and 120 days post-surgery will be completed with the participant or a proxy either via telephone interviews by a member of the central research team, or through electronic means depending on the choice expressed by the participant or proxy at the time of consent/declaration.

Refer to section 17 for full details of outcome data collection and follow-up assessments.

10.3 Countries of recruitment

UK.

10.4 Duration of participant involvement

Participants will be in the study for approximately 120 days (4 months) from registration to last follow up timepoint (120 days post-surgery). For participants who are also taking part in the interview study, their second interview will be approximately six month after their discharge from hospital.

10.5 Post-study treatment/care and follow-up

Following a participant's hospital discharge, they will receive standard care.

10.6 Central review procedures

Not applicable for this study.

10.7 Use of registry/NHS Digital data

No data of this type is to be accessed for this study.

10.8 Expected recruitment rate

The anticipated monthly recruitment rate is 8 participants per recruitment centre per month.

The predicted recruitment rate is based on recruitment to previous WHiTE studies within the 22 trauma centres / hip fracture units planned to take part in INITIATE.

10.9 Equality, diversity and inclusion for study participants

Participation will be offered regardless of the patient's gender, sexual orientation, marital status, ethnicity, religion or belief, disability, or socio-economic status. Screening logs will be kept at each recruitment centre to determine the number of eligible and recruited patients, and the number who decline consent or withdraw. Screening data, as detailed in the data management plan (DMP), will be reviewed each month by the trial management team to assess whether representative samples of patients are being approached and to ensure no selection bias occurs in any of the recruitment centres regarding approach and inclusion/exclusion of specific groups of patients. Continued training of site staff on accurate and inclusive screening and recruitment will be done through newsletters, regular Q&As/top tips, and refresher sessions. If deemed necessary, adapted versions of information materials (i.e. larger fonts, different languages, simplified text) will be created.

10.10 End of study

The end of study is the point at which all CRF and non-CRF data relating to the primary and secondary outcomes has been entered/received (or collected if non-CRF data) and all queries resolved.

The Sponsor and the Chief Investigator reserve the right to terminate the study earlier at any time. In terminating the study, they must ensure that adequate consideration is given to the protection of the participants' best interests.

11 Participant Eligibility Criteria

Participant eligibility will be confirmed by a suitably qualified and experienced individual who has been delegated to do so by the Principal Investigator (PI).

11.1 Timing of eligibility assessment

Eligibility will be assessed at point of surgical treatment for hip fracture. It will then be confirmed at the point of registration.

11.2 Overall description of study participants

INITIATE will recruit adults aged 60 years or above having surgery for a fracture of the hip.

Participants will be recruited from INITIATE participating wards in NHS hospitals providing hip fracture care in the UK.

Participants can be co-enrolled into WHiTE platform or non-WHiTE studies that do not conflict with the follow-up of the study and with consideration to participant burden.

11.3 Inclusion criteria

A patient will be eligible for inclusion in this study if **ALL** of the following criteria apply:

1. Aged 60 years and above with a hip fracture
2. Have planned surgery for the hip fracture or has received surgery in the past 48 hours.

11.4 Exclusion criteria

A patient will not be eligible for the study if **ANY** of the following apply:

1. A fracture caused by an area of abnormal bone (e.g., a tumour)
2. A pre-existing contraindication to mobilising after surgery

3. A patient who had severely limited mobility prior to injury (i.e confined to bed, transfer from bed to chair only)
4. Previous participation in INITIATE or actively engaged in other hip fracture research with contralateral hip fracture.

11.5 Rationale for inclusion and exclusion criteria

The eligibility criteria align with NHFD criteria for reporting NHS hospitals providing hip fracture care. All NHS hospitals providing hip fracture care follow nationally agreed care pathways, aligned with best practice tariffs.

11.6 Pre-study screening tests or investigations

There are no pre-study screening tests for inclusion in the study.

11.7 Protocol waivers to entry criteria

Protocol adherence is a fundamental part of the conduct of a randomised study. There will be no waivers regarding eligibility (i.e., each participant must satisfy all the eligibility criteria). Changes to the approved inclusion and exclusion may only be made by a substantial amendment to the protocol.

Before entering a patient onto the study, the PI or designee will confirm eligibility. If unsure whether the potential participant satisfies all the entry criteria and to clarify matters of clinical discretion investigators should contact the INITIATE central study team, who will contact the Chief Investigator or designated clinicians as necessary. If in any doubt the Chief Investigator must be consulted before recruiting the patient. Details of the query and outcome of the decision must be documented in the Investigator Site File (ISF)/Trial Master File (TMF).

11.8 Clinical queries and protocol clarifications

Every care has been taken in drafting this protocol. Contact the INITIATE central study team for clarification if any instructions seem ambiguous, contradictory, or impractical. Clinical queries must also be directed to the central study team. All clinical queries and clarification requests will be logged, assessed and a written response provided. Minor administrative corrections or clarifications will be communicated to all study investigators for information as necessary. For urgent safety measures or changes that require a protocol amendment see section 27.7.

12 Screening and Recruitment

12.1 Participant identification

Patients will be identified in trauma meetings and on the hip fracture wards within NHS hospitals in the UK. The local clinical team will confirm the eligibility (see section 11) of the individual patient to participate.

Potentially eligible patients will be identified by those in the clinical care team. Any patients who are thought to fulfil the eligibility criteria will be given a Participant Information Sheet (PIS) by a member of their usual care team (who may also be a member of the site research team) and asked to consider the study. Where their usual care clinician is not a member of the site research team potential participants will be asked if it would be acceptable for their name and contact details to be passed to the site research team who will make contact at a later time point during their hospital admission. This will be documented in the patient's clinical notes.

At intervention sites, a patient-area poster will be displayed on intervention wards in order to raise awareness of the INITIATE intervention among patients.

12.2 Re-screening if a potential participant does not meet inclusion/exclusion criteria first time round

Not applicable for this study. Re-screening of ineligible patients is not permitted (exclusion criteria is unlikely to change).

12.3 Use of screening logs

A screening log (within the REDCap study database) will be used to record information about the number of patients considered and/or approached for the study and if provided, the reasons for declining participation. The screening logs will contain non-identifiable information such as the age, sex, fracture type and ethnicity. A screening number will be assigned to each patient screened.

13 Study Intervention and Comparator

13.1 Internal practice review and average length of stay

As this is a cluster RCT, training of staff with regards to the intervention, intervention materials and additional physiotherapy support staff will only be available to those recruitment centres randomised to the intervention. Cross-over from usual care to the intervention is not possible because they will not have access to these resources. However, there is a risk that usual care sites may change behaviours related to championing mobility due to knowing they are being observed and conversely that intervention sites rely on the additional resources and reduce their usual baseline care.

For the above reasons, an internal practice review will be conducted in all hospitals prior to the intervention period and when 70% of the site target has been achieved. Anonymous data will be collected on physiotherapy received during the in-patient stay for patients admitted on the ward after hip fracture surgery over a 30 day period during days 0-7 post-surgery.

In addition, for the duration of the intervention period, anonymous data will be collected on the average length of stay of patients admitted on the post-surgical ward after hip fracture surgery.

13.2 Control: Usual Care

The Usual Care (control) centres are expected to follow existing NICE quality standards, NHFD best tariff criteria and Chartered Society of Physiotherapy (CSP) standards for rehabilitation following hip fracture.

13.3 Intervention: Usual Care with an Additional Mobility-Focused Intervention

Intervention sites will be expected to follow the same existing national standards as control centres, with an additional mobility focused intervention.

One physiotherapist and one health care assistant will be appointed at each intervention site. They will aim to offer, as a minimum, one session of daily rehabilitation, over and above usual care during the participant's in-patient stay on the acute hip fracture ward. In the intervention sites, information

on the frequency and duration of additional physiotherapy received will be collected by the research team for each consented participant throughout the intervention period for days 0–7 post-surgery.

The additional physiotherapy and health care assistant posts appointed at each intervention site will receive standardised training using training materials developed by the trial management group (e.g., written manuals and training videos via a study website), to ensure standard delivery of the interventions across the study.

Following the initial training from the study team, the additional staff members will undertake a two-month bedding in period at the intervention sites. During this time, a member of the central research team will continue to support them through weekly contact to assist with any further training needs.

The physiotherapy content of the additional sessions will follow the same content as usual care, focusing on mobility, muscle strengthening, balance, range of movement, and psychological management of health beliefs and the fear of falling. These interventions will be tailored for those with cognitive impairment, as per usual care.

To enhance engagement of patients with the offer of additional physiotherapy sessions, the biopsychosocial model of behaviour change will be the underlying theoretical principle.^{25,26} Michie's COM-B model²⁹ (based on 19 pre-existing behaviour change frameworks) will address capability (including expectations and perceived severity of the hip fracture), opportunity (including effective communication), and motivation (which will enable goal setting) as mechanisms to engage in mobility focused interventions, together with self-regulation (monitoring of own behaviour).²⁷

Wider ward team facilitation of mobility is current practice, with, for example, 20% of a nurse's time spent on patient mobility.¹¹ However, wider implementation is held back by fear of patients falling, lack of confidence with equipment to mobilise, and perceived lack of skill, which the additional physiotherapists will also address through educational support.^{11,12}

For the wider ward-based team, online resources supported by the onsite additional physiotherapy posts, will provide education materials to increase knowledge of the effects of immobility; the psychology of falling, including fear avoidance and loss of independence; and the benefits of physical activity.²⁸ In addition to increasing skill sets of the ward based team to assist with mobilisation, focus will be on ensuring patients have appropriate walking aids, equipment and footwear to be administered to facilitate mobility. In line with previous research, we will aim to promote a patient-centred approach, where the ward team and patient work together.²⁹ Once training is complete, team members who have attended the training will complete a short assessment which will test aspects of their knowledge and, more importantly, their confidence to mobilise people early after hip fracture. Similar to previous studies delivered by the study team, if they score below 70% they will be offered further support by the additional physiotherapy posts, covering aspects of the training they feel less confident about.³⁰

The educational content will be supported by raising awareness of this same educational material through promotional materials for ward-based staff, visitors and people with a hip fracture on the ward (e.g., posters, pamphlets, slippers, study website).

To enhance engagement from ward-based health care professionals, the COM-B framework will also underpin this component, mapping the identified barriers and facilitators of learning and implementation, self-efficacy, expectations and outcomes, behavioural attitudes and planning (e.g. prioritisation of tasks, and perceptions of patient reactions to early mobility).^{25,26}

A poster will be available to display in wards specifically for recruitment centres randomised to the intervention, to raise awareness of the physiotherapy provision available to patients via the study.

14 Informed Consent

14.1 Consent procedure

The cluster design raises ethical issues related to recruitment and consent. All patients admitted in the intervention sites, irrespective of whether or not they chose to take part in the study, will be exposed to the intervention, and individual consent with respect to the intervention is therefore not required/possible. We have consent from the Clinical Director at each site for participation of the unit in the intervention (cluster guardian). However, individual participant/consultee consent for data collection will be sought. The study population will include people who lack capacity to consent to this research (refer to 14.4).

A member of the local research team who is appropriately trained and delegated will invite potentially eligible patients to take part in the research and provide them with an information sheet and a verbal explanation of the study. Potential participants who have capacity to consent to this research will be asked to provide written consent. If they lack capacity to consent, the research nurse will approach the next of kin as a Personal Consultee or Deputy, provide them with an information sheet, and seek their agreement for participation of their relative in study data collection. Where a Personal Consultee is not available, then a Nominated Consultee will be identified to advise the research team. The local research team will document in the medical notes that written and verbal information has been provided to the participant, including the PIS version number and any other applicable information.

