CLINICAL TRIALS RESEARCH UNIT (CTRU)
UNIVERSITY OF LEEDS

STATISTICAL ANALYSIS PLAN
FOR FINAL ANALYSIS

AN INDIVIDUALLY RANDOMISED CONTROLLED TRIAL OF A HOME-BASED EXERCISE INTERVENTION FOR OLDER PEOPLE WITH FRAILTY AS EXTENDED REHABILITATION FOLLOWING ILLNESS OR INJURY (THE HERO TRIAL)

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1 Acronyms

Abbreviation	Description
AE	Adverse Event
APC	Admitted Patient Care
CA	Competent Authority
CACE	Complier Average Causal Effect
CI	Chief Investigator
CFS	Clinical Frailty Scale
COVID	Coronavirus Disease
CTRU	Clinical Trial Research Unit
CRF	Case Report Form
EC	European Commission
ECDS	Emergency Care DataSet
EHR	Electronic Health Records
EU	European Union
EQ5D 5L	EuroQol 5-Dimension Health Questionnaire 5-Level
GCP	Good Clinical Practice
HES	Hospital Episode Statistics
HOPE	Home-based Older People's Exercise
HTA	Health Technology Assessment
ICC	IntraClass Correlation Coefficient
ICF	Informed Consent Form
ITT	Intention to Treat
ISF	Investigator Site File
ISRCTN	International Standard Randomised Controlled Trials Number
MAR	Missing At Random
MCAR	Missing Completely At Random
MNAR	Missing Not At Random
MoCA	Montreal Cognitive Assessment
MCS	Mental Component Summary
NEADL	Nottingham Extended Activities of Daily Living Index
NHS R&D	National Health Service Research & Development
ONS	Office for National Statistics
PCS	Physical Component Summary
PI	Principal Investigator
PIC	Participant Identification Centre
PIS	Participant Information Sheet
QA	Quality Assurance
QC	Quality Control
RCT	Randomised Controlled Trial
REC	Research Ethics Committee
REF	Research Excellence Framework
RUSAE	Related and Unexpected Serious Adverse Event
SAE	Serious Adverse Event
SAP	Statistical Analysis Plan
SF6D	Short-Form health survey 6 Dimension score
SF36	Short-Form 36 Item Health Questionnaire
SOP	Standard Operating Procedure
SUSAR	Suspected Unexpected Serious Adverse Reaction
TIDieR	Template for Intervention Description and Replication
TMG	Trial Management Group
TSC	Trial Steering Committee
TMF	Trial Master File
TIDieR	Template for Intervention Description and Replication
TUGT	Timed Up and Go Test
WTE	Working Time Equivalent

2 Introduction

HERO is an individually randomised controlled multi-centre study (with internal pilot) to determine the clinical and cost-effectiveness of a home-based exercise intervention for older people with frailty as extended rehabilitation following acute illness or injury, including embedded process evaluation.

2.1 Background

Frailty is a condition characterised by reduced biological reserves and increased vulnerability to adverse outcomes including falls, disability, hospitalisation and care home admission [1]. It develops as a consequence of an age-related decline in several physiological systems, which collectively results in a vulnerability to sudden health status changes triggered by relatively minor stressor events. The majority of older people (>65 years) in hospital have frailty and are at increased risk of readmission following discharge home [2, 3].

Following admission to hospital with acute illness or injury, approximately 1/3 of frail older people are likely to be discharged home after a brief period of rehabilitation on an inpatient ward [7] but are at high risk of readmission [3]. Around 1/3 are likely to be admitted from/discharged to a care home, or die during admission. A further 1/3 are referred to intermediate care (IC), which is a range of community rehabilitation services predominantly for older people with frailty to promote recovery and reduce premature need for long-term care [8]. IC is provided in two general forms: bed based (e.g. community hospital) and home-based (e.g. hospital at home) services. National guidelines for both bed-based and home-based IC recommend only a brief contact (two to six weeks) with services [8]. Findings from the 2014 UK National Audit of Intermediate Care [1] identified that many recipients of IC did not feel ready to leave the service, indicating the possibility of incomplete recovery. Although reduced early readmission to hospital (<30 days) has been reported in five studies of IC [9], no difference in re-admissions between 60 days and six months has been identified, indicating that the early benefits of IC may not be sustained [10]. A simple, generalisable intervention that can address more directly the abnormal health state of frailty and so augment usual NHS rehabilitation care provided to older people admitted to hospital following an acute illness or injury is required. A programme of progressive physical exercise is a candidate intervention [11].

Exercise has positive physiological effects on skeletal muscle, the brain and the endocrine system [1]. Additionally, observational studies have identified a consistent inverse dose-response relationship between physical activity and inflammation [12], which may be especially relevant following acute illness or injury. RCT evidence indicates that exercise can down-regulate inflammation in older people, and that the benefit is most pronounced in older people at greatest risk of disability and loss of independence [13]. Systematic reviews of exercise interventions for older people with frailty have reported evidence for improvements in mobility and activities of daily living, but few studies measured effects on quality of life and no studies reported on cost-effectiveness [11, 14]. This evidence for positive physiological, mobility and functional benefits of exercise in frailty underpins the HERO trial which evaluates a home-based exercise intervention to extend the rehabilitation period for older people with frailty following acute illness or injury.

2.2 Design

HERO is a pragmatic, multi-centre individually randomised controlled trial with a two-level, partially nested hierarchical design, including internal pilot with clear progression criteria and an embedded process evaluation.

The original sample size for the HERO trial was 718 participants (318 control, 400 intervention – the HOPE programme), but increased to 742 participants (325 control and 417 intervention) following a request for an extension to recruitment in August 2019 (see section 2.5). Following admission to general/elderly medicine, trauma and orthopaedics wards in 15 UK hospitals patients are approached to participate and screened for

initial eligibility by research staff who have no role in the delivery of the intervention. For consenting patients, full eligibility is assessed 48 hours ahead of discharge (up to a maximum of 7 days post discharge) home from hospital or from linked intermediate care (IC) services. Participants are randomised on a 1:1.25 to either control or the HOPE programme following completion of the recruitment process.

The HOPE programme, a 12-week home-based manualised, graded, progressive exercise intervention is delivered by community therapy staff not blinded to allocation. Participants randomised to the intervention are stratified to the appropriate level of the programme based on their Timed-Up-And-Go test score measured during the recruitment process. Following the 12-week programme participants receive a further 12 weeks of telephone based support for intervention sustainability. Additional interventions during study participation for all participants is documented as part of the usual care review.

Participant self-reported outcome assessments are undertaken at 6- and 12-months post-randomisation primarily by postal questionnaire. The primary endpoint is the SF36 Physical Component Summary score at 12 months post-randomisation. Data is collected at the care provider (therapist) and participant (self-complete diary) level to assess adherence to the intervention. Health care resource use, mortality, hospital admissions with falls, new care home placement and hospital readmission is collected by participant self-report questionnaires and informed by routine data (such as hospital episode statistics and GP usage) where appropriate and used to define usual care. Participant follow-up is assessed in the internal pilot 6 months after the start of recruitment, based on a traffic light system of green (go), amber (review) and red (stop). Details of the progression criteria and analysis of the internal pilot can be found in Appendix 9.1.

The initial end date for this trial was October 2019, however, due to a slower recruitment rate than first assumed, a 15-month extension for recruitment was approved in August 2019, allowing recruitment to continue until January 2021. Due to the coronavirus pandemic, and the UK national lockdown, there was a pause in recruitment to the HERO trial from March 2020 to October 2020 in all sites that had been open. Due to this, an additional 9-month extension to recruitment to end of October 2021 was approved by the funder (HTA).

2.3 Aims

The aim is to establish whether the HOPE programme plus usual care is a clinically and cost-effective extended rehabilitation programme for older people with frailty discharged home from hospital or from intermediate care services after acute illness or injury, when compared with usual care alone.

2.3.1 Primary Objective

To establish whether a home-based exercise intervention plus usual care as extended rehabilitation for older people with frailty improves health-related quality of life, measured using the Physical Component Summary (PCS) of the Short-Form 36 Item Health Questionnaire (SF36) 12 months after randomisation.

2.3.2 Secondary Objectives

Secondary objectives for the study will be measured at 6- and 12-months post randomisation.

1. To establish whether the intervention improves the PCS at six months.

2. To establish whether the intervention improves mental health, measured using the Mental Component Summary (MCS) of the SF36.

3. To establish whether the intervention improves activities of daily living, measured using the Barthel index, and Nottingham Extended Daily Living (NEADL) scale.

4. To establish whether the intervention reduces hospital readmission, care home admission rates, hospitalisation due to falls, mortality and overall health and social care use.