Responsibility for recording and dating of written informed consent/consultee agreement will be with the Principal Investigator (PI) or the persons delegated by the PI (recorded on the site delegation log) who conducted the informed consent/agreement discussion.

No study-specific procedures will be performed or baseline data collected prior to completion of the consent process.

14.2 Time allowed to decide to take part

An extended period to consider consent for data collection is deemed not necessary and the participant/consultee/deputy may provide consent/agreement as soon as they understand what the research is and what they are consenting to. Consent/agreement may be obtained prior to surgery or up to 48 hours after surgery.

14.3 Completion of the Informed Consent Form

The patient, personal consultee or nominated consultee, and the PI or their authorised designee must personally sign and date the current approved version of the informed consent form or declaration form as applicable.

The Informed Consent Form will usually be offered to participants on the trauma ward, as an electronic form on a tablet device (with the Consent Form being filled in directly on the study database, REDCap), however paper Consent Forms will also be made available for use in situations where electronic consent is not possible or suitable.

Where Consent Forms are completed, electronic signatures will be either achieved by a finger tracing across a tablet device or using an electronic stylus on a tablet device or using a mouse dragging the cursor across the screen – all methods are to be used as if signing with a traditional pen.

Where electronic consent is used and the participant has an email address that they are willing to provide, an electronic version of the signed ICF will be automatically emailed to them. If the participant does not have/ provide an email address, the site research team will be able to print a copy of the signed ICF and provide this to the participant. A copy of the electronic consent form downloaded from the study database must be placed in the Investigator Site File in recruitment order and a copy in the participant's medical record. Written confirmation of informed consent will be documented in the medical notes, including who performed the consent process.

14.4 Individuals lacking capacity to consent

We will conduct our recruitment consent processes in line with the Ottawa Statement on ethical design and conduct of cluster randomised trials³¹ and the legal framework of the Mental Capacity Act.³² CI Costa leads the 'World Hip Trauma Evaluation' (WHiTE) cohort/Platform, which has successfully delivered 9 studies to date. This study will mostly recruit in recruitment centres which are currently taking part in the WHiTE Platform and have previous track records of delivering studies that include hip fracture patients who lack capacity to consent. The proposed consent model has been published, is acceptable to ethical committees, and is in active use in current NIHR funded research.³³

Where an eligible patient lacks capacity at the time of enrolment, we will follow a process approved by the relevant Research Ethics Committee and act in accordance with:

- England & Wales: section 32(9) of the Mental Capacity Act 2005
- Northern Ireland: sections 135 & 136 of the Mental Capacity Act 2016 (Northern Ireland)
- Scotland: Adults with Incapacity (Scotland) Act 2000.

In England, Wales and Northern Ireland

We will seek a consultee, or nominated person in Northern Ireland, for simplicity hence described as a consultee. The consultee will be asked to advise the research team of any information regarding the patient that might indicate their unwillingness to enter INITIATE.

A Personal Consultee is a person who is:

- engaged in caring for the participant (not professionally or for payment) or is interested in his/her welfare, and
- is prepared to be consulted.

Where a Personal Consultee is available, they will be provided with the relevant information. The Personal Consultee will be given the opportunity to ask questions and discuss INITIATE, after which their advice will be recorded. Where a Personal Consultee is not available, then a Nominated Consultee will be identified to advise the research team.

The Nominated Consultee will usually be the patient's treating clinician, but may also be another healthcare professional, who must be independent of INITIATE. If that surgeon (or healthcare professional) is a member of the research team, another independent healthcare professional will be identified. This will be a professional whom the local research team deems appropriately qualified. The role of the Nominated Consultee will initially be introduced by the local PI to clinical professionals undertaking the role of Nominated Consultee. The potential Nominated Consultees will be provided with a copy of this protocol and the current prospective participant information sheet. This will be done at each recruitment centre prior to opening the site to recruitment and repeated as new

members join the clinical team. Prior to the enrolment of a participant, the Nominated Consultee will be asked to advise the research team on whether the patient should participate in INITIATE; this will be prospectively recorded during the electronic registration process. Thereafter, at the first appropriate opportunity when the clinical situation allows, the Nominated Consultee will provide sign off on the recorded declaration, which will include the date of their declaration.

In Scotland

We will seek 1) the patient's guardian if appointed or 2) their welfare attorney, or if not appointed then 3) the adult's nearest relative, for their consent to enter the patient into INITIATE (this person is hereafter referred to as a Deputy). They will be given sufficient information, in an understandable form, about the study and the opportunity to ask questions and discuss the research to ensure that they can make an informed decision. They will be informed that they are free to decide whether they wish to make this decision or not, and to consider what the participant would want, and to set aside their own personal views when making this decision before being asked to provide written consent.

14.5 Recovery of capacity

At the first appropriate time when a participant has regained capacity, a member of the site research team will provide the participant with the research information. The participant will be given the opportunity to ask questions and discuss the research with their family and carers for as long as they require. The participants will then be asked for their consent. If the central research team is made aware of the participant regaining capacity after they have been discharged from hospital, a member of the site research team will send a cover letter and PIS to the participant. They will then ring the participant, discuss the study and obtain verbal consent for continuation if the patient is happy to do so.

If the participant does not wish to complete study procedures they will be given the opportunity to decline to continue with the study follow-up; they will be asked if they consent to the research team using routinely collected data. Alternatively, the participant can choose to withdraw completely.

14.6 Participants who lose capacity during the study

For participants in England, Wales and Northern Ireland who lose capacity during the study, every effort will be made to find a consultee/nominated person to answer the follow-up questions on their behalf.

For participants in Scotland the patient's guardian or welfare attorney, or if not appointed, the adult's nearest relative will be approached for consent to continue. This deputy will be provided with an information sheet, and a written record will be made of their verbal declaration or consent as appropriate.

Where the consultee/nominated person does not wish to answer questions on their behalf, or where the deputy does not consent for the participant to participate in all future procedures; they can opt for the participant to remain in the study through ongoing sharing of their routinely collected personal data only. Their verbal agreement to this will be documented in the participant's medical notes and the ISF.

14.7 Re-consenting

Should there be any subsequent amendment to the final protocol which might affect a participant's participation in the study, continuing consent will be obtained using an amended consent form which

will be signed by the participant or consultee, as applicable, and copies stored in the ISF and participant's medical notes.

14.8 Optional aspects of consent

Participants in intervention hospitals will be asked if they are willing to be contacted at a later date about potential participation in an interview to discuss their perception of the intervention. Participation in these interviews is voluntary and declining to participate will not affect their inclusion in the clinical study or their clinical care. Once data saturation is reached, invitations to participation in an interview will no longer be issued.

14.9 GP notification

Permission from the participant will also be obtained to inform their GP of their inclusion in the study. An approved GP letter will be sent by the local study team, together with study information to the participant's GP informing them of their participation in the study.

14.10 Withdrawal

Throughout the course of the study, a participant may choose to withdraw early from the study at any time, without giving reasons, and without affecting their clinical care.

Withdrawal of consent means that a participant (and/or their consultee) has expressed a wish to withdraw from the study altogether or from certain aspects of the study only. The type of withdrawal will be collected on the CRF labelled 'Withdrawal'.

The Withdrawal CRF must be completed to document the reasons for withdrawal, if given, and state who the decision to withdraw was made by. Discussions and decisions regarding withdrawal must be documented in the participant's medical notes. Investigators should continue to follow-up any SAEs and should continue to report any SAEs to resolution in the CRF in accordance with the safety reporting section.

Where a participant expresses a wish to withdraw from the study, the research team will determine which aspect(s) of the study the participant wishes to withdraw from.

The aspects of the study that the participant may request to withdraw from are as follows:

1. No longer willing to complete study questionnaires
2. No longer willing to take part in qualitative aspects of study
3. No longer willing to have routine data from the medical record provided to the study

Where a participant wishes to withdraw from all aspects of study participation detailed above this will be recorded on the Withdrawal CRF as full withdrawal.

In addition to participant self-withdrawal, an investigator/clinician may decide to withdraw a participant from trial treatment for clinical reasons. Participants will still be asked to participate in the collection of follow-up data. The reason for withdrawal will be recorded on the study withdrawal case report form.

Completion of the Withdrawal CRF by the local research team will trigger a notification to the Central Study Team. Appropriate action will be taken by the study teams (centrally and by the local research team at each recruitment centre) to ensure compliance with the participant's withdrawal request. This may include marking future CRFs as not applicable and ensuring any relevant communications which the participant had consented to receive regarding their participation are no longer sent.

Data up to the point of withdrawal will be used as explained in the PIS.

15 Randomisation & Registration

Recruitment centres will be **cluster randomised** to one of the two treatment groups.

Participants will be individually **registered**.

Full details of the randomisation & registration procedure will be stored in the Randomisation and Blinding Plan in the confidential statistical section of the TMF.

15.1 Randomisation procedure

Recruitment centres will be registered to one of the following treatment groups (according to the randomisation of the cluster):

Group	Treatment
Intervention	Usual Care with additional Mobility Focused Intervention
Control	Usual Care

Clusters will be allocated in a 1:1 ratio using a computer-generated randomisation minimisation sequence. In recognition that there is national variation in adherence to current national guidelines, key metrics collected nationally to monitor site performance will be used for minimisation. Additionally, there is national variation in recruitment centre size and given that the additional physiotherapy support will not be tailored to centre size this is also important to take account for.

Allocations will be minimised for unit size (360 patients per year is the average unit size reported by NHFDs), , NHFD crude 30-day mortality data and will be generated by the study statistician, independently from the clinical team. For the centres based in Scotland the Scottish Hip Fracture Audit will be used with additional information required from individual sites if required.

We will collect Trust level baseline data on patient demographics, mortality and average length of hospital stay prior to randomisation. Cluster randomised trials recruiting incident cases are very prone to recruitment bias.³⁴ In previous studies we have overcome this by embedding recruitment into routine procedures.³⁵ In this study we will seek to ensure the recruitment team approach all consecutive admissions and document any reasons for failing to approach consecutive people.

Controlling for cluster size in this way will improve our statistical power compared to recruiting for a fixed time. Similarly, we will approach consecutive patients admitted to control sites starting two months after randomisation.

15.2 Registration procedure

Registration should take place once informed consent has been given by the participant/consultee. Eligibility will be reconfirmed at registration. Participants will be registered by the local research team via a centralised validated computer randomisation program through a secure (encrypted) web-based service, provided by the Oxford Clinical Trials Research Unit (OCTRU), accessed via the INITIATE REDCap study database.

Upon registration of a participant the central study team and a member of the site research team will be notified by an automated email.

15.3 Back-up randomisation/registration procedure

There is no back-up randomisation or registration procedure for this study.

16 Sub-Studies/Translational Studies/Mechanistic Studies

There are currently no planned sub-studies/translational studies/mechanistic studies.

17 Study Assessments/Procedures And Data Collection

The Study Flow Chart can be found in Appendix 1 of this protocol.

17.1 Overview

Table 1 shows the data collection schedule. Participants also taking part in the interview study will also have a first interview around the time of their discharge and a second interview 6 months post-discharge.