5. To establish whether the intervention is cost-effective, measured using differences in cost of service use between groups and the incremental cost effectiveness ratios (ICERs) using quality-adjusted life years (QALYs) derived from the EuroQol 5 dimension health questionnaire, 5 level (EQ-5D-5L) and the Short form 6 dimension health index (SF6D).

6. To understand how the intervention is experienced and understood by providers and recipients and explore the organisational implications of embedding and sustaining the intervention in preparation of a wider NHS roll-out.

This statistical analysis plan (SAP) does not cover objective 5, which is included as part of the health economics analysis plan written by the HE team. Quantitative data analysis (including intervention delivery) informing the process evaluation objective (objective 6) will be included in this analysis plan but a detailed plan of analysis for objective 6 will be developed separately by the PE team.

2.4 Randomisation

Participants are individually randomised after confirmation of eligibility, informed consent and collection of baseline data is completed following confirmation of discharge. Randomisation is performed using the CTRU automated 24-hour randomisation service, which provides each participant with a unique study ID.

Participants are individually randomised in a 1.25:1 allocation ratio (HOPE programme and usual care: usual care) to ensure the study is powered for the primary objective while accounting for the partially nested design of the study. The increased proportion of participants allocated to the intervention arm accounts for a greater level of correlation anticipated in the outcomes for those receiving the HOPE programme, as a result of the same community therapy staff treating multiple participants.

Allocation uses a computer-generated minimisation programme, Gen24, incorporating a random element, with 4 stratification factors:

- Site
- Discharge setting
    - (hospital, bed-based intermediate care, or home-based intermediate care)
- Intended level of HOPE programme
    - (level 1, 2, or 3) based upon TUGT
- Reason for admission
    - (acute illness or injury).

2.5 Sample size

The original sample size for HERO was 718 participants (318 intervention, 400 control). This provided 90% power to detect the specified effect size of 0.317. An ICC of 0.03 was assumed, with 20 therapists, and an average of 20 participants per therapist (cluster size). The coefficient of variation of cluster size was assumed to be no greater than 0.23 with a loss to follow-up of 25%.

Following a request for an extension to recruitment in August 2019, the assumptions underpinning the calculations were reviewed. With an increased number of therapists of 60, a reduced average cluster size of 7 participants per therapist, an increased coefficient of variation of cluster size to 0.7, and an increased loss to follow-up of 35%, the sample size increased to 742 to maintain 90% power to detect the specified effect size of 0.317.

For community-dwelling older people, a mean PCS score of 30 (SD=9.47) has been reported [39]. The smallest detectable difference of 2.8 points has been reported for the PCS in a population of older people receiving rehabilitation for lower limb osteoarthritis [22]. Hence, our sample size is powered to detect a

minimum clinically important difference of 3 points, as this is both a clinically relevant and detectable difference for this intervention, and is consistent with a moderate effect size of 0.3. Hence it is clinically meaningful for both patients and commissioners of rehabilitation services. In the pilot study 15% of participants were lost to follow-up but for the purposes of this study we have assumed a higher rate due to longer follow-up; recruitment in a population more likely to be readmitted to hospital; and a primary outcome measured primarily through postal questionnaires which have a lower completion rate than researcher-administered outcomes.

2.6 Planned analyses

Final analysis of the primary and secondary outcomes will commence once all data has been collected and the database cleaned and locked. No interim or sub-group analyses are planned for this trial.

3 Endpoints and their derivation

3.1 Primary endpoint

This trial tests whether the home-based exercise intervention plus usual care as extended rehabilitation for older people with frailty improves health-related quality of life. The primary endpoint is measured using the Physical Component Summary (PCS) of the Short-Form 36 Item Health Questionnaire (SF36) 12 months after randomisation.

3.2 Secondary endpoints

Secondary outcomes in the HERO trial are measured at 6 and 12 months post-randomisation unless otherwise stated.

- PCS score at 6 months post randomisation
- Mental health measured using the Mental Component Summary (MCS) of the SF36
- Activities of daily living using the Barthel Index and the Nottingham Extended Activities of Daily Living (NEADL) scale
- Hospital readmission within 30 and 90-days post discharge
- All-cause hospitalisation and hospitalisation due to falls
- Care home admission rates
- Mortality

3.3 Derivation of endpoints

3.3.1 Primary endpoint

Primary endpoint data, the Physical Component Summary (PCS) of the Short-Form 36 Item Health Questionnaire (SF36), is collected via self-report postal questionnaires at 6 and 12 months after randomisation, by telephone assessment if physical disability prevents written communication, or by face-to-face assessment for participants with mild dementia who live alone. If participants fail to respond to postal questionnaires or the hub researchers become aware of any concern regarding capacity, a member of the hub research team attempts to establish contact with the participant via telephone. Between the period 16th March to 29th October 2020 collection of the primary outcome was prioritised where full data collection was difficult due to the COVID pandemic and completion methods included via telephone and video-calling.

The SF36 consists of 36 questions used to measure 8 domains of health-related quality of life: physical functioning (PF), social functioning, role limitations due to physical problems, role limitations due to emotional problems, bodily pain, mental health (MH), energy/vitality, and general health perceptions. The information obtained on these eight domains can be further aggregated into two summary component measures of physical and mental health; the Physical Component Score (PCS) and Mental Component Score (MCS). The PCS score incorporates physical functioning; role-physical; bodily pain and general health scales (questions 3a – 3j).

The scoring of the SF36 questionnaire is undertaken using OPTUM PRO CoRE. The raw questionnaire data is downloaded from the MACRO database into SAS using the SAS data views process and formatted in SAS through a manually written program before being imported into the OPTUM PRO CoRE software to create the scores. This program, following the user guide:

- Renames the SF36 variables to those recognised by the scoring software
- Ensures that variables are formatted as required by the scoring software
- Derives other fields required by the scoring software:
    - RecordID – unique identifier relating to each questionnaire returned
    - Timepoint – variable distinguishing between the time points
    - UserID – unique identifier for each participant
- Removes any missing observations
- Outputs the modified dataset as a csv file for use in the scoring software

The scored datasets from the scoring software are read back into SAS for use in the analysis via a manually written SAS program. The purpose of this program is to:

- Import the csv file for the scored SF36 data into SAS
- Merge with the raw (unscored) dataset, to include any missing observations removed previously
- Apply labels to the score variables.

Missing data is handled using Maximum Data Recovery in the scoring software. This method applies a value to a scale item rendered missing if at least one of the items in that scale has valid data. A scale receives a missing score only if all the items in that scale are missing. PCS and MCS are calculated when at least seven of the eight individual scales have valid data, either actual or estimated. However, to calculate PCS, the PF scale must be one of the seven scales having valid data. To calculate MCS, the MH scale must be one of the seven scales having valid data.

Scores range from 0 to 100 where 0 is the worst possible health rating and 100 is the best possible health rating [20]

3.3.2 Secondary endpoints

3.3.2.1 Physical Component Summary (PCS) Score of the SF-36

The PCS (Physical Component Summary) score is collected and analysed at 6 months post randomisation. The derivation of this is the same as that described for the PCS score at 12 months (see section 3.3.1).

3.3.2.2 Mental Component Summary (MCS) of the SF-36

The MCS score incorporates vitality; social functioning; role-emotional and mental health scales (questions 9b-9d, 9f and 9h) and is calculated by the OPTUM Pro CoRE software, as described in section 3.3.1 for the PCS score. As with the PCS, MCS scores range from 0-100, with higher scores indicating better mental health, and a score at or below 42 considered “at risk” for depression. [20].

3.3.2.3 Activities of Daily Living using the Barthel Index [33] and the Nottingham Extended Activities of Daily Living (NEADL) Scale

The Barthel index is a questionnaire designed to measure a person's ability to care for themselves. The index covers 10 domains of self-care and aims to assess if the respondent can perform certain tasks independently. There are 2 items scored 0 or 1 (Grooming and Bathing), 6 items scored 0, 1 or 2 (Bowels, Bladder, Toilet use, Feeding, Dressing, Stairs) and the final 2 items are scored 0, 1, 2 or 3 (Transfer, Mobility). In each case a higher score indicates a greater level of independence with which the person can perform the given task. The overall score is taken as the summation of each of the individual item scores and therefore ranges from 0 to 20. Greater scores indicate greater self-care ability. Scores will be prorated if 50% or more of the items are completed. The prorating method will take the mean of all answered questions and multiply this by the total number of items in that questionnaire to give a prorated score for the whole questionnaire.

The NEADL measures help needed with instrumental activities of daily living, including walking around outside; doing the housework; using the telephone. It is a 22 item scale each with four possible responses: 0 'Not at all'; 1 'With help'; 2 'On your own with difficulty'; 3 'On your own'. All item scores are then summed to obtain the NEADL score (range 0-66). A higher score indicates greater independence. Scores will be prorated if 50% or more of the items are completed. The prorating method will take the mean of all answered questions and multiply this by the total number of items in that questionnaire to give a prorated scored for the whole questionnaire.

3.3.2.4 Hospital readmission rates

Hospitalisation data will be obtained from Hospital Episode Statistics (HES) admitted patient care (APC) dataset from NHS digital.

Readmission will be defined as a hospitalisation starting from the date of discharge home from hospital or IC services as recorded on the randomisation CRF (day 0) (hospitalisation at randomisation will not be counted).

A hospitalisation will be defined as an acute inpatient admission (regardless of length of stay) where an acute admission will be identified through the ADMIMETH field (codes 21, 22, 23, 2A, 2B, 2D and 24).

Spells

A complete inpatient spell (which could compromise multiple patient episodes and multiple patient spells) will be derived to classify an inpatient admission using an algorithm based on guidance from NHS Digital.

All participants for whom successful linkage with HES APC data is possible, based on the above definitions, will be classified as having a rehospitalisation or not. If a participant cannot be linked to the HES APC, researcher reported hospitalisations collected at 12 months via a CRF completed from care notes (F07) will be used. This will be supplemented by hospitalisations due to falls or fractures reported during safety reviews(F06).

We expect a high level of linkage to routine data sources, with only a very small percentage of participants who we are unable to link. Participants we cannot link to NHS Digital and do not have follow-up data from F06/F07 will be classified as missing. Participants who have withdrawn from data collection from electronic health records and have a reported rehospitalisation on F06/F07 will be classified as rehospitalised. Participants who have withdrawn from data collection from electronic health records, do not have data on F06 and have reported "unknown" rehospitalisation on F07 will be classified as missing. Participants who have withdrawn from data collection from electronic health records and have reported no rehospitalisations on F06/F07 will be classified as not rehospitalised.

3.3.2.5 All-cause hospitalisation and hospitalisation due to falls

Hospitalisation data will be obtained from Hospital Episode Statistics (HES) admitted patient care (APC) dataset, accident and emergency (A&E) dataset, and emergency care dataset (ECDS; replaced A&E from 2018/19) from NHS digital.

For all-cause hospitalisation a hospitalisation will defined as outline in section **Hospital readmission rates** 3.3.2.4.

For hospitalisation due to falls a hospitalisation will be defined as:

- An acute inpatient admission or A&E attendance;
    - In the APC dataset a hospitalisation will be considered falls-related if the primary reason / diagnosis for admission includes any of the ICD-10 codes W00-W19, M80, S22, S32, S42, S52, S72, S82, T08, T10, T12, T14.2;
    - In the A&E and ECDS dataset a hospitalisation will be considered falls-related if the code relates to either a fall or fracture (see Appendix 9.2 and 9.3).

All participants for whom successful linkage with HES APC and A&E/ECDS data is possible, based on the above definitions, will be classified as having an all-cause or falls-related hospitalisation (32), during the 12 months post-randomisation period (excluding hospitalisation at randomisation).

If a participant cannot be linked to the HES data, researcher care review (F07) data will be considered for all-cause hospitalisation and the safety reporting CRF (F06) for inpatient hospitalisations due to falls or fractures.

We expect a high level of linkage to routine data sources, with only a very small percentage of participants who we are unable to link.

For falls-related hospitalisations, participants we cannot link to NHS Digital and we do not have follow-up data for (F06) will be classified as missing. For participants we cannot link to NHS Digital but we have follow-up data for (F06), the information in F06 will be used. Data from F07 cannot be used here as it does not collect reason for hospitalisation.

For all-cause hospitalisations, participants we cannot link to NHS Digital and do not have follow-up data from F06/F07 will be classified as missing. Participants who have withdrawn from data collection from electronic health records and have a reported rehospitalisation on F06/F07 will be classified as rehospitalised. Participants who have withdrawn from data collection from electronic health records, do not have data on F06 and have reported “unknown” rehospitalisation on F07 will be classified as missing. Participants who have withdrawn from data collection from electronic health records and have reported no rehospitalisations on F06/F07 will be classified as not rehospitalised.

3.3.2.6 Care home admission rates

Admission to a care home will be obtained from the change in contact details CRF (F08).

3.3.2.7 Mortality

Mortality data (date and cause of death) will be obtained from the Civil Registrations (Deaths) Secondary Care Cut dataset. Participants we cannot link to this dataset, but for whom we have received a notification of death CRF (F11) will also be classified as having died. Participants we cannot link to this dataset and for whom we haven’t received a notification of death will be assumed not dead.

3.4 Missing data

Missing data, except individual data items collected via the postal questionnaires, will be chased until they are received, confirmed as not available, or when the study is at analysis. Reminders will be sent to participants if postal questionnaires are not returned on time. Hub researchers will also be offered telephone and face-to-face visits to facilitate data completion where appropriate.

3.4.1 Investigation of missing data pattern

The proportion of participants with missing outcome data will be presented overall, by treatment arm, by baseline characteristics, by baseline characteristics between arms and by site. Where available, reasons for missing data will be presented (death, withdrawal, etc.). A distinction will be made between missing data due to questionnaires not returned and invalid scores/subscale scores due to missing items. The missing data percentages for questionnaires not returned will take into account those forms not expected for reasons such as participant's withdrawal from the study. If 95% of expected questionnaires are completed and returned, a complete case analysis will be performed for secondary endpoints, otherwise multiple imputation will be used.

The data will be examined to assess whether the missingness is missing completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR). Variables explored for the investigation of the missing data will include, but not be limited to:

1. Missing outcome data
2. Missing patient-level covariate data measured at baseline
    - Patient age
    - Patient gender
    - Discharge setting (hospital, bed-based IC, or home-based IC)
    - Intended level of HOPE
    - Reason for admission (acute illness or injury)
3. Missing therapist-level covariate data measured at initial visit
    - Missing therapist ID

To determine whether the pattern of missingness is monotone or non-monotone the pattern and frequency of the missingness will be explored as per the table below and as recommended by Carpenter & Smuk (25).

Pattern	Var 1	Var 2	Var 3	Outcome	Number
1	X	O	O	O	N (%)
2	X	X	O	O	N (%)
3	X	X	X	O	N (%)
…	…				

As a pre-defined standard, if the data is not considered to be MCAR and more than 5% of the observations are missing/invalid and therefore do not contribute to the final analysis model, then imputation via pattern-mixture modelling will be used for all outcomes as a large number of deaths is expected given the population (19). Similarly, missing primary outcome data due to death will be imputed in the final primary analysis model.

3.4.2 Method of imputation

Patterns of missing questionnaire data will be explored to identify whether the data is MAR, MNAR or MCAR, as above. If the data is MCAR, complete case analysis will be used. If the data is MAR or MNAR, questionnaire data / scores will be estimated using multiple imputation for all participants. Multiple imputation via pattern-mixture modelling method will be used to impute missing values for each of the questionnaire scores and allows for the clustered nature of the data to be taken into account, as well as the pattern of missingness [24]. The model uses the average differences in response between baseline and each of the follow-up time points, 6 and 12 months, along with the difference between treatment arms.

Pattern mixture models will use linear mixed models to evaluate whether each missing data pattern predicts the outcome variable (SF-36) or interacts with time (time points 0, 1 and 2 representing baseline, 6 months and 12 months respectively) to predict changes in the outcome variable over time. The dependent variable will be the SF-36 PCS score, and the predictors will be the missing data patterns (missing PCS score at just 6 months, missing PCS score at just 12 months, missing PCS score at both 6 and 12 months and no missing PCs score at any time point). We expect there to be no missing data at baseline.

4 Populations

4.1 Eligibility

4.1.1 Participant Eligibility

Inclusion Criteria

Patients that meet all of the following criteria at screening are eligible for trial entry:

- Age >65 years
- Admitted to general medicine / elderly medicine or trauma & orthopaedics wards following acute illness of injury then discharged home from hospital or from intermediate care.*
- Mild, moderate or severe frailty, defined as a score of 5-7 on the 9-item Clinical Frailty Scale (CFS).
- Ability to complete the TUGT without additional external support (other than usual walking aids).
- Willing and able to give informed consent to participate in the study.
- Able to comply with intervention delivery (consideration of audio-visual impairments).

*Intermediate care services are provided to patients after leaving hospital. The aim is to provide rehabilitation to maximise independence after a stay in hospital. These services can be provided, for example, in a community hospital, commissioned residential home beds or in people's own homes. A variety of different professionals can deliver this type of specialised care. The person or team providing the care plan will depend on the individual's needs at this time [23].