Table 1: Schedule of data collection

Assessments	Pre-consent	At time of consent/ registration	Records over Day 0 (day of surgery) to Day 7 (Intervention sites only)	30 Days post-surgery for hip fracture	120 Days post-surgery for hip fracture
Eligibility Check	*✓				
Written informed consent		✓			
Demographics, medical history, injury and treatment details		✓			
EQ-5D-5L		✓*		✓	✓
Residential Status		✓*		✓**	✓
Basic Mobility				✓**	✓
Mobility		✓*		✓	✓
Resource use		✓*			✓
Complications				✓	✓
Death				✓	✓
Intervention details			✓		

* Participants will be asked to complete the outcome measure retrospectively for pre-injury scores.

** If participant has been discharged by 30 days, outcome data will also be harvested from the discharge summary at this time-point.

17.2 Data collection

All data collected by the local research team will be entered directly into the REDCap database. Completion windows for each of the data collection time-points will be specified in the Data Management Plan.

17.2.1 Pre-consent

The local research team will collect the following information from patients' medical records to confirm eligibility:

1. Participant age
2. Confirmation of hip fracture diagnosis and cause
3. Having received or have been recommended for surgical treatment for hip fracture
4. Previous mobility status
5. Any contraindications to mobilisation
6. Any previous enrolment into the study or involvement in other hip fracture research with contralateral hip fracture

17.2.2 Baseline

Baseline data will be completed after the participant has consented and been registered. Data will be entered into the REDCap database by the local research team with the participant/consultee. The CRF includes the following participant questionnaires:

1. EQ-5D-5L Retrospective Pre-Injury
2. Modified New Mobility Score Pre-injury
3. Residential Status NHFD questions Pre-injury
4. Resource use Pre-injury

The CRF completed by the local research team includes information regarding:

1. Demographics
2. Medical history
3. Injury details
4. Treatment details

17.2.3 Intervention details

To be completed by the INITIATE physiotherapist and/or assistant over Day 0 (day of surgery) to Day 7 of the inpatient stay on an acute hip fracture ward at intervention sites only. The CRF completed includes information regarding:

1. Number of sessions provided
2. Duration of sessions provided
3. Reason if additional session is not provided

17.2.4 30-day data collection

The CRFs will be completed by participants through telephone interview or via electronic/paper questionnaire. Information provided through telephone interview will be directly entered into the study database by a member of the central study team. Information from paper questionnaires will

be transcribed into the database by a member of the central study team. For electronic completion, the participant or their consultee will be e-mailed a link by email or text. The link is unique to a participant and their timepoint/questionnaire in the study. Electronic completion of questionnaire acts as direct entry. The CRFs will include:

1. EQ-5D-5L
2. Modified New Mobility Score
3. Residential Status NHFD questions
4. Medical follow-up (complications)

The CRF completed by the local research team include information regarding :

1. Initial discharge date and destination, provision of aids/appliances, re-admission(s) and subsequent discharge.
2. Cumulated Ambulation Score at discharge
3. Complications, including data on falls up to initial discharge or 30 days post-surgery, whichever occurs soonest.

17.2.5 120-day data collection

Completion of patient CRF will be done as per 30-day data collection. The CRFs completed by the participant or their consultee include:

1. EQ-5D-5L
2. Modified New Mobility Score
3. Residential Status NHFD questions
4. Health Economics
5. Medical follow-up (complications)

17.2.6 Ad-hoc data collection

Death notification and complication forms can be completed by the local and central study teams as required between consent and 120 days post-surgery.

17.2.7 Additional data collection

The average length of in-hospital patient stay for all patients at each recruitment centre during the recruitment period will be collected. The local research team will report data on the average length of stay to the central research team at the end of the recruitment phase.

For the *internal practice review*, the usual care team will report on:

- 1a) Number of people with a hip fracture who are mobilised on the day of, or day following, hip fracture surgery.
- 1b) Reasons why mobilisation has not happened on the day of, or the day following, hip fracture surgery
- 2a) Number of people with a hip fracture who receive daily physiotherapy during days 0-7
- 2b) Reasons why a patient has not received daily rehabilitation.
- 3a) Number of people with a hip fracture who cumulatively receive at least two hours of physiotherapy over days 0-7
- 3b) Reasons why patients do not receive two hours of physiotherapy.

These questions are based on information collected in a nationally available audit tool.³⁶ The data will be collected on a locally held spreadsheet, with total numbers/reasons reported to the central research team after both 30 day periods.

17.3 Communication with study participants by the Central Study Team

If the participant or proxy chooses telephone follow-ups, the research team will attempt to ring the participant, the proxy or carer up to five times.

The team will check contact details with the recruitment centre and /or GP to send a further postal questionnaire if telephone contact has not been successful. If, after another two weeks the questionnaire is not received, a final telephone call will be attempted. If the participant or proxy is unable to be contacted at this point, then these data will be considered missed. If there are further follow up time-points, the same attempts to contact them for the subsequent assessments will be made.

For electronic follow-up, emails and/or Short Messaging Service (SMS) messages with a personalised link to an electronic questionnaire will be sent out at the time a follow-up is due. Participants or proxies who do not complete the electronic questionnaires within a specified timeframe will receive up to two reminder emails and/or SMS messages, and if this does not elicit a response, the research team will attempt to contact them via telephone and follow the schedule as outlined in the Data Management Plan.

Where a proxy has declared that they feel the patient would wish to be involved or consented for them to enter INITIATE, they will be contacted to provide follow-up data if the participant has continued loss of capacity. Where this person is no longer available or aware of the participant's quality of life and personal circumstances, an alternative carer will be approached.

Where a participant entered the study under a declaration from a professional and no person with knowledge of the participant's quality of life has been identified, we will contact the last known care provider for further follow-up. Care provider contact details from the participants medical record will be provided by the site team to the central research team when required for this purpose.

At 120 days post-surgery, if the participant or carer has indicated they have had a complication or if any information required for the CRF completion at this time point is unclear, the local research team will be asked to review medical notes to provide additional information.

Where the participant or carer cannot be contacted, or where complications are reported by a participant or carer, further information with regards to the participant's residential status and symptoms/treatment for any complications will be obtained from the participant's GP and/or the recruitment centre.

If all these methods of contact and data collection fail, then we will class the participant as a non-responder, or "lost to follow-up", for that time point.

18 Process Evaluation

Process evaluation helps us to evaluate the extent to which an intervention has been delivered per protocol (fidelity) and implemented (adherence). The process evaluation will be grounded within the current framework proposed by the MRC.⁴¹

The focus will be on the extent the intervention is or is not becoming embedded into practice. The process evaluation team will provide a process evaluation report prior to the release of the effectiveness results.

A detailed process evaluation protocol will be produced for operational purposes. Below we outline the planned formative process evaluation followed by a description of the continuation of the process evaluation into the main trial period.

The process evaluation will take place in all intervention sites. The team will gather and report on quantitative and qualitative data, based on components proposed by Steckler and Linnane.⁴² This is important to understand the context of the recruitment centres, examining aspects of the larger social, political and economic environment that may influence implementation of the content of the intervention delivered and understand why an intervention works.^{41,43}

The primary aim of the formative process evaluation, within the internal pilot sites, is to ensure we maximise recruitment into the study and minimise variations that could affect outcomes. The objectives will be:

- To document the various care pathways at individual sites that potential participants are exposed to as they enter the trial (context);
- To engage with keys stakeholders (healthcare professionals, research staff, admin staff and patients) at sites to understand their experiences of recruiting to the trial;
- To engage with the intervention teams and explore their perceived facilitators or barriers to delivering the intervention as per protocol;
- To feedback in a timely manner, during the internal pilot, findings (positive or negative) to the trial management group so appropriate actions can be discussed and changes implemented as required.

These objectives will be achieved by the process evaluation researcher spending time in the centres carrying out ethnographic type observations (taking field notes) and short interviews (with key stakeholders) including research staff, intervention staff, patients and relatives.

Main trial: Summative Process evaluation (post-internal pilot)

The overarching aims of the process evaluation are:

- To assist in the interpretation of the results of the main effectiveness trial,
- To develop a set of transferable principles regarding the intervention to inform its implementation on a wider scale.

Objectives

- To monitor implementation processes i.e., recruitment, reach, dose delivered dose received, delivery of the intervention and acceptability/use of the intervention in practice, adherence and fidelity.
- To explore participants' experiences taking part in the trial through observations and interviews.
- To explore with members of the research team and the intervention delivery teams their experiences, and possible facilitators and barriers to wider implementation.

For the summative process evaluation, the researcher will spend time within the site, making extensive field notes through observing practice, to understand the extent to which the intervention is embedded in the intervention sites and if the causal assumptions underpinning the intervention were realised. The researcher will also talk to staff and patients, carrying out interviews with key staff, patients and their key supporters including relatives and non-relatives, on at least two time points. For patients we will seek to understand how they feel about their time in hospital with an emphasis

on mobility and how they feel they are being treated in relation to being mobilised. Interviews will explore perceptions of the intervention. For the wider ward-based staff we will seek to understand how they feel about the interaction with the educational materials and subsequent interaction in patient centred mobility focused interventions as part of routine care. Interviews will explore issues surrounding early implementation (e.g., changes to practice). Follow-up interviews will explore the extent to which the intervention has been embedded into practice or not.

All potential interviewees will be provided with information and will provide fully informed consent. Paper forms will be used for the consenting process. Interviews will be a mixture of face-to-face (within the sites) or virtual via telephone or Microsoft Teams at a mutually agreeable time. We plan to carry out the interviews at two points in time. Interviews with staff will take place firstly, after a period of embedding the intervention and secondly towards the end of recruitment. Interviews with patients and key supporters will take place firstly around the time of discharge from hospital, and secondly about six months later. We will carry out a minimum of 10 interviews per site at each time-point (i.e. four ward staff, four patients and two relatives/non-relatives per site) other stakeholders may be identified during the study.

The training of the additional physiotherapy posts, number of daily physiotherapy contacts offered to patients in the intervention centre after a hip fracture (for days 0–7 post-surgery) and the number of wider ward-based team members being offered additional educational training will be recorded through site records (e.g., additional physiotherapy session offered), training records (e.g., trial training records and online monitoring of educational resource completion), data collection forms (e.g., self-reporting) observations and interviews (e.g., how they are, or are not, operationalising the intervention). These elements of the intervention will be defined as intervention fidelity.

The extent to which site staff and patients actively engage with and interact with the intervention and its resources will be captured through site records already captured through the trial data collection (e.g., duration of physiotherapy per week and wider ward-based team assessment pass rates of online educational resources), data collection forms (e.g., self-reporting) observations and interviews (e.g., why they are, or are not, operationalising the intervention). These elements of the intervention will be defined as intervention adherence.

Interviews will be recorded and transcribed. Field notes will also be transcribed. No individuals will be identified on written material. Codes or pseudonyms will be used as appropriate to protect the individuals. The qualitative data will be managed on NVivo software. Transcripts will be analysed thematically. Quantitative data will be presented as descriptive statistics in appropriate tables.

19 Blinding and Code Breaking

19.1 Blinding

There is no blinding of the intervention in the study. It will not be possible to blind participants or those delivering the interventions. The local research team reviewing hospital records can also not be blind to the treatment allocation.

19.2 Code break / unblinding

Not applicable for this study.

20 Samples

This study protocol does not involve any taking of new biological samples or any use of pre-existing samples.

21 Safety Reporting

21.1 Safety reporting period

Safety reporting for each participant will begin from registration and will end when the participant has reached their final main follow-up time point, at 120 days post-surgery.