Exclusion Criteria

Patients that meet any of the following criteria at screening will not be eligible to take part in the study;

- Permanent care home residents (but not those occupying temporary rehabilitation beds within a care home as part of intermediate care services).
- Moderate/sever dementia at baseline* (defined as Montreal Cognitive Assessment test <20).
- Recent (<3 months prior to randomisation) myocardial infarction, or unstable angina.
- Another household member in the study.
- Very severe frailty (defined as score of 8 on CFS).
- Terminally ill (defined as score of 9 on CFS).
- Receiving palliative care.
- Referral at discharge for condition-specific rehabilitation (e.g. pulmonary rehabilitation, stroke rehabilitation, falls prevention programme).
- Currently participating in HERO or another contraindicated study+

** Baseline assessments should be completed within 2 days of consent ahead of participant randomisation at discharge*

+ Patients can only be enrolled into the HERO study once. Participation in another study will not necessarily exclude a patient from participation.

4.1.2 Carer Eligibility

Carers for all eligible participants will be approached to participate in the project following written informed consent from the participant.

A carer is defined as anyone who cares, unpaid, for a friend or family member who due to illness, disability or a mental health problem cannot cope without their support.

Inclusion Criteria

- Anticipated to provide support following the participants discharge from hospital.
- Anticipated to be available to support HOPE programme sessions (if randomly allocated to intervention).

Exclusion Criteria

- Unable to provide written informed consent.

4.2 Intention to treat population

The intention to treat (ITT) population will consist of all randomised participants, regardless of non-compliance with the intervention and whether they were eligible and/or remained in the trial. Participants will be grouped according to the treatment they were randomised to receive. However, any participant who withdraws their full consent to participation, or for whom written informed consent has not been obtained (and implied consent cannot be assumed), will be excluded. If a participant is found to be ineligible after randomisation they will still be included in the analysis unless full consent to trial participation is withdrawn, or informed consent has not been obtained.

4.3 CACE population

The Complier Average Causal Effect (CACE) analysis approach will be used to estimate the treatment effect amongst compliant participants. This analysis will be considered if more than 20% of intervention participants do not implement the intervention as intended, i.e. do not complete 4 of the 5 home visits planned. The CACE is defined as the average effect of treatment in the compliers. Compliers are defined as participants who would have received an effective dose of the intervention had it been offered. Analysis will take non-adherence to the intervention into account, comparing treatments received rather than treatments allocated.

The CACE approach assumes four types of compliance status: compliers, never takers, defiers and always takers:

1. Always-takers will always receive the intervention irrespective of their allocation
2. Never-takers will never receive the intervention irrespective of their allocation
3. Compliers receive the intervention if and only if they are allocated to the treatment arm
4. Defiers receive the intervention if and only if they are allocated to the control arm

5 Data Handling

5.1 Data monitoring

Data will be monitored for quality and completeness by the CTRU, using established verification, validation and checking processes. Missing data, except individual data items collected via the postal questionnaires, will be chased until they are received, confirmed as not available, or when the study is at analysis. Reminders will be sent to participants if postal questionnaires are not returned on time. Hub researchers will also be offered telephone and face-to-face visits to facilitate data completion where appropriate. Any problems with data collection will be discussed at Project Delivery Meetings and, if appropriate, at Trial Management Group meetings.

Data received via NHS Digital is monitored upon receipt by the trial statistician to ensure we only have data for those who have consented for electronic clinical data collection; all the requested variables are present and participants have matched reliably to the hospital episode statistics dataset.

5.2 Data validation

Data management will carry out initial validation of the forms in accordance with the guidelines developed for the study; the database has many validation checks built-in to identify data errors at the time of data entry. For the final analysis, a SAS program will be used to validate the data and identify inconsistent and missing data.

Additional checks to be performed include:

- Eligibility checks
- Sequential dates
- Checks for unusual and outlying data
- Checks for missing data
- Other checks as deemed appropriate

Prior to the final analysis, any inconsistent data will be noted and an email sent to data management responsible for the trial. A copy of this email will be kept in the statistician's trial file. All queries will be resolved, and the outcome documented.

6 Data Analysis

6.1 General calculations

Analyses will be on the intention to treat population, which will include all randomised participants, regardless of non-adherence with the intervention, analysed in the study arm to which they were randomised.

All tables will present summary statistics by treatment group and overall. Descriptive statistics will consist of mean and standard deviation or median, quartiles, minimum and maximum for continuous variables (depending on statistical distribution), and counts and percentages for categorical variables. All percentages, means, medians, interquartile ranges and ranges will be rounded to 1 decimal place (or 1 significant figure for numbers less than 1), whilst standard deviations (SDs) will be rounded to 2 decimal places (or 2 significant figures for numbers less than 1). P-values will be rounded to 3 decimal places (with those less than 0.001 displayed as <0.001). Parameter estimates, standard errors, ICCs and 95% confidence intervals will be reported to 2 decimal places (or 2 significant figures for numbers less than 1). Unless otherwise stated, all percentages will be calculated using the total number of participants with known data as the denominator (i.e. not including participants with missing data for that variable) and the number of missing values will be presented. All hypothesis tests will be two-sided at the 5% significance level unless stated otherwise.

All analyses will be carried out using SAS v9.4 unless otherwise stated.

6.2 Recruitment

6.2.1 Patient Screening and Recruitment

A CONSORT flow diagram will be used to summarise the screening and recruitment process for all participants:

- Number of patients screened
- Number (%) of patients eligible of those screened, reasons for ineligibility
- Number (%) of patients approached of those eligible, reasons not approached
- Number (%) of patients consenting/assenting to the study of those eligible and approached; reasons for non-consent/assent
- Number (%) of patients randomised of those consenting; reasons for non-randomisation

Screening and recruitment will also be summarised by site, and recruitment per month (overall and by arm) will be displayed graphically which will also highlight period of non-recruitment and changes to context under

which recruitment took place (pre-lockdown/following re-start).

Demographic characteristics will include age, sex, ethnicity, and admission reason (acute illness/injury).

6.2.2 Carer Screening and Recruitment

The number of carers recruited will also be summarised in a flow diagram and tabulated by site, and by arm. The outcomes to be summarised include:

- Number (%) of participants with a carer identified
- Number (%) of carers screened for eligibility and reasons for ineligibility
- Number (%) of carers consenting of those eligible and reasons for non-consent
- Number (%) of participants with a registered carer

Baseline demographics of participants with a carer identified will also be summarised.

6.3 Baseline Characteristics

6.3.1 Participant Characteristics

The following baseline characteristics and questionnaire scores will be summarised overall and by arm using appropriate summary statistics. The number of participants with missing data will be presented for each of these characteristics.

- Age (years)
- Gender
- Ethnicity
- Reason for admission (acute illness or injury)
- Discharge Level
- SF36 score (PCS and MCS)
- Barthel Index Score
- NEADL (Nottingham Extended Activities of Daily Living) index
- MoCA
- Clinical Frailty Score (CFS)
- Timed up and Go Test (TUGT) score
- Whether they were previously involved in another rehabilitation programmes
- Comorbidity (Charlson Index)

As a result of a pause in recruitment between 16th March 2020 due to COVID until a restart in recruitment on 30th October 2020, the above baseline characteristics will also be reported by recruitment period (pre-lockdown, following restart) to inform whether or not an adjust for time period or particular characteristics are required in the analysis of the primary and secondary outcomes.

6.3.2 Carer Characteristics

The following baseline characteristics for carers consented into the study will be summarised overall and by arm using appropriate summary statistics. The number of carers with missing data will be presented for each of these characteristics.

- Age (years)
- Gender
- Relationship to participant
- Type of carer help (Personal care, Help inside home, Help outside home or other)
- Average no. of hours per week of carer support

6.4 Intervention Delivery

The delivery of the intervention will be summarised in line with the TiDIER checklist (31).

6.4.1 Therapist training

Within each site one or more HERO workshops were delivered to provide training for the therapists. An initial workshop(s) was held and if necessary a follow-up workshop(s).

The following will be presented by site and overall for the initial workshop(s):

- Duration of the workshop
- Number (%) of therapists attending the workshop of those expected
- For each training component, whether or not it was delivered and if any amendments were required
- For each scenario, whether it was delivered or not
- Whether there were errors identified from the quiz
- Number (%) of therapists with errors by question number
- Whether any additional training was delivered following results of quiz / scenarios
- Which components / scenarios additional training was delivered in
- Whether follow-up workshops were required and if so number of workshops received

If a site received additional bespoke training the following will be presented by site:

- Number of additional training sessions
- Type of session (teleconference, face-to-face, other)
- Duration of session (mins)
- Number of attendees

Data on trainers' comments around attendees' knowledge and engagement in the workshops, amendments to training, insight into additional training requirements, and additional feedback will be summarised by the process evaluation team.

6.4.2 Therapist characteristics

For those therapists who attended training and delivered the intervention, the following characteristics will be summarised overall:

- Age (years)
- Gender
- Clinical role
- Whole Time Equivalent (WTE)
- Agenda for Change (AFC) band
- Length of experience in therapy with older people (years)
- Professional qualifications
- Additional training in specific therapy with older people
- Current community care services they deliver.