21.2 Definitions

An adverse event (AE)	Any untoward occurrence in a clinical study participant. <i>Note: An AE can therefore be any unfavourable and unintended sign (including an abnormal laboratory finding, for example), symptom or disease temporarily associated with the study procedures, whether considered related to the procedures or not.</i>
Related Adverse Event	An event that resulted from administration of any of the research procedures
Serious Adverse Event (SAE)	Any AE that: 1. results in death 2. is life-threatening¹ 3. requires hospitalisation or prolongation of existing hospitalisation 4. results in persistent or significant disability or incapacity 5. is a congenital anomaly or birth defect; or 6. is otherwise considered medically significant by the Investigator²
Unexpected Related Serious Adverse Event	A serious adverse event related to the study (i.e. resulted from administration of any of the research procedures) and is unexpected (not listed in the protocol as an expected occurrence).

¹ Participant was at risk of death at the time of the event; it does not refer to an event which hypothetically might have caused death if it were more severe.

² Medical events that may jeopardise the participant or may require an intervention to prevent one of the above characteristics / consequences.

A distinction is drawn between serious and severe AEs. Severity is a measure of intensity whereas seriousness is defined using the criteria above. Hence, a severe AE need not necessarily be serious.

21.3 Expected adverse events

Foreseeable adverse events relating to hip fracture that will be recorded as complications include:

1. Chest Infection/Pneumonia
2. Urinary Tract Infection
3. Cerebrovascular Accident
4. Myocardial Infarction/Acute Coronary Syndrome
5. Blood transfusion
6. Acute Kidney Injury
7. Pulmonary Embolism
8. Deep Vein Thrombosis
9. Additional surgery related to the hip fracture (including intra-operative)
10. Damage to a nerve, tendon or blood vessel
11. Dislocation
12. Wound Infection
13. Failure of fixation
14. Non-union

Complications will be classified as:

1. related systemic complications (venous thromboembolic phenomena, death, pneumonia, urinary tract infection, blood transfusion, acute cerebrovascular incident, acute cardiac event, acute kidney injury).
2. related local complications (superficial/deep infection, non/mal union, dislocation, failure/removal/revision of implants including further surgery for intraoperative/postoperative periprosthetic fracture, injury to adjacent structures such as nerves/tendons/blood vessels, other).

Foreseeable adverse events relating to the intervention that will be recorded as complications include:

1. Falls resulting in head injury or fracture.

21.4 Reportable AEs/SAEs

Adverse events which are related to a hip fracture and expected before, during and after the admission for a hip fracture including standard surgical procedures, will be exempt from reporting as SAEs. Expected SAEs that are related to the interventions will also be exempt from this. These will all be recorded as complications via participants (through a bespoke patient-reported complications questionnaire) or local research staff (on a site complication CRF) but will not need to be reported immediately. These events may be checked with the participant and/or by the local research team to ensure accurate recording and avoidance of duplicate reports over the follow-up time points.

Only serious adverse events not expected as per section 21.3 considered by the site investigator to be related (possibly, probably, or definitely) to the study intervention/any of the research procedures will be reported immediately to the central study team. Collection of this safety data is proportionate to the level of risk of the study.

21.5 Non-reportable AEs/SAEs

Any events that do not meet the criteria set out in section 21.4 will not be reportable in the study:

These events include:

1. All Adverse Events (AEs) that are unrelated to the injury, intervention or treatment

2. Pre-existing disease or conditions present or detected or diagnosed before the start of the study that did not worsen (NB. Where pre-existing conditions are expected to worsen over time, these should only be reportable if they affect the ability of the participant to comply with study procedures)
3. Situations where an untoward medical occurrence has not occurred (e.g., hospitalisations for cosmetic elective surgery, social and / or convenience admissions).
4. Disease or disorder being studied, or sign or symptom associated with the disease or disorder unless more severe than expected for the participant's condition

21.6 Procedure for collecting safety events from sites/participants

Safety events will be collected from participants by the site/study research team:

1. During hospital admission following hip fracture and surgery
2. Via discussion with participants during follow-up phone calls at 30 days and 120 days*
3. Via study questionnaires completed at 30 days and 120 days*
4. From medical notes review
5. Spontaneous reporting by the participant or their representative

*If a participant reports on a study questionnaire, or during a follow up phone call, that they were admitted to hospital, this should be followed up by the central and/or local research team to determine whether an SAE should be reported and if this has already been done.

The PI should determine whether the events meet the criteria of serious per 21.2.

21.7 Reporting of SAEs from sites to the central study team

Only serious adverse events considered by the local research team to be related (possibly, probably, or definitely) to the study intervention/any of the research procedures will be reported immediately to the central study team. Such events will be reported immediately to the central study team as follows:

SAEs will be reported by the site research team using the SAE form within the REDCap study database within 24 hours of becoming aware of the event. The site will record the description, date of onset, end date, severity and assessment of relatedness to trial intervention.

The central study team is automatically notified of the SAE report through the database. A paper SAE form should be used as a back-up if the SAE form is not available electronically. This must be e-mailed to initiate@ndorms.ox.ac.uk within 24 hours of becoming aware of the event. The central study team will acknowledge receipt of any SAEs reported via e-mail within one working day and provide the site with a unique SAE Log number.

Refer to section 21.5 for events that do not require reporting.

21.8 Assessment of SAEs by the Principal Investigator (or delegate)

The PI, or delegated individual, is responsible for assessing all reported serious adverse events for seriousness, causality and expectedness. For any SAEs assessed as unexpected and potentially related, the details of the event will be reported as outlined in 21.7, within 24 hours of the local research team becoming aware of the event.

21.8.1 Relatedness/causality

The assessment of “relatedness” to the study intervention is the responsibility of the PI at site or an agreed designee according to the following definitions:

Relationship to intervention	Attribution (Causality)	Description
Unrelated	Unrelated	The AE is clearly NOT related to the intervention
	Unlikely	The AE is doubtfully related to the intervention
Related	Possible	The AE may be related to the intervention
	Probable	The AE is likely related to the intervention
	Definite	The AE is clearly related to the intervention

For the purpose of safety reporting the intervention is defined as Usual Care with additional Mobility Focused Intervention.

21.9 Review of SAEs by the Sponsor/CTU Nominated Person

The Sponsor has delegated the responsibility of reviewing SAEs to the CTU. Once an SAE report has been received from the site, causality and expectedness will be confirmed by the Chief Investigator (CI) or delegate (Nominated Person). In the event that consensus is not reached between the PI and Nominated Person about assessment of causality and expectedness, this will be escalated to the CI for further discussion. However, if no consensus decision is reached about expectedness after further discussion within one working day, and the SAE is judged to be unexpected by any one of the PI, Nominated Person or CI, the event will be classified as an unexpected event. An appropriately qualified person will review the SAE and raise any queries with the reporting site. If the site has not provided an assessment of causality and has not responded to the query, it will be assumed that the event reported is related to the study procedures/intervention. The site will be encouraged to respond and if a response is not provided the CI will be consulted by the CTU and the CTU will complete the Sponsor part of the SAE report.

21.10 Reporting of SAEs to the Research Ethics Committee (REC)

A serious adverse event (SAE) occurring to a participant should be reported to the REC that gave a favourable opinion of the study where in the opinion of the CI the event was ‘related’ (resulted from administration of any of the research procedures) and ‘unexpected’ in relation to those procedures. Reports of related and unexpected SAEs should be submitted to the REC within 15 working days of the CTU/Sponsor becoming aware of the event using the HRA report of serious adverse event form (see HRA website). All such events will also be reported to the Trial Management Group at their next

meeting. All intervention/study procedure related SAEs will be recorded and reported to the REC as part of the annual reports.

21.11 Unblinding of SAEs for reporting to the REC

Not applicable. There is no blinding in this study.

21.12 Follow-up of Serious Adverse Events

If the SAE is an unexpected and related event then follow up information must be provided as requested by the central study team until resolution. A follow-up report must be completed when the SAE resolves, is unlikely to change, or when additional information becomes available.

22 Statistical Considerations

22.1 Statistical Analysis Plan (SAP)

The statistical aspects of the study are summarised here with details fully described in a statistical analysis plan (SAP) that will be drafted early in the study and finalised prior to the final analysis data lock, or any planned interim comparative analyses. The SAP will be written by the Study Statistician in accordance with the current OCTRU Standard Operating Procedures (SOPs). The DSMC will review and, if necessary, provide input into the SAP.

22.2 Sample size / power calculations

A minimum of 2310 participants will be recruited from 22 clusters. This is based on carrying out simulations, seeking 90% power, 2-sided 5% significance, a minimum clinically important difference of 2 days on the DAH30 and an Intra-Cluster correlation (ICC) of 0.025 and average cluster size of 100, and allowing for a small amount of missing data/imbalance in cluster size. The minimum difference of 2 days is based upon our group's PPI work which indicated that 75% of patients with a hip fracture considered 'more than one day' sooner to return to their own home to be important to them. Furthermore, a minimum difference of 2 days in DAH30 has previously been used in other HTA-funded trials, including a peri-operative intervention in the hip fracture population (NIHR133467). No directly relevant estimates of the ICC have been published to our knowledge. The ICC of 0.025 was chosen based on the clustering effect anticipated with a ward-based intervention delivered by multiple health care professionals, rather than a handful of specialists, in addition to the uniformity of site cluster processes due to national best practice tariffs for hip fracture management.

The DAH30 is a numerical outcome measure with a left-skewed distribution with a spike at zero (reflecting in-hospital deaths and admission to hospital or other nursing facilities at 30 days after surgery. Hence it tends to have zero inflation. Using published data on mortality and length of stay after hip fracture surgery from Goubar et al (2021), the DAH30 was estimated to have a mean of 17.4 in this population where 3.3% die within 30 days (i.e. DAH30 of zero).¹ Using these two criteria, a distribution which matches the shape of DAH30 provided in Myles et al (2017) was generated.²¹ The operating characteristics of a comparison of the mean difference using linear regression analysis for 2 groups individually randomised trial was assessed in terms of the statistical power, and 95% confidence interval coverage. Correspondingly, the type 1 error was empirically estimated assuming no treatment effect for the same basis distribution. Performance for n=200 to n=500 per group (in increments of 50), and a one or two day increase in the DAH30 were assessed. Based upon this n=300 was found to provide >90% power with coverage of 95% (at 2-sided 5 significance level), which correspondingly maintaining type 1 error rate of 0.05 in the presence of no treatment effect. This

sample size was then inflated for clustering using an intra-cluster correlation of 0.025, average cluster size of 100 leading 2085 observations being required. This was further inflated to allow for small proportion of missing data and some minor variation in cluster size leading to 2310 participants. A very small loss to follow up is achievable because the DAH30 can be collected direct from the medical and nursing records.

22.3 Description of statistical methods

The statistical methods used for the analysis will be described fully in a separate Statistical Analysis Plan (SAP). Results will be reported in line with the CONSORT statement and any appropriate extensions.

Analyses will be conducted using Stata (StataCorp LP, www.stata.com) or R (<https://cran.r-project.org/>) or other well-validated statistical software.

23 Primary Outcome

The association of the primary outcome (DAH-30) with the treatment allocation will be analysed with linear regression with cluster robust variance adjusted for minimisation variables and any systematic variation identified at baseline. This analysis will estimate the mean difference of DAH30 between the intervention and the control group and the associated confidence interval. Standard descriptive statistics will be used to summarise the baseline characteristics by treatment group using means with standard deviations or medians with interquartile ranges as appropriate for continuous variables and numbers with percentages for binary or categorical variables.

23.1.1 Secondary outcome(s)

Secondary outcomes will be analysed in a similar manner, with appropriate models dependent on the outcome type and using cluster robust variance estimation. A repeated measures analysis will be used for the secondary outcomes collected at multiple time points.

23.2 Inclusion in analysis

Reflecting the ITT principle, the primary and secondary analyses will assume that patients received the intervention allocated at the cluster level, and will encompass all patients who have consented to take part in the study at baseline.³⁷ Consent rates will be compared between randomised groups to explore potential for bias.

23.3 Subgroup analysis

There are no proposed subgroup analyses planned.

23.4 Interim analyses

No formal interim analyses of treatment effect are planned for any of the study outcomes.

23.5 Level of statistical significance

Outcome analyses will be reported with 95% confidence intervals and a significance level of 5% will be used to test statistical significance.

23.6 Procedure for accounting for missing data

The procedure for handling spurious or missing data will be described fully in the SAP. The study will attempt to collect data as completely as possible.

Missing data will be summarised, and patterns analysed. The main analyses will be performed on an available case basis. Sensitivity analyses using multiple imputation under a missing not at random assumption will be conducted to explore the impact of missing data on the primary outcome results.

The sample size calculation also incorporated an inflation to account for potential loss to follow-up or patient death.

23.7 Procedures for reporting any deviation(s) from the original statistical analysis plan

Any proposed changes / deviation(s) from the original SAP will be included in an updated protocol, updated SAP, and/or reported in the final statistical report as appropriate to the timing of the changes.

23.8 Internal pilot/decision points

An internal pilot is planned that will progress seamlessly to the definitive study if predefined progression criteria are reached. Data from the internal pilot trial will contribute to the final analysis. The purpose of the internal pilot is to assess the feasibility of recruitment, adherence and fidelity.

Stop-go criteria will be reviewed approximately 4 months after the initial 8 sites have opened to recruitment.

Stop-go criteria for the pilot phase are given in table 2 together with the definitions of how each will be measured.

Table 2: stop-go criteria for internal pilot

Progression criteria	Red	Amber	Green
Number of recruits per centre per month	<4	4–7	8
Number of recruitment centres opened	<3	3–5	6
Total number of participants recruited	<112	112–223	224
% fidelity: Offer of physiotherapy	<50%	≥50%, <100%	100%
% adherence: Takes part in physiotherapy	<50%	≥50%, <100%	100%
% adherence: Completes educational training	<50%	≥50%, <100%	100%

Fidelity will be defined as:

1. Physiotherapists offering an additional daily in-patient treatment session to patients after hip fracture surgery during the inpatient stay on an acute hip fracture ward (denominator is consented participants)
2. Wider ward-based team being offered educational training to enhance mobility activities. (denominator is average number of nursing and health care assistant staff members during the first week of recruitment) – This will be offered to all staff via an email at site opening, so 100% will be offered at the start of the trial intervention period.

Adherence will be defined as:

1. Participants: Take part in the additional physiotherapy treatment sessions.
2. Ward-based staff completing the additional educational training. Completion of training will be demonstrated through the passing of an assessment. (denominator is

average number of nursing and health care assistant staff members during the first week of recruitment)

The TMG will closely monitor the progression criteria during the internal pilot, and together with the TSC and DSMC will perform a full review towards the end of the internal pilot. The TSC will provide recommendations to the funder with regards the progression of the study.

The internal pilot study will mirror the procedures and logistics undertaken in the main definitive study. It is intended that the study will progress seamlessly into the main phase, with internal pilot participants included in the final analysis. Should a decision be made to stop the study, all participants will be followed up per protocol.

24 Health Economic Evaluation

We will integrate a prospective economic evaluation into the study, applying a UK NHS and Personal Social Services (PSS) perspective, informed by the NICE Reference Case.³⁸ The economic evaluation will compare usual care versus usual care with the additional ward-based mobility focused intervention by capturing patient resource use and health-related quality-of-life outcomes over the 120-day post-diagnosis of hip fracture period. Economic costs directly associated with the mobility focused intervention, including staff inputs, equipment costs and follow-on management will be captured through the trial case report forms. Broader resource utilisation will be captured through: (1) routine health service data collection systems and (2) patient questionnaires administered at baseline and each follow-up assessment point. Unit costs will be applied to resource use values and will be sourced using either national reference sources or derived local values where necessary. EQ-5D-5L responses will be used to generate quality-adjusted life years (QALYs) using the UK value set recommended by NICE at the time of analysis.³⁹ Baseline (pre-injury) scores will be used in the construction of QALYs and as an adjusting covariate within regressions.^{40,41}

Mechanisms of missingness of data will be explored, and (as appropriate) imputation sets will be used. Bivariate regression of costs and QALYs, with (where appropriate) multiple imputation of missing data, will be conducted to generate within-trial estimates of incremental cost-effectiveness associated with the additional ward-based mobility focused intervention. Sensitivity analyses will be undertaken to assess the impact of areas of uncertainty surrounding components of the economic evaluation. The sensitivity analyses will include re-estimation of cost-effectiveness based on cases with complete data, and re-estimation of cost-effectiveness assuming a broader societal perspective. The analysis will generate estimates of incremental cost per QALY associated with the additional ward-based mobility focused intervention, cost-effectiveness planes and cost-effectiveness acceptability curves. If incremental costs and benefits are not convergent within the trial duration, we will develop a long-term decision analytical model. All economic analysis will be prospectively planned and detailed within a '*Health Economic Analysis Plan*' and signed off by the CI.

25 Data Management

The data management aspects of the study are summarised here with details fully described in the study-specific Data Management Plan (DMP).

25.1 Source data

Source documents are where data are first recorded, and from which CRF data are obtained. Source data is outlined in section 9.

25.2 Location of source data

The location of source data in the study is listed in the tables within the section 9.

25.3 Case report forms (CRFs)

The PI and local research teams will ensure that data collected on each participant is recorded in the CRF as accurately and completely as possible. All appropriate data, summary reports and Investigator observations will be transcribed into the CRFs from the relevant source data held in the site medical record(s).

All documents will be stored safely in confidential conditions. On all study-specific documents, other than the signed consent, the participant will be referred to by the study participant number/code, not by name.

25.3.1 Source data to be recorded directly on the CRFs

CRF entries will be considered source data if the CRF is the site of the original recording (e.g. there is no prior written or electronic record of data).

25.4 Non-CRF data

Audio recordings of qualitative interviews will be made digitally on password-protected devices. They will be transcribed by an appropriately trained member of the central research team, and the de-identified transcriptions stored on secure servers at the University of Warwick, identified by a study ID and/or initials only.

25.5 Access to data

To ensure compliance with regulations, direct access will be granted to authorised representatives from the Sponsor and recruitment centres to permit study-related monitoring, audits and inspections. The data submitted by study participants directly via the study database (i.e. electronic participant reported outcomes) will also be made available to the recruitment centre that recruited the participant; this is detailed within the PIS so that participants are aware of who will have access to this data.

Members of the study team will only be able to access data that they need to, based on their roles and responsibilities within the study.

25.6 Data recording and record keeping

The case report forms will be designed by members of the study management team which will include the Chief Investigator, study statistician(s) and study manager.

Data will, wherever possible, be collected in electronic format with direct entry onto the study database by site staff or participants. Electronic data collection has the major advantage of building “data logic” into forms, minimising missing data, data input errors and ensuring the completeness of consent and assent forms. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

All data entered will be encrypted in transit between the client and server. All electronic patient-identifiable information, including electronic consent forms, will be held on a server located in an access-controlled server room at the University of Oxford.

The database and server are backed up to a secure location on a regular basis. Details of the data collected, where it is stored and who has access to it along with a fair processing statement will be available for the participants within the study participant information sheet.

Direct access to source data/documents will be required for study-related monitoring and/or audit by the Sponsor, research team or NHS Trust or regulatory authorities as required.

Data captured during phone calls to participants or from paper-based study questionnaires returned to the central study team will be entered into the study database by suitably trained central study team members. Full details of this process will be recorded in the Data Management Plan. Identifiable data will only be accessible by members of the research team with a demonstrated need (managed via access controls within the application) and only used to communicate with the participant (e.g. sending follow-up reminders for online form completion or telephone follow-up).

Refer to section 28.3 for details about retention of participant identifiable data.

25.7 Electronic transfer of data

Any electronic transfer of data during the course of the study will be strictly controlled in accordance with the Oxford Clinical Trial Research Unit's (OCTRU) Standard Operating Procedure for Secure Information/Data Transfer.

26 Quality Assurance Procedures

A rigorous programme of quality control will be implemented. The study management group will be responsible for ensuring adherence to the study protocols at the study sites. Quality assurance (QA) checks will be undertaken by OCTRU to ensure integrity of randomisation, study entry procedures and data collection. The OCTRU has a QA team who will monitor this study by conducting audits of the Trial Master File. Furthermore, the processes of obtaining consent, randomisation, registration, provision of information and provision of treatment will be monitored by the central CTU study team. Additionally, the study may be monitored, or audited by Sponsor or host sites in accordance with the current approved protocol, GCP, relevant regulations and SOPs.

A study-specific data management and monitoring plan will be in place prior to the start of the study.

26.1 Risk assessment

This protocol is designed to deliver a risk-adapted approach to conducting the research. A risk assessment has been conducted and a monitoring plan will be prepared before the study opens. The known and potential risks and benefits to participants have been assessed in comparison to those of standard of care. A risk management strategy is in place and will be reviewed and updated as necessary throughout the study or in response to outcomes from monitoring activities. Monitoring plans will be amended as appropriate.

26.2 Study monitoring

Monitoring will be performed by the central study team according to a study-specific monitoring plan.

Data will be evaluated for compliance with the protocol, completeness, and accuracy. The PI and institutions involved in the study will permit study-related monitoring and provide direct on-site access to all study records and facilities if required. They will provide adequate time and space for the completion of monitoring activities.

Recruitment centres will be monitored centrally by checking incoming data for compliance with the protocol, consistency, completeness, and timing. The CRF data will be validated using appropriate set criteria, range, and verification checks. The recruitment centre must resolve all data queries in a timely manner as specified in the Site Initiation Visit slides. All queries relating to key outcome and safety data and any requiring further clarification will be referred to the study site for resolution.

Recruitment centres will also be monitored remotely and/or by visit, as necessary, to ensure their proper conduct of the study. The central study team will be in regular contact with local research teams to check on progress and deal with any queries that they may have. Any monitoring reports/data discrepancies will be sent to the site in accordance with OCTRU SOPs and the study monitoring plan. The PI is expected to action any points highlighted through monitoring and must ensure that corrective and preventative measures are put into place as necessary to achieve satisfactory compliance, within 28 days as a minimum, or sooner if the monitoring report requests.

26.3 Audit and regulatory inspection

All aspects of the study conduct may be subject to internal or external quality assurance audit to ensure compliance with the protocol, GCP requirements and other applicable regulation or standards. Such audits or inspections may occur at any time during or after the completion of the study. PIs and their host Institution(s) should understand that it is necessary to allow auditors direct access to all relevant documents, study facilities and to allocate their time and the time of their staff to facilitate the audit visit. Anyone receiving notification of an audit that will (or is likely to) involve this study must inform the central study team without delay.