The number of therapists with missing data will be presented for each of these characteristics.

6.4.3 Delivery of the intervention

A flow diagram illustrating the number of participants randomised to the intervention, number commencing the intervention, number withdrawing or discontinuing, and number of home visits and telephone calls received will be presented, alongside reasons for withdrawal/discontinuation and timing. A summary table presenting this information by site, will also be provided.

An overview of the contact type and timing of the intervention delivery will be provided graphically. Along the x-axis will be the planned intervention programme schedule and up the y-axis will be the participants. For each participant the graph will denote whether the contact took place as planned or not at all, the type was changed, and the timing of the contact. The graph will also depict periods in which telephone calls replaced home visits due to COVID.

As therapists will be used as clusters in the primary outcome analysis, the following will also be summarised to inform the final analysis model:

- Number of therapists
- Average number (and range) of participants per therapist (cluster size)
- Number (%) of participants who have had their intervention delivered by more than one therapist
- If delivered by more than one therapist average (and range) number of therapists delivering the intervention
- Number (%) of therapists who shared intervention delivery with a second therapist (i.e. therapist pairings)

6.4.3.1 Initial visit / Home Visit 1

For all those randomised to the intervention arm, the following will be summarised:

- Number (%) with an initial visit
- Reasons for no initial visit
- Number (%) with initial visit within 3 weeks of randomisation
- Reasons for initial visit not within three weeks of randomisation
- Average length of time from randomisation to commencement of intervention

Content of the visit will be summarised as follows:

- Number (%) with TUGT repeated and number (%) with change to level
- Number (%) prescribed each level of exercise
- Among those prescribed level 1 exercises, the number (%) prescribed each exercise and average reps. Similarly for level 2 and 3 exercises.
- Number (%) with the exercise manual and exercises issued/demonstrated/practiced
- Number (%) with goals discussed, set, and documented
- Average (range) number of goals set at first home visit
- Number (%) with exercise diary issued and format explained
- Number (%) with staying on track exercises explored/discussed/practiced

6.4.3.2 Home visits

For those participants continuing with the intervention following the first home visit the following will be described for each subsequent home visit:

- Number (%) continuing with the intervention
- Number (%) with exercise diary reviewed
- Number (%) who experienced difficulties during the exercises /had their exercises observed during the home visit /performance errors corrected
- Number (%) who required assistance with the exercise program. Of these:
    - Number (%) who required physical assistance and who provided this
    - Number (%) who required guidance on performing the exercises and who provided this
    - Number (%) who required a reminder to complete the exercises and who provided this
    - Number (%) who required assistance to fill in the diary and who provided this
    - Number (%) who required a reminder to complete the diary and who provided this
- For those who were prescribed level 1 exercises in previous visit, the number who completed the exercises. Similarly for levels 2 and 3.
- Number (%) completing progression exercises, by level
- Number (%) who had new health concerns
- Number (%) where a Timed-Up-and-Go-Test (TUGT) was repeated, and level changed

- Number (%) where progression was made and description of progression (increased reps, increased level, progression exercises taught)
- Number (%) who reviewed goals, achieved goals, and set new goals
- Number (%) completed the Staying On Track exercises
- For those who completed the Staying On Track exercises, the number of days these were completed since last contact
- Number (%) where Staying On Track strategies were explored
- Number (%) where a carer was present and engaged in the visit
- Among those prescribed level 1 exercises, the number (%) prescribed each exercise and average reps. Similarly for level 2 and 3 exercises.

Due to the COVID pandemic, from 16th March to 29th October 2020 (lockdown), home visits were replaced with telephone calls. To explore potential loss of engagement by the participants and changes to intervention fidelity, the above summaries will be repeated by presenting for each time period: pre-lockdown, during, and post-lockdown.

Changes in levels of exercise prescriptions over the intervention delivery period will also be displayed graphically.

6.4.3.3 Telephone calls

For participants continuing with the intervention following the first home visit the following will be described for the subsequent telephone contacts overall:

- Number (%) reporting experiencing difficulties with exercises
- Number (%) where the exercise diary was reviewed
- Number (%) who required assistance. Of these:
    - Number (%) who required physical assistance
    - Number (%) who required guidance on performing the exercises
    - Number (%) who required a reminder to complete the exercises
    - Number (%) who required assistance to fill in the diary
    - Number (%) who required a reminder to complete the diary
- For those who were prescribed level 1 exercises in previous visit, the number who completed the exercises. Similarly for levels 2 and 3.
- Number (%) completing progression exercises, by level
- Number (%) who had new health concerns
    - Of these, number (%) who required a face-to-face review
- Number (%) who made progression and/or required a change to prescription
    - Number (%) who increased to 10 reps
    - Number (%) who increased to 15 reps
- Number (%) who reviewed goals, achieved goals, set new goals
- Number (%) completing Staying On Track exercises and on how many days they were completed
- Number (%) who explored Staying On Track strategies

6.4.3.4 Additional contact with participants

- Number (%) with additional contact
- Average (range) number of additional contacts per participant
- Number (%) of contacts
- Number (%) of contacts by method, who was involved and purpose of contact
- Timing of additional contact

6.4.3.5 Goals achieved

Further to the contents of the intervention delivery summaries, the goals section will be explored further, with

the following summaries:

- Average number of goals set per participant
- Number (%) of which were achieved
- Average time taken to complete all goals achieved
- Average number of new goals set following the initial home visit
- Mean and range of number of visits new goals were set
- Mean and range of number of visits in which it took to achieve goals

6.4.3.6 Exercise Diaries

Participants are also asked to fill in an exercise diary for the duration of the intervention. The following summaries will be made from the exercise diaries:

- Average number (range) of diaries completed per participant
- Total number of weekly diaries received
- Length of engagement (date of the last weekly completed diary - date of the first weekly completed diary)
- Reasons why exercises weren't completed

6.4.3.7 Intervention Discontinuation

For participants who have discontinued with the intervention the following summaries will be made:

- Timing of discontinuation (Home Visit 1/2/3/..)
- Number who started intervention within 3 weeks of randomisation
- Who initiated the discontinuation (Therapist, Clinical Team, Other)
- Number of completed weekly diary entries
- Reasons for discontinuation (Hospitalised and unable to continue/participant placed in residential/care home and unable to continue/Other)
- Baseline demographics of participants who discontinued with the intervention

6.4.4 Withdrawals

The number, proportion and timing of, and reasons (where available) of participant withdrawals will be summarised, overall and by arm. The type of withdrawal will also be summarised: withdrawal for questionnaire follow-up, of researcher-administered questionnaire follow-up, of routine health data and from intervention.

6.4.5 Deaths

Number and proportion of participant deaths, cause of death and timing of death post-randomisation will be summarised overall and by arm.

6.4.6 Unblinding

The number of researcher unblinding at each level, time-point and the reasons for those unblindings will be summarised by treatment arm, and by site.

6.4.7 Protocol Violations

Protocol violations and eligibility violations will be summarised by the following, overall, by site and by arm:

- Number and percentage of participants who breached each inclusion/exclusion criteria
- Timing of identification of breach / eligibility violation

This will include those who were identified after randomisation.

6.4.8 Safety

A serious adverse event (SAE) is defined in the HERO trial as any untoward medical occurrence that results

in death, is life-threatening, requires inpatient hospitalisation or prolongation of existing hospitalisation, results in persistent or significant disability/incapacity or consists of a congenital anomaly or birth defect.

Number and proportion of participants with related and unexpected serious adverse events (RUSAEs) will be listed and summarised overall and by arm up to and including 12 month follow-up. Further detail on seriousness and outcome of RUSAE will be included.

Falls and fractures resulting in hospitalisation are also defined as a reportable SAE and were reported via ongoing quarterly checks by researchers during the trial. These will be summarised and presented, by treatment arm and trial time-point. Falls and fractures resulting in hospitalisation that are reported via the electronic health records will be summarised and presented separately, by treatment arm.

6.5 Statistical Considerations

All analyses, unless otherwise specified, will be conducted on the intention-to-treat population defined as all participants randomised regardless of non-compliance with the intervention. A per-protocol analysis will be considered if there are a considerable number of protocol violators. This decision will be made jointly by the trial statistician in co-operation with other members of the Trial Management Group on examination of the population and without reference to endpoint data.

An overall two-sided 5% significance level will be used for all endpoint comparisons, confidence intervals will be presented at the 95% level as these are for summary purposes.

6.6 Data Analysis

6.6.1 Primary End-point analysis

The primary analysis will be carried out on the ITT population and per-protocol population (if appropriate). The primary endpoint is the physical component summary (PCS) of the SF36 index (SF36) at 12 months' post randomisation.