27 Study Committees

27.1 Trial Management Group (TMG)

A Trial Management Group (TMG) will be established for the study and operate in accordance with a study specific TMG charter.

The day-to-day management of the study will be the responsibility of the Trial Manager, supported by a Senior Trial Manager. This will be overseen by the Trial Management Group (TMG), who will meet monthly to assess progress.

Other specialities/ individuals will be invited as required for specific items/issues.

27.2 Data and Safety Monitoring Committee (DSMC)

An independent Data & Safety Monitoring Committee (DSMC) will be established for this study. The DSMC is a group of independent experts external to the study who assess the progress, conduct, participant safety and, if required critical endpoints of a clinical trial. The study DSMC will adopt a DAMOCLES charter which defines its terms of reference and operation in relation to oversight of the study. They will also review accruing data and summaries of the data presented by treatment group and will assess the screening algorithm against the eligibility criteria. They will also consider emerging

evidence from other related studies or research. The DSMC will review the safety data generated, including all safety data and make recommendations as to whether the protocol should be amended to protect patient safety. Recommendations of the DSMC will be discussed between the CI, TSC, and the Sponsor.

The DSMC will meet regularly throughout the study at time-points agreed by the Chair of the Committee and the Chief Investigator. At a minimum this will be on an annual basis during the recruitment phase of the study. Full details including names will be included in the DSMC charter.

27.3 Trial Steering Committee (TSC)

The TSC, which includes independent members, provides overall supervision of the study on behalf of the funder. The TSC will act in accordance with a TSC charter which will outline its roles and responsibilities. Full details including names will be included in the TSC charter. Meetings of the TSC will take place at least once a year during the recruitment period. An outline of the remit of the TSC is to:

1. monitor and supervise the progress of the study towards its interim and overall objectives
2. review at regular intervals relevant information from other sources
3. consider the recommendations of the DSMC
4. inform the funding body on the progress of the study

The TSC will consider, and act, as appropriate, upon the recommendations of the DSMC.

The TSC will include at least one PPI representative as an independent member.

28 Identification and Management of Participating Sites

28.1 Identification of recruitment sites

Recruitment centres will be selected based on suitability to conduct the study. An invitation pack which includes a Site Feasibility Questionnaire (SFQ) will be provided to potential centres. The SFQ may be completed by an individual with adequate, authoritative knowledge of the centre (where a centre is known to the central study team through previous research enterprises the SFQ may be part-completed in advance). The PI or an appropriate deputy must confirm participation and the accuracy of any SFQ submitted to the central study team.

The central coordinating study team will evaluate returned SFQs to ensure a recruitment centre is equipped with appropriate resources to deliver the project and meet recruitment targets. Confirmation of collaboration will be provided in writing to the PI.

28.2 Study site responsibilities

The PI has overall responsibility for the conduct of the study but may delegate responsibility where appropriate to suitably experienced and trained members of the site research team. All members of the site research team must complete delegation log provided by the central study team prior to undertaking any study duties. The PI must countersign and date each entry in a timely manner, authorising staff to take on the delegated responsibilities.

28.3 Study site set up and activation

The PI leading the recruitment centre is responsible for providing all required core documentation. Mandatory training which is organised by the central study team (see below) must be completed

before the site can be activated. Training in the study processes will be administered at site initiation visits delivered either in person or online by the central study team. The central study team will check to confirm that the site has all the required study information/documentation and is ready to recruit. The site will then be notified once they are activated on the study database and are able to begin recruiting participants.

28.4 Training

Training in the study processes will be administered at site initiation visits (delivered face to face or online) online by the central study team.

28.5 Study documentation

The central study team will provide an electronic Investigator Site File to each participating site containing the documents needed to conduct the study. The central study team must review and approve any local changes made to any study documentation including patient information and consent forms prior to use. Additional documentation generated during the course of the study, including relevant communications must be retained in the site files as necessary to reconstruct the conduct of the study.

29 Ethical and Regulatory Considerations

29.1 Declaration of Helsinki

The PI will ensure that the study is conducted in accordance with the principles of the Declaration of Helsinki.

29.2 Guidelines for Good Clinical Practice

The PI will ensure that the study is conducted in accordance with relevant regulations and with the principles of Good Clinical Practice.

29.3 Ethical conduct of the study and ethical approvals

The protocol, patient information sheet, informed consent form and any other information that will be presented to potential study participants (e.g., advertisements or information that supports or supplements the informed consent process) will be reviewed and approved by an appropriately constituted, independent Research Ethics Committee (REC).

29.4 NHS Research Governance

Once HRA & HCRW approval is in place for the study, sites will confirm capability and capacity to participate in the study.

29.5 Protocol amendments

All amendments will be generated and managed according to the central study team standard operating procedures to ensure compliance with applicable regulation and other requirements. Written confirmation of all applicable REC and local approvals must be in place prior to implementation by PIs as applicable for the amendment type. The only exceptions are for changes necessary to eliminate an immediate hazard to study participants (see below).

It is the PI's responsibility to update participants (or their authorised representatives, if applicable) whenever new information (in nature or severity) becomes available that might affect the

participant's willingness to continue in the study. The PI must ensure this is documented in the participant's medical notes and the participant is re-consented if appropriate.

29.6 Protocol compliance and deviations

Protocol compliance is fundamental to GCP. Prospective, planned deviations or waivers to the protocol are not allowed. Changes to the approved protocol need prior approval unless for urgent safety reasons.

A study related deviation is a departure from the ethically approved study protocol or other study document or process or from GCP or any applicable regulatory requirements. Deviations from the protocol will be captured within the study database either using a protocol deviation form or via suitably designed fields within the CRF which will be extracted from the study database and filed in the study master file. Protocol Deviations will be reviewed regularly by the Trial Management Group (TMG), who will decide on a case-by-case basis if a protocol deviation is considered important. Deviations will be handled and reviewed in a timely manner in accordance with a study-specific Data Management and Monitoring Plan and with the parameters set out by the relevant SOPs issued by OCTRU.

The PI must promptly report any important deviation from Good Clinical Practice or protocol to the central study team. Examples of important deviations are those that might impact on patient safety, primary/ secondary endpoint data integrity, or be a possible serious breach of GCP (see section 27.9).

29.7 Urgent safety measures

The Sponsor or local investigators may take appropriate urgent safety measures to protect study participants from any immediate hazard to their health or safety. Urgent safety measures may be taken without prior authorisation. The study may continue with the urgent safety measures in place.

The local investigator must inform the central study team IMMEDIATELY if the study site initiates an urgent safety measure.

The notification must include:

1. Date of the urgent safety measure;
2. Who took the decision; and
 1. Why the action was taken.

The local investigator will provide any other information that may be required to enable the central study team to report and manage the urgent safety measure in accordance with the current regulatory and ethical requirements for expedited reporting and close out. The central study team will follow written procedures to implement the changes accordingly.

29.8 Temporary halt

The Sponsor and PIs reserve the right to place recruitment to this protocol on hold for short periods for administrative reasons **or** to declare a temporary halt. A temporary halt is defined as a formal decision to:

2. interrupt the treatment of participants already in the study for safety reasons;
3. stop recruitment on safety grounds; or
 1. stop recruitment for any other reason(s) considered to meet the substantial amendment criteria, including possible impact on the feasibility of completing the study in a timely manner.

The central study team will report the temporary halt via an expedited substantial amendment procedure. The study may not restart after a temporary halt until a further substantial amendment to re-open is in place. If it is decided not to restart the study this will be reported as an early termination

29.9 Serious breaches

A “serious breach” is a breach of the protocol or of the conditions or principles of Good Clinical Practice which is likely to affect to a significant degree –

1. the safety or physical or mental integrity of the study subjects; or
2. the scientific value of the research.

The central study team must be notified within one working day if any serious breach of GCP is suspected. The central study team will review the event and, if appropriate will report a serious breach to the REC and the NHS host organisation within 7 days of the Central study team becoming aware of the breach.

29.10 Study reports

This protocol will comply with all current applicable Research Ethics Committee, HRA, Host Organisation, Sponsor and Funder reporting requirements as applicable.

29.11 Transparency in research

Prior to the recruitment of the first participant, the study will be registered on a publicly accessible database (ISRCTN), which will be kept up to date during the study, and results will be uploaded to the registry within 12 months of the end of the study declaration. A final report will be submitted to the REC containing a lay summary of the study results which will be published on the HRA website.

The results of the study will be published and disseminated in accordance with section 35

29.12 Use of social media

Social media (e.g. Twitter feeds) may be utilised to promote the study, and acknowledge when milestones are met (e.g. recruitment centre open to recruitment, first recruitment by a recruitment centre etc).

30 Participant Confidentiality

Identifiable information will be kept on a separate database to the study data, with the exception of date of birth (DOB) which is recorded in the Baseline and Registration CRFs. All documents will be stored securely and only accessible by study staff and authorised personnel. The study staff will safeguard the privacy of participants’ personal data.

30.1 Collection and use of personal identifiable information

Identifiable data of participants will be limited to contact details (including name, address including postcode, email addresses, NHS/CHI/H&C number, sex at birth, and telephone numbers), and will be accessed separately from the outcome data obtained from/about the participants and managed within the rules of the clinical database system. The Baseline and Registration forms will record DOB. Paper forms with identifiable data will not be collected. In all other data, participants will be identified by a study ID only.

Contact details will be collected in this study for the following purposes, and where an activity is optional, only with the specific consent of the participant (or consultee):

1. Sending of follow-up questionnaires and any reminder messages
2. Sending text messages regarding follow-up questionnaires
3. Sending of text messages
4. Sending a copy of the completed consent form by e-mail (for any participants that consent electronically and wish to receive a copy by e-mail)
5. Sending of questionnaires direct to participant's homes
6. Qualitative research interviews

The patient information sheet explains what contact details will be collected and how these will be used; explicit consent will be obtained for this.

Local research teams will ensure that contact details for study participants are up to date when participants attend for study visits.

30.2 Use of audio/visual recording devices

Audio recordings of qualitative interviews will be made digitally on password-protected devices. They will be transcribed by an appropriately trained member of the central research team, and the de-identified transcriptions stored on secure servers at the University of Warwick, identified by a study ID and/or initials only, will only be accessible to the CI and those members of the research team who have been authorised to do so by the CI. The audio recordings will be retained for 12 months after transcription and then deleted. It is necessary to retain the recordings for this period as they are the source data and help us to interpret participants' responses. Access to them is required in case these are needed to refer back to these during the analysis. The recordings will form a key part of interpretation of participants' responses and will inform analysis. This is relevant to both interviews with patient participants and therapists. In the unlikely scenario that external transcription services are sought, a confidentiality agreement will be in place between the Sponsor and the transcriber, who will also be on the InfoSec third party register.

30.3 Storage and use of personal data

Personal data during the study will be stored and used in accordance with the OCTRU SOP for confidentiality, protection and breach of personal data in relation to research subjects. This ensures that all personal data collected during the study is recorded, handled and stored in such a way that is satisfies the requirements of the UK General Data Protection Regulation (GDPR) and requires data to be anonymised as soon as it is practical to do so.

All electronic patient-identifiable information will be held on a secure, password-protected database accessible only to authorised personnel. Paper forms with patient-identifiable information will be held in secure, locked filing cabinets within a restricted area. The processing of the personal data of participants will be minimised wherever possible by the use of a unique participant study number on study documents and any electronic databases.

Personal data on all documents will be regarded as confidential. The study staff will safeguard the privacy of participant's personal data.