The primary analysis will be undertaken using the partially clustered model adjusting for the stratification factors: site, discharge setting, intended level of HOPE, reason for admission, as well as age, gender, baseline measures (PCS of the SF36), and level of previous engagement with community rehabilitation services. The intervention arm will also be adjusted for therapist at the group-level. This model confines the random effect to the intervention arm only and does not require artificial clustering in the control arm. Should there be different participant level errors across the trial arms a heteroskedastic individual errors model will be used instead, adjusted for the same errors [16].

Some therapists worked as a team to deliver the intervention; further investigation will be needed to see whether they worked together consistently enough to be classed as one cluster. For the primary analysis, clustering will be summarised according to the main therapist (or pairing), who delivered the majority of the intervention.

A sensitivity analyses will be conducted: if the average cluster size is below two then a generalised linear model, adjusted for the same covariates as above minus the therapist in the intervention arm, should be considered, if the average cluster size is two or above, then the partially clustered model should be used [17].

6.6.2 Sensitivity analysis of the Primary Outcome

The primary analysis model will include participants who have died, with their primary outcome imputed using the method outlined in Section 3.4 to be able to understand whether the intervention improved physical health-related quality of life in even the most severe frailty cases. However, further analysis will include the primary outcome model, with only participants who remained alive for the entire 12 month follow-up to understand whether the intervention improved physical health-related quality of life for those who were able to receive the intervention and follow-up period as intended.

Further analyses will include clustering summarised as the therapist pairing to assess the level of differences in the deviation of therapist cluster. Weighting will also be applied to the participants that receive treatment from more than one therapist, whereby the percentage of time with each therapist is accounted for in the model i.e. if participant 1 is treated by Therapist A for two out of the five visits, and Therapist B for the remaining visits, they will be weighted 0.4 for Therapist A effect and 0.6 for Therapist B effect [18].

6.6.3 CACE Analysis

6.6.3.1 Analysis Population

The CACE analysis population is as defined in Section 4.3.

6.6.3.2 Compliance Definition

Compliers will be defined on two levels: participant “compliance” with prescribed exercises with therapist fidelity assessed via session delivery. For the therapist delivery, the following will be defined as “compliant” in a staged approach:

1. Those who completed at least 4 home visits
2. Those who completed at least 2 home visits

For the participant compliance, the exercise completion will be considered. Whilst there are two sources for the exercise completion rate, participant reported exercise diaries and therapy records, only the therapy records will be used to assess this. Participant reported exercise diaries may be poorly reported, with participants forgetting to fill in weeks of the diary and variability is expected to be high for exercise prescriptions between participants, making it difficult to find natural cut-off points in the data. For these reasons the therapy record will be used.

Participant compliance will be assessed by the exercises completed as a proportion of the exercises prescribed:

1. Those who completed 75% of all exercises prescribed (through the entire duration of the intervention)
2. Those who completed 50% of all exercises prescribed (through the entire duration of the intervention)

The CACE analysis will take a staged approach and will be repeated four times, considering the four different levels of participant/therapist compliers, considering both therapist and participant compliance. The below outlines the stages taken:

1. The strictest compliance:

The strictest compliance definition is those who had at least 4 home visits **and** completed at least 75% of all exercises prescribed.

2a. Relaxed definition of participant compliance:
A more lenient definition of compliance is those who had at least 4 home visits **and** completed at least 50% of all exercises prescribed

2b. Relaxed definition of therapist compliance:
A more lenient definition of compliance is those who had at least 2 home visits **and** completed 75% of all exercises prescribed

3. Most lenient compliance:

The most lenient definition of compliance is those who had at least 2 home visits **and** completed at least 50% of all exercises prescribed.

6.6.3.3 Methods for handling departures from randomised intervention

There are 5 assumptions that need to be fulfilled before CACE analysis can be employed (28):

1) Potential outcomes for each participant are independent of the outcomes for other participants, known as the Stable Unit Treatment Value assumption
2) Assume there is a monotonic relationship between treatment assignment and treatment receipt. Therefore, there are no individuals for whom assignment to treatment actually reduces the likelihood of receiving treatment (i.e. no defiers, no one who would take the intervention if it was not offered, but not take the intervention if it was offered)
3) Offering treatment to participants in the intervention condition induces at least some participants to receive the treatments, so compliance rate is not zero.
4) Assignment to treatment is random
5) Random assignment to treatment does not affect the outcomes of individuals who do not comply with the treatment, an assumption known as the exclusion restriction

The outcome for each participant depends only on their own treatment assignment and not the assignment of any other participant, however, therapist standard error will be used to account for clustering, and so we can assume the Stable Unit Treatment Value assumption stands for the HERO population.

As the therapists did not deliver the intervention to the control group, we can assume there were no “defiers” in the control group. Due to the randomness of the allocation we can also assume that there were the same lack of defiers in the intervention group.

We can assume that at least some of the intervention group complied with the intervention, i.e. the rate of non-compliance is not zero. Due to the randomness of the allocation we can assume there is the same rate of non-compliance in the control group.

For the fourth assumption, the allocation was random in nature due to the study design using a minimisation randomisation algorithm.

The final assumption, the exclusion restriction, we assume that the randomised treatment allocation only has an effect on the outcome received and the effect of assignment is mediated by treatment exposure, can be assessed by including covariates that predict “engagement” with the intervention, i.e. carer present and helping.

A mixed linear regression model will be used as the CACE model. Participants in the intervention group will have direct observation of compliance, and estimated compliance in the control group. The compliance in the control group will be estimated using maximum likelihood estimation via the expectation-maximisation algorithm estimation (ML-EM) (29, 30). Two dummy variables will be used to indicate compliance status. For the intervention group, compliers (as defined in 6.6.3.2) will be assigned 1 for dummy class variable 1 and 0 for dummy class variable 2, non-compliers will be assigned 0 for dummy class variable 1 and 1 for dummy class variable 2. To allow the compliance status to be estimated, for the control group, both dummy class variables will be estimated as 1 (30).

The intervention effect will be fixed at 0 for non-compliers (under the exclusion restriction assumption), and baseline covariates that are potential predictors will be included in the model to allow for increased precise CACE estimates. These covariates will include: baseline PCS score of the SF-36 score, age, gender, and level of previous engagement with community rehabilitation services.

6.6.4 Secondary End-point analysis

SF-36 Physical Component Summary scores and Mental Component Summary scores at 6 months post-randomisation will be analysed with the same model as the primary endpoint.

Partially nested mixed effects models will be fitted for all secondary endpoints, with continuous secondary endpoints analysed using linear regression and binary endpoints analysed using logistic generalised estimating equations or random intercept models to account for heteroscedasticity (as per Table 1). The models will be adjusted for treatment group, stratification factors: site, discharge setting, intended level of HOPE, reason for admission, as well as age, gender, baseline measures of the outcome measure, where available (SF-36, NEADL, Barthel and EQ-5D-5L), Charlson Index and level of previous engagement with community rehabilitation services.

Time to death will be analysed using a shared frailty model. Multilevel shared frailty models, in which a

common frailty for individuals within the same cluster, allows for heterogeneity between groups of patients in different clusters and accounts for within group correlations. The frailty model will be fitted using the RANDOM statement in PROC PHREG and will include the same covariates as the primary analysis. The gamma distribution will be used to model the shared frailty (Hayes and Moulton). If convergence issues arise (e.g. from cluster sizes or a small number of events), a marginal Cox using a sandwich variance estimator to account for within cluster correlations, using the COVS(AGGREGATE) statement within PROC PHREG, will be used. Model diagnostics and the assumptions of proportional hazards will be assessed using the ASSESS statement. Effect sizes, 95% confidence intervals and an estimate of the ICC will be reported.

All-cause hospitalisations and hospitalisations due to falls will be compared between treatment arms using mixed effects Poisson regression, adjusting for the same covariates as the primary outcome. Rate ratios, p-values and 95% confidence intervals will be presented and regression diagnostics will be assessed.

Table 1. Type of regression model that will be used for each endpoint

Endpoint	Time point	Regression Type
SF-36 PCS Score	6m	Linear
SF-36 MCS Score	6 & 12m	Linear
Hospital Admission Rates	12m	Logistic
All-cause hospitalisations	12m	Poisson
Hospitalisations due to falls	12m	Poisson
Care Home Admission rates	12m	Logistic
NEADL Score	6 & 12m	Linear
Barthel Index	6 & 12m	Linear
EQ-5D-5L Summary index	6, & 12m	Linear
Mortality	12m	Logistic
Time to Death	12m	Survival

7 Reporting and Dissemination of the Results

A full statistical report of the analysis following the template laid out in this final analysis plan will take place, and where possible will be written up so it can be used as part of the threaded publication plan requested by the HTA. It is estimated that it will take approximately four months from the final download of the MACRO database. Timelines for completion of analyses using data from NHS-Digital are dependent on the date of receipt. After these analyses are complete, the results will be presented to the project teams who will discuss them and decide if any further analysis or investigation is required. The members of the project team will then write up the results into a manuscript for submission to a peer-reviewed journal.