The use of all personal data in the study will be documented in a study-specific data management and sharing plan which details what and where personal data will be held, who will have access to the data, when personal data will be anonymised and how and when it will be deleted.

The recruitment centre will maintain the patient's anonymity in all communications and reports related to the research.

Data Breaches will be highlighted to the relevant site staff and reported as required by the UK GDPR and Data Protection Act 2018. This will also be deemed a protocol deviation.

30.4 Access to participants' personal identifiable data during the study

Direct access to source data/documents will be required for study-related monitoring and/or audit by the Sponsor, NHS Trust or regulatory authorities as required.

Access to participant's personal identifiable data will be restricted to individuals authorised to have access. This includes a) members of the research team at participating study sites with delegated responsibility by the site PI and b) members of the central CTU study team involved in the conduct/management of the study where this is necessary for their role.

Research staff that are not part of the participant's direct healthcare team will not have access to personal identifiable data until the participant has given their consent to take part in the study or the participant has indicated to their direct healthcare team that they wish to be contacted by a member of the site research team – permission for this will be recorded in the participant's medical notes.

The patient information sheet clearly describes who will have access to the participant's personal identifiable data during the study.

Participants will be asked to consent to relevant sections of their medical notes and data collected during the trial being looked at by individuals from the University of Oxford, from regulatory authorities [and from the NHS Trust(s)], where it is relevant to their taking part in this trial; only authorised individuals will be granted access where this is necessary for their role.

30.5 Destruction of personal identifiable data

Explicit consent for the storage and use of personal identifiable data (which includes consent forms) will be obtained from participants as detailed in the Participant Information Sheet and Informed Consent Form.

Personal identifiable data will be destroyed as soon as it is no longer required – the time point for this destruction is detailed in the study data management plan and is in accordance with OCTRU SOPs which comply with the UK GDPR.

30.6 Participant identification log

The recruitment centre must keep a separate log of enrolled patients' personal identification details as necessary to enable them to be tracked. These documents must be retained securely, in strict confidence. They form part of the Investigator Site File and are not to be released externally.

31 Public and Patient Involvement

31.1 PPI in study design and protocol development

This study has been developed with Patient and Public involvement from the UK Musculoskeletal Trauma PPI group, two members of which were co-applicants on the grant application.

This study is in response to a NICE research recommendation (CG124, research recommendation 4) and addresses the NIHR themed call 'Complex Health and Care Needs in Older People'. The importance of this question was confirmed during a James Lind Alliance PPI and healthcare partnership in which patients and their carers clearly identified inpatient mobilization as a top priority for research. CI

Professor Costa and Lead Investigator Professor Kearney, co-applicant Dr Keene and PPI co-applicants Mr. Grant and Mrs. McGibbon took part in this James Lind Alliance Partnerships.

Following the James Lind Alliance priority setting partnership, in line with INVOLVE guidelines, the research team consulted with an established lay group that form part of the World Hip Trauma Evaluation (WHiTE) platform and secured broader engagement through the UK Musculoskeletal Trauma PPI Group. Their views were sought regarding proposed study designs and processes, specifically the choice of primary outcome measure and the follow-up process.

31.2 PPI during the study

The PPI co-applicants (Mr Grant and Mrs McGibbon) are an integral part of the team and have equal voice and representation on the TMG. They will be invited to the monthly TMG meetings to offer insight and perspective throughout the lifecycle of the study. Mr Grant and Mrs McGibbon will have peer-support from 30 people members of the established UK Musculoskeletal Trauma PPI group.

The PPI co-applicants and associated reference group will make substantial contributions to decision making, design and study materials at all stages of the trial. This will be important throughout but particularly for patient facing materials and dissemination activities, to ensure that they are sufficiently informative.

A further lay member will be recruited to join the independent TSC.

The PPI members of the research team will have access to training materials through the Oxford BRC as well as day-to-day support from the Co-Chief Investigators and the rest of the research team.

31.3 Dissemination of study results

Patient representatives will lead dissemination to the patients and carers directly through their extensive network of patient advocacy organisations including the Royal Osteoporosis Society. They will help generate plain language summaries for patients and the public. These documents will be available in multiple mediums. Posters, abstracts and oral presentations will also be prepared with the PPI team for inclusion at any workshop or conference where relevant PPI is being discussed. In addition, to disseminate directly to participants, findings will be more widely available locally through posters in appropriate outpatient rooms and liaising with identified service user groups.

Findings of the study will be made available to participants via the CTU website and social media.

Patients and the public will be informed about the results through lay presentations at patient conferences and patient support networks. There will be collaboration with health care professionals and health care planners to ensure the results help to shape future guidelines. The results will be published in relevant academic journals and present at national meetings.

32 Expenses/Payments to Participants

All research activity is conducted during routine standard of care visits; no payments will be made to study participants for taking part in this study.

33 Sponsorship, Finance and Insurance

33.1 Sponsorship

The Sponsor will provide written confirmation of Sponsorship. A separate study-specific Division of Responsibilities will outline the responsibilities of the Chief Investigator, Sponsor and OCTRU.

33.2 Funding and support in kind

The table below provides a summary of all funding and support in kind for the study.

Funder(s)	Financial and non-financial support given
National Institute for Health and Care Research, Health Technology Assessment. NIHR134681	Funding for study conduct

33.3 Insurance

The Sponsor (University of Oxford) has a specialist insurance policy in place which would operate in the event of any participant suffering harm as a result of their involvement in the research (Newline Underwriting Management Ltd, at Lloyd's of London). NHS indemnity operates in respect of the clinical treatment that is provided.

Non-negligent harm is not covered by the NHS indemnity scheme.

In exceptional circumstances an ex-gratia payment may be offered.

34 Contractual Arrangements

Appropriate contractual arrangements will be put in place with all third parties.

This study is subject to the Sponsor's policy requiring that written contracts/agreements are agreed formally by the participating bodies as appropriate.

The Sponsor will also set up written agreements with any other external third parties involved in the conduct of the study as appropriate.

35 Publication and Dissemination

The PIs will be involved in reviewing drafts of the manuscripts, abstracts, press releases and any other publications arising from the study.

The contractor (North Bristol NHS Trust) will retain ownership of all data arising from the study, but will provide academic license to use the study results to all collaborating parties.

Publication and dissemination of study results will be in accordance with OCTRU SOPs and irrespective of study findings.

The study protocol will be made available in an open-access setting in accordance with the Standard Protocol Items: Recommendations for Interventional Trials statement (SPIRIT, www.spirit-statement.org/). The study results will be published in an open-access journal, in accordance with the NIHR's policy on open-access research. The study will be reported following the Consolidated Standards of Reporting Trials guideline (CONSORT) including any applicable extensions to this. The Template for Intervention Description and Replication (TIDieR) statement will be used for reporting the intervention.

35.1 Study results

All data will be presented such that no individual participants can be identified.

Dissemination of study results to participants

A summary of the study results for study participants will be written collaboratively with clinicians and patient representatives and distributed accordingly. The PIS includes a link to the study website where participants will be advised that the results will be published. Newsletters, Facebook, Twitter etc. will also be used to ensure the results of the study. are communicated to the wider community once they are available.

Dissemination of results will include the following methods:

Conference: The results of this study will be disseminated to the clinical community via presentations at national and international meetings. Traditional conference dissemination will focus on presentations to include the key professional stakeholders. It is expected that findings from this study will be presented at national and international conferences.

Publications: Results will usually be published in peer-reviewed journals. Where possible, plain English summaries will be published alongside the full paper, along with links to other digital media on the study website to explain the study result in an accessible format – i.e. an explainer video and infographic.

Public Dissemination: To ensure a broad campaign a range of social media outlets will be targeted (this may include an explainer video and infographic). Engagement with the NHS Dissemination centre will be sought along with publishing 'digital story' as part of the 'NIHR Signal'.

The wider public will be alerted via links with relevant organisations/charities, and the Research Media Offices. Engagement with the NIHR Dissemination Centre will also be sought, to ensure global awareness of study findings. Moreover, the University of Oxford and Oxford University Hospitals NHS Trust have professional communication officers. It is anticipated that together these individuals, and NIHR equivalents, we will agree upon effective communication strategies including co-ordinated press releases, interviews etc.

35.2 Authorship

Authorship of any publications arising from the study will be determined in accordance with the ICMJE guidelines and any contributors acknowledged accordingly.

All publications arising from this study will acknowledge the contribution of participants, funder(s), OCTRU, NDORMS and the Sponsor.

36 Development of a New Product/Process or the Generation of Intellectual Property (IP)

All Foreground IP will vest in and be owned by the Lead Party (North Bristol NHS Trust) and Research Data will be owned or controlled by University of Oxford.

No restricted background was registered with NIHR under the Schedule B of the main contract between the contractor and funder.

37 Archiving

Documents and electronic systems will be archived as per the appropriate SOPs as prepared by OCTRU.

37.1 Minimum mandatory archiving period

It is the University of Oxford's policy to store data for a minimum of 3 years following publication. Pls may not archive or destroy study essential documents without written instruction from the central study team.

Contact details will be retained for 12 months after the end of the study. Electronic de-identified study data will be retained for three years after final publication of the study.

37.2 Archiving responsibilities/procedure

During the study and after study closure the PI must maintain adequate and accurate records to enable the conduct of a clinical study and the quality of the research data to be evaluated and verified. All essential documents must be stored in such a way that ensures that they are readily available, upon request for the minimum period as specified above.

38 CTU Trial Master File

All paper and electronic data including the Trial Master File and study database will be retained and archived in accordance with OCTRU's SOPs which are compliant with the UK GDPR.

38.1.1 Investigator Site File and participant medical records

The Investigator Site Files will be archived at the recruitment centre. The medical files of study participants must be retained for the mandatory archiving period stated above and in accordance with the maximum period of time permitted by the participating site. Recruitment centres must comply with the documentation retention specified in the clinical trial agreements (or equivalent) issued by the trial Sponsor.

38.2 Retention of data sets

Trial data and associated metadata will be held electronically in a suitable format on a secure server maintained and backed up to the required standard defined by OCTRU's policies and procedures at the time of archiving. Access will be restricted to the responsible Archivist and will be controlled by a formal access request. On completion of the mandatory archiving period the TMF and associated archived data sets will be destroyed or transferred as appropriate, according to any data sharing requirements.

39 Data Sharing

The study statistician and health economist may retain copies of anonymised datasets for the purpose of data sharing in accordance with the study data sharing plan.

39.1 Retention of anonymised datasets

Anonymised research data may be shared with other organisations on request to the CI and in accordance with the data sharing policies of OCTRU, the Sponsor and funder(s).