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9 Appendices

9.1 Internal Pilot and Progression Criteria

9.1.1 Internal Pilot and Progression Criteria Objectives

The purpose of the internal pilot was to assess whether the provision and acceptability of the intervention met the pre-defined progression criteria thresholds and to assess whether study recruitment and six month follow-up rates met the pre-defined progression criteria thresholds.

9.1.2 Planned Analyses

Descriptive statistics only were used to evaluate the progression criteria for the four internal pilot sites. The progression criteria assessed the level of recruitment for each site, follow-up rates, as well as provision and acceptability of the intervention.

9.1.3 Progression Criteria

9.1.3.1 Recruitment

Recruitment was assessed at 6 months after the start of internal pilot recruitment (in June 2018). The progression criteria were:

Green: ≥4 patients/month/site (measured in months 4-6 to allow time for recruitment to stabilise)
Amber: <4 but ≥2 patients/month/site
Red: <2patients/month/site

9.1.3.2 Intervention Provision

Provision of the intervention was assessed at 6 months after the start of internal pilot recruitment (in June 2018). The progression criteria were:

Green: ≥80% of intervention participants receiving their first home visit within 3 weeks
Amber: <80% but ≥65% of intervention participants receiving their first home visit within 3 weeks
Red: <65% of intervention participants receiving their first home visit within 3 weeks

9.1.3.3 Intervention Acceptability

Provision of the intervention was assessed at 9 months after the start of internal pilot recruitment (in September 2018). The progression criteria were:

Green: ≥80% retention of intervention participants
Amber: <80% but ≥65% retention of intervention participants
Red: <65% retention of intervention participants

Assessment was conducted in September 2018 among those participants who had been recruited in the four internal pilot sites during the internal pilot recruitment period (i.e. for those randomised up to 31/05/2018).

9.1.3.4 Completion of outcomes (follow-up)

Six-month follow-up criteria was assessed at 12 months after the start of internal pilot recruitment (in December 2018). The progression criteria were:

Green: ≥80% completion of the SF-36 physical component summary
Amber: <80% but ≥65% completion of the SF-36 physical component summary
Red: <65% completion of the SF-36 physical component summary

Assessment was conducted in December 2018 among those participants who had been recruited in the internal pilot sites reaching the 6-month follow-up (end May 2018) with allowance for a 7-week data chase period i.e. participants randomised up to 12/04/2018.

9.1.4 Results

9.1.4.1 Recruitment

The internal pilot found that overall recruitment in the first 6 months of the study had been steady and exceeded the target; 83 participants were randomised compared with the target of 75 (Fig. 1). Three of the four internal pilot sites exceeded their green target, however, one site did not meet their target of 19 due to initial researcher capacity to support the study being limited to 0.5FTE requiring more time to embed and understand workload management required to recruit a participant.

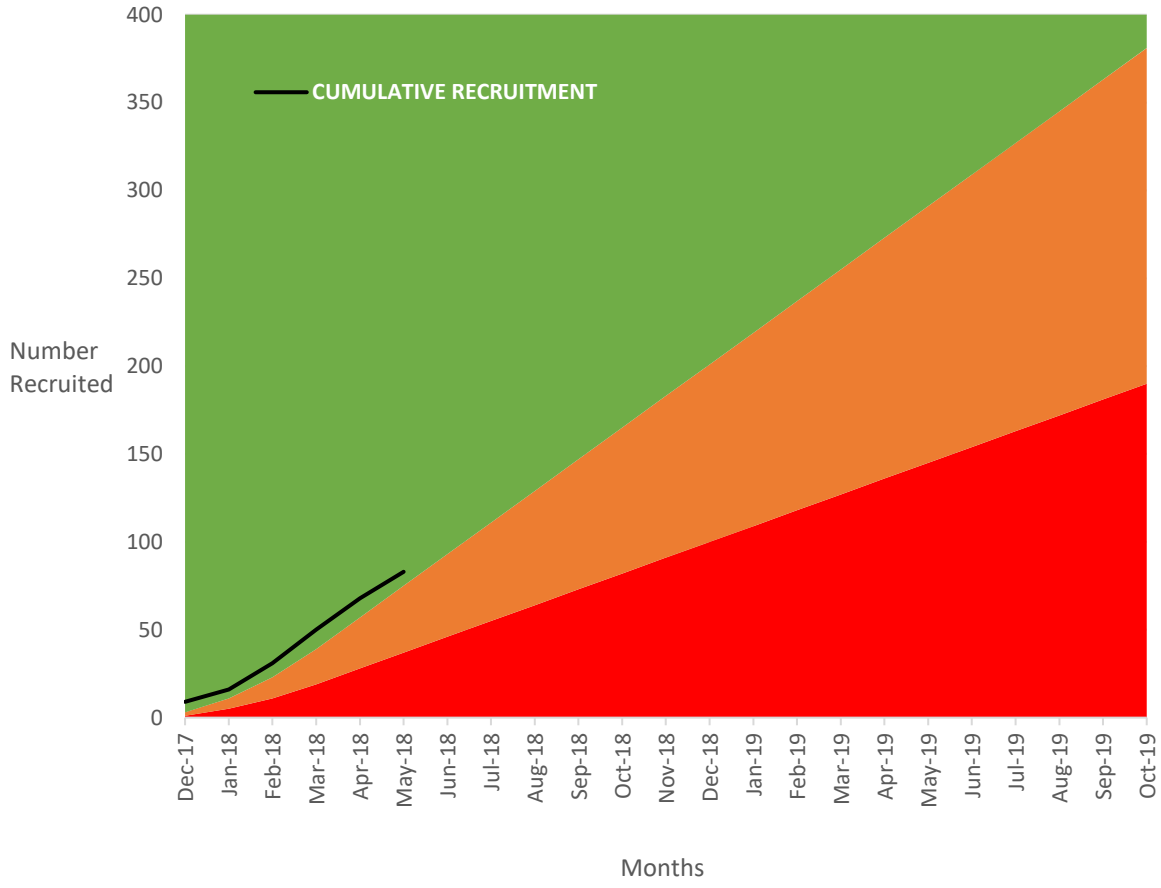

Figure 1. Cumulative recruitment across pilot sites against recruitment red-amber-green criteria

9.1.4.2 Intervention provision

Of the 49 intervention participants randomised up to 31/05/18, 41 were available for their initial visit (5 withdrew and 3 had treatment discontinued as confirmed by completion of documentation within 3 weeks of randomisation). A total of 26 (53.1% of those randomised; 63.4% of those available) intervention participants commenced the intervention within 3 weeks of randomisation. Hence intervention provision was within the red zone for progression at 6 months after the start of the internal pilot.

In the 3 months following the internal pilot, these numbers had increased to 100 participants commencing the intervention, 80 participants within 3 weeks (54% of those randomised; 80% of those available). Hence the intervention provision rate had vastly improved and was in the amber zone.

9.1.4.3 Intervention Acceptability

Of the 49 intervention participants randomised up to 31/05/2018, 35 had commenced the HOPE programme – 71.4% of randomised. Of those participants commencing treatment, as of March 2019, 4 had completed the 24 week period of intervention delivery, with 13 still receiving treatment. Considering the retention of participants from this perspective gives a retention rate of 48.6% (n=17/35) of those who commenced treatment (34.7% of randomised) which fell into the red progression criteria.

As of March 2019 however, a total of 100 participants had commenced treatment. Of these 51 participants were ongoing treatment, with 49 participants finished. Of those that finished the intervention – 20 participants had completed 5 Home Visits giving a retention rate of 71% of those who commenced treatment.

9.1.4.4 Completion of outcomes (follow-up)

Of the 57 randomised participants reaching the six-month follow-up period, 46 were available for follow-up. Of these, 33 (71.7% available, 57.9% randomised) had returned a completed questionnaire. Hence, the follow-up progression criteria was in the red zone using all randomised participants as the denominator.