40 References

- 1 Johnell O, Kanis JA. An estimate of the worldwide prevalence, mortality and disability associated with hip fracture. *Osteoporosis International* 2004;**15**:897–902. <https://doi.org/10.1007/s00198-004-1627-0>.
- 2 NHFD 2019 annual report. n.d. URL: <https://www.nhfd.co.uk/20/hipfracturer.nsf/docs/2019Report> (Accessed 9 February 2023).
- 3 Friedman SM, Menzies IB, Bukata S V., Mendelson DA, Kates SL. Dementia and Hip Fractures. *https://doi.org/10.1177/2151458510389463* 2010;**1**:52–62. <https://doi.org/10.1177/2151458510389463>.
- 4 Physicians RC of. *Recovering after a hip fracture: helping people understand physiotherapy in the NHS | RCP London*. n.d. URL: <https://www.rcplondon.ac.uk/projects/outputs/recovering-after-hip-fracture-helping-people-understand-physiotherapy-nhs> (Accessed 9 February 2023).
- 5 NICE. Hip fracture: management (CG124) 2017.
- 6 Kimmel LA, Liew SM, Sayer JM, Holland AE. HIP4Hips (High Intensity Physiotherapy for Hip fractures in the acute hospital setting): a randomised controlled trial. *Med J Aust* 2016;**205**:73–8. <https://doi.org/10.5694/MJA16.00091>.
- 7 Goubar A, Martin FC, Potter C, Jones GD, Sackley C, Ayis S, *et al*. The 30-day survival and recovery after hip fracture by timing of mobilization and dementia. *Bone Joint J* 2021;**103-B**:1317–24. <https://doi.org/10.1302/0301-620X.103B7.BJJ-2020-2349.R1>.
- 8 Handoll HHG, Sherrington C, Mak JCS. Interventions for improving mobility after hip fracture surgery in adults. *Cochrane Database Syst Rev* 2011;**3**:.
- 9 Goubar A, Ayis S, Beaupre L, Cameron ID, Milton-Cole R, Gregson CL, *et al*. The impact of the frequency, duration and type of physiotherapy on discharge after hip fracture surgery: a secondary analysis of UK national linked audit data. *Osteoporosis International* 2022;**33**:839–50. <https://doi.org/10.1007/S00198-021-06195-9/TABLES/2>.
- 10 Chartered Society of Physiotherapy. *Standards for hip fracture rehabilitation 2018*. n.d. URL: [https://www.csp.org.uk/system/files/publication_files/001563_Hip Fracture Standards_Full version_A4_V4.pdf](https://www.csp.org.uk/system/files/publication_files/001563_Hip%20Fracture%20Standards_Full%20version_A4_V4.pdf).
- 11 Rindsland S. *Early mobilisation 1: risk factors, complications and costs of immobility | Nursing Times*. n.d. URL: <https://www.nursingtimes.net/clinical-archive/patient-safety/early-mobilisation-1-risk-factors-complications-and-costs-of-immobility-15-03-2021/> (Accessed 9 February 2023).
- 12 Jones RA, Merkle S, Ruvalcaba L, Ashton P, Bailey C, Lopez M. Nurse-Led Mobility Program: Driving a Culture of Early Mobilization in Medical-Surgical Nursing. *J Nurs Care Qual* 2020;**35**:20–6. <https://doi.org/10.1097/NCQ.0000000000000404>.
- 13 Fernandez MA, Arnel L, Gould J, McGibbon A, Grant R, Bell P, *et al*. Research priorities in fragility fractures of the lower limb and pelvis: a UK priority setting partnership with the James Lind Alliance. *BMJ Open* 2018;**8**:e023301. <https://doi.org/10.1136/bmjopen-2018-023301>.

- 14 McDonough CM, Harris-Hayes M, Kristensen MT, Overgaard JA, Herring T, Kenny AM, *et al.* Physical therapy management of older adults with hip fracture. *Journal of Orthopaedic and Sports Physical Therapy* 2021;**51**:CPG1–81.
<https://doi.org/10.2519/JOSPT.2021.0301/ASSET/IMAGES/LARGE/JOSPT-CPG1-FIG133.JPEG>.
- 15 Li J, Wu X, Li Z, Zhou X, Cao J, Jia Z, *et al.* Nursing resources and major immobility complications among bedridden patients: A multicenter descriptive study in China. *J Nurs Manag* 2019;**27**:930–8. <https://doi.org/10.1111/JONM.12731>.
- 16 Karumo I. Intensive physical therapy after meniscectomy. *Ann Chir Gynaecol* 1977;**66**:41–6.
- 17 Lauridsen UB, de la Cour B, Gottschalck L, Svensson B. Intensive physical therapy after hip fracture. A randomised clinical trial. *Dan Med Bull* n.d.;**49**:70–2.
- 18 Moseley AM, Sherrington C, Lord SR, Barracough E, St George RJ, Cameron ID. Mobility training after hip fracture: a randomised controlled trial. *Age Ageing* 2009;**38**:74–80.
<https://doi.org/10.1093/AGEING/AFN217>.
- 19 Hauer K, Specht N, Schuler M, Bärtsch P, Oster P. Intensive physical training in geriatric patients after severe falls and hip surgery. *Age Ageing* 2002;**31**:49–57.
<https://doi.org/10.1093/AGEING/31.1.49>.
- 20 Bischoff-Ferrari HA, Dawson-Hughes B, Platz A, Orav EJ, Stähelin HB, Willett WC, *et al.* Effect of high-dosage cholecalciferol and extended physiotherapy on complications after hip fracture: a randomized controlled trial. *Arch Intern Med* 2010;**170**:813–20.
<https://doi.org/10.1001/ARCHINTERNMED.2010.67>.
- 21 Myles PS, Shulman MA, Heritier S, Wallace S, McIlroy DR, McCluskey S, *et al.* Validation of days at home as an outcome measure after surgery: a prospective cohort study in Australia. *BMJ Open* 2017;**7**:e015828. <https://doi.org/10.1136/BMJOPEN-2017-015828>.
- 22 Kristensen MT, Jakobsen TL, Nielsen JW, Jørgensen LM, Nienhuis R-J, Jønsson LR. Cumulated Ambulation Score to evaluate mobility is feasible in geriatric patients and in patients with hip fracture. *Dan Med J* 2012;**59**:1–5.
- 23 Griffiths F, Mason V, Boardman F, Dennick K, Haywood K, Achten J, *et al.* Evaluating recovery following hip fracture: a qualitative interview study of what is important to patients. *BMJ Open* 2015;**5**:e005406–e005406. <https://doi.org/10.1136/bmjopen-2014-005406>.
- 24 Haywood KL, Griffin XL, Achten J, Costa ML. Developing a core outcome set for hip fracture trials. *Bone Joint J* 2014;**96-B**:1016–23. <https://doi.org/10.1302/0301-620X.96B8.33766>.
- 25 Engel GL. The Need for a New Medical Model: A Challenge for Biomedicine. <https://doi.org/10.1521/Pdps.2012.40.3.377> 2012;**40**:377–96.
<https://doi.org/10.1521/PDPS.2012.40.3.377>.
- 26 Alonso Y. The biopsychosocial model in medical research: the evolution of the health concept over the last two decades. *Patient Educ Couns* 2004;**53**:239–44.
[https://doi.org/10.1016/S0738-3991\(03\)00146-0](https://doi.org/10.1016/S0738-3991(03)00146-0).
- 27 Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychol Rev* 1977;**84**:191–215. <https://doi.org/10.1037/0033-295X.84.2.191>.

- 28 Tinetti ME, Powell L. Fear of Falling and Low Self-efficacy: A Cause of Dependence in Elderly Persons. *J Gerontol* 1993;**48**:35–8. https://doi.org/10.1093/GERONJ/48.SPECIAL_ISSUE.35.
- 29 Haslam-Larmer L, Donnelly C, Auais M, Woo K, DePaul V. Early mobility after fragility hip fracture: a mixed methods embedded case study. *BMC Geriatr* 2021;**21**:1–14. <https://doi.org/10.1186/S12877-021-02083-3/FIGURES/4>.
- 30 McGregor G, Sandhu H, Bruce J, Sheehan B, McWilliams D, Yeung J, *et al*. Rehabilitation Exercise and psycholoGical support After covid-19 Infection' (REGAIN): a structured summary of a study protocol for a randomised controlled trial. *Trials* 2021;**22**:1–3. <https://doi.org/10.1186/S13063-020-04978-9/PEER-REVIEW>.
- 31 Weijer C, Grimshaw JM, Eccles MP, McRae AD, White A, Brehaut JC, *et al*. The Ottawa Statement on the Ethical Design and Conduct of Cluster Randomized Trials. *PLoS Med* 2012;**9**:e1001346. <https://doi.org/10.1371/JOURNAL.PMED.1001346>.
- 32 Hope T, Slowther A, Eccles J. Best interests, dementia and the Mental Capacity Act (2005). *J Med Ethics* 2009;**35**:733–8. <https://doi.org/10.1136/JME.2009.030783>.
- 33 Fernandez MA, Achten J, Parsons N, Griffin XL, Png M-E, Gould J, *et al*. Cemented or Uncemented Hemiarthroplasty for Intracapsular Hip Fracture. *New England Journal of Medicine* 2022;**386**:521–30. <https://doi.org/10.1056/NEJMoa2108337>.
- 34 Farrin A, Russell I, Torgerson D, Underwood M. Differential recruitment in a cluster randomized trial in primary care: the experience of the UK Back pain, Exercise, Active management and Manipulation (UK BEAM) feasibility study. *Http://DxDoiOrg/101191/1740774505cn073oa* 2016;**2**:119–24. <https://doi.org/10.1191/1740774505CN073OA>.
- 35 Lamb SE, Williams MA, Williamson EM, Gates S, Withers EJ, Mt-Isa S, *et al*. Managing Injuries of the Neck Trial (MINT): a randomised controlled trial of treatments for whiplash injuries. *Health Technol Assess (Rockv)* 2012;**16**:1–141. <https://doi.org/10.3310/HTA16490>.
- 36 Hoffmann TC, Glasziou PP, Boutron I, Milne R, Perera R, Moher D, *et al*. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ* 2014;**348**:. <https://doi.org/10.1136/BMJ.G1687>.
- 37 Herdman M, Gudex C, Lloyd A, Janssen M, Kind P, Parkin D, *et al*. Development and preliminary testing of the new five-level version of EQ-5D (EQ-5D-5L). *Quality of Life Research* 2011;**20**:1727–36. <https://doi.org/10.1007/s11136-011-9903-x>.
- 38 Underwood M, Lamb SE, Eldridge S, Sheehan B, Slowther A, Spencer A, *et al*. Exercise for depression in care home residents: a randomised controlled trial with cost-effectiveness analysis (OPERA). *Health Technol Assess* 2013;**17**:1–281. <https://doi.org/10.3310/HTA17180>.
- 39 Guide to the methods of technology appraisal 2013 | Guidance | NICE n.d.
- 40 Griffiths F, Mason V, Boardman F, Dennick K, Haywood K, Achten J, *et al*. Evaluating recovery following hip fracture: a qualitative interview study of what is important to patients. *BMJ Open* 2015;**5**:e005406. <https://doi.org/10.1136/BMJOPEN-2014-005406>.

- 41 Hernández Alava M, Pudney S, Wailoo A. Estimating the relationship between EQ-5D-5L and EQ-5D-3L: results from an English Population Study. 2 Acknowledgements 2020.

41 Version History

Previous versions of this protocol and a summary of the changes made are provided in the table below:

Protocol version no.	Protocol date	Summary of key changes from previous version
V1.0	01May2024	N/A 1 st version of the protocol
V2.0	13Dec2024	Section 3: Updated information for DSMC chair. Section 13.1: During the internal practice review, anonymous data will be collected on physiotherapy received by hip fracture patients during days 0-7 post-surgery only, and not up to discharge. Section 13.1: Average length of stay on ward data will be provided by recruitment centres without the requirement of collecting individual admission / discharge dates. Section 13.3: Introduction of patient-area posters to raise awareness of the trial on intervention wards. Section 17: At intervention sites, details of physiotherapy intervention will be collected from Day 0 (day of surgery) to Day 7, and not up to discharge.

42 Appendix 1 – Study Flow Chart