9.2 ICD-10 categories

Table 2. ICD-10 codes used to identify falls-related admissions on the HES dataset

ICD-10	Definition
W00	Fall on same level involving ice and snow
W01	Fall on same level from slipping, tripping, and stumbling
W02	Fall involving ice-skates, skis, roller-skates or skateboards
W03	Other fall on same level due to collision with, or pushing by, another person
W04	Fall while being carried or supported by other persons
W05	Fall involving wheelchair
W06	Fall involving bed
W07	Fall involving chair
W08	Fall involving other furniture
W09	Fall involving playground equipment
W10	Fall on and from stairs and steps
W11	Fall on and from ladder
W12	Fall on and from scaffolding
W13	Fall from, out of or through building or structure
W14	Fall from tree
W15	Fall from cliff
W16	Diving or jumping into water causing injury other than drowning or submersion
W17	Other fall from one level to another
W18	Other fall on same level
W19	Unspecified fall
M80	Osteoporosis with pathological fracture
S22	Fracture of rib(s), sternum and thoracic spine
S32	Fracture of lumbar spine and pelvis
S42	Fracture of shoulder and upper arm
S52	Fracture of forearm
S72	Fracture of neck of femur
S82	Fracture of patella
T08	Fracture of spine, level unspecified
T10	Fracture of upper limb, level unspecified
T12	Fracture of lower limb, level unspecified
T14.2	Fracture of unspecified body region

9.3 SNOMED categories

Table 3. SNOMED codes used to identify falls-related admissions on the HES dataset

SNOMEDCT_CONCEPTID	CTV3	Provenance	Code Description
1912002	16D..	efi-falls	Falls
213911003	T04..	clegg-falls	Fall in, on, or from train
213912005	T040.	clegg-falls	Fall in train
213917004	T041.	clegg-falls	Fall on train
213925002	T042.	clegg-falls	Fall from train
214436006	T170.	clegg-falls	Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting
214447004	T171.	clegg-falls	Noncollision motor vehicle traffic accident involving fall from car in street while boarding or alighting
242089005	T335.	clegg-falls	Fall in road vehicle NEC
215633002	T43..	clegg-falls	Fall on stairs or ladders in water transport
215634008	T430.	clegg-falls	Fall on stairs in water transport (WT)
215644005	T431.	clegg-falls	Fall on ladder in water transport
242182003	T43z.	clegg-falls	Fall on stairs or ladders in water transport, NOS
242408008	T440.	clegg-falls	Fall from one level to another NEC in water transport
216107001	T53..	clegg-falls	Fall in, on, or from aircraft
216131006	T532.	clegg-falls	Fall in aircraft
216154002	T534.	clegg-falls	Fall from aircraft
216293001	T60E.	clegg-falls	Accident involving fall from powered vehicle, used solely within the buildings and premises of an industrial or commercial establishment
216302002	T613.	clegg-falls	Accident involving fall from cable car, not on rails
217082002	TC...	efi-falls	Accidental fall
217083007	TC0..	clegg-falls	Fall on or from stairs or steps
217084001	TC00.	clegg-falls	Fall on or from escalator
67223001	TC000	clegg-falls	Fall on escalator
217086004	TC001	clegg-falls	Fall from escalator
217088003	TC01.	clegg-falls	Fall on or from stairs
414190009	TC010	clegg-falls	Fall on stairs
217090002	TC011	clegg-falls	Fall from stairs
217092005	TC02.	clegg-falls	Fall on or from steps
217093000	TC020	clegg-falls	Fall on steps
217094006	TC021	clegg-falls	Fall from steps
86591008	TC10.	clegg-falls	Fall from ladder
217142006	TC42.	clegg-falls	Fall from chair or bed
83468000	TC420	clegg-falls	Fall from chair
20902002	TC421	clegg-falls	Fall from bed
242413007	TC42z	clegg-falls	Fall from chair or bed NOS
217150002	TC4y2	clegg-falls	Fall from stationary vehicle
217154006	TC5..	efi-falls	Fall on same level from slipping, tripping or stumbling
217155007	TC50.	clegg-falls	Fall on same level from slipping
217156008	TC51.	clegg-falls	Fall on same level from tripping
217157004	TC52.	clegg-falls	Fall on same level from stumbling
217158009	TC53.	clegg-falls	Fall on moving sidewalk
33036003	TC5z.	clegg-falls	Fall on same level from slipping, tripping or stumbling NOS
274918000	TC6y.	clegg-falls	Fall on same level from other pushing, shoving or collision, with or by other person
217173005	TCy0.	clegg-falls	Fall from bump against object
415171000000109	U0815	clegg-falls	[X]Occupant of railway train or railway vehicle injured by fall in railway train or railway vehicle
213770003	U0815	clegg-falls	[X]Occupant of railway train or railway vehicle injured by fall in railway train or railway vehicle

391351000000106	U0816	clegg-falls	[X]Occupant of railway train or railway vehicle injured by fall from railway train or railway vehicle
242118006	U0825	clegg-falls	[X]Occupant of streetcar injured by fall in streetcar
472811000000105	U0825	clegg-falls	[X]Occupant of streetcar injured by fall in streetcar
391891000000105	U0826	clegg-falls	[X]Occupant of streetcar injured by fall from streetcar
242387001	U100.	clegg-falls	[X]Fall on same level involving ice and snow
435521000000108	U100.	clegg-falls	[X]Fall on same level involving ice and snow
475151000000109	U1000	clegg-falls	[X]Fall on same level involving ice and snow, occurrence at home
386521000000100	U1001	clegg-falls	[X]Fall on same level involving ice and snow, occurrence in residential institution
447051000000100	U1002	clegg-falls	[X]Fall on same level involving ice and snow, occurrence at school, other institution and public administrative area
435171000000103	U1003	clegg-falls	[X]Fall on same level involving ice and snow, occurrence at sports and athletics area
422231000000102	U1004	clegg-falls	[X]Fall on same level involving ice and snow, occurrence on street and highway
420851000000109	U1005	clegg-falls	[X]Fall on same level involving ice and snow, occurrence at trade and service area
457591000000103	U1006	clegg-falls	[X]Fall on same level involving ice and snow, occurrence at industrial and construction area
407341000000105	U1007	clegg-falls	[X]Fall on same level involving ice and snow, occurrence on farm
423931000000100	U100y	clegg-falls	[X]Fall on same level involving ice and snow, occurrence at other specified place
388321000000105	U100z	clegg-falls	[X]Fall on same level involving ice and snow, occurrence at unspecified place
407281000000106	U101.	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling
448751000000102	U1010	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence at home
447041000000103	U1011	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence in residential institution
386481000000100	U1012	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence at school, other institution and public administrative area
435161000000105	U1013	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence at sports and athletics area
457651000000105	U1014	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence on street and highway
404191000000109	U1015	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence at trade and service area
385421000000107	U1016	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence at industrial and construction area
420961000000101	U1017	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence on farm
392191000000107	U101y	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence at other specified place
436061000000104	U101z	clegg-falls	[X]Fall on same level from slipping, tripping and stumbling, occurrence at unspecified place
436311000000103	U103.	clegg-falls	[X]Other fall on same level due to collision with, or pushing by, another person
388101000000103	U1030	clegg-falls	[X]Oth fall on same level due to collision with, or pushing by, another person, occurrence at home
423711000000106	U1031	clegg-falls	[X]Other fall on same level due to collision with, or pushing by, another person, occurrence in residential institution
456781000000105	U1032	clegg-falls	[X]Oth fall on same level due to collision with, or pushing by, another person, occurrence at school,

			other institution and public administrative area
423221000000108	U1033	clegg-falls	[X]Other fall on same level due to collision with, or pushing by, another person, occurrence at sports and athletics area
475921000000102	U1034	clegg-falls	[X]Other fall on same level due to collision with or pushing by, another person, occurrence on street and highway
472361000000102	U1035	clegg-falls	[X]Other fall on same level due to collision with, or pushing by, another person, occurrence at trade and service area
391411000000103	U1036	clegg-falls	[X]Other fall on same level due to collision with, or pushing by, another person, occurrence at industrial and construction area
472381000000106	U1037	clegg-falls	[X]Other fall on same level due to collision with, or pushing by, another person, occurrence on farm
415251000000106	U103y	clegg-falls	[X]Other fall on same level due to collision eith, or pushing by, another person, occurrence at other specified place
456801000000106	U103z	clegg-falls	[X]Other fall on same level due to collision with, or pushing by, another person, occurrence at unspecified place
388911000000103	U104.	clegg-falls	[X]Fall while being carried or supported by other persons
60594001	U1040	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence at home
387841000000107	U1040	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence at home
461541000000109	U1041	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence in residential institution
477161000000102	U1042	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence at school, other institution and public administrative area
476241000000106	U1043	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence at sports and athletics area
394471000000106	U1044	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence on street and highway
394501000000104	U1045	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence at trade and service area
436041000000100	U1046	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence at industrial and construction area
460361000000109	U1047	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence on farm
436071000000106	U104y	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence at other specified place
475821000000107	U104z	clegg-falls	[X]Fall while being carried or supported by other persons, occurrence at unspecified place
17886000	U105.	clegg-falls	[X]Fall involving wheelchair
456921000000107	U1050	clegg-falls	[X]Fall involving wheelchair, occurrence at home
472451000000107	U1051	clegg-falls	[X]Fall involving wheelchair, occurrence in residential institution
422241000000106	U1052	clegg-falls	[X]Fall involving wheelchair, occurrence at school, other institution and public administrative area
460861000000104	U1053	clegg-falls	[X]Fall involving wheelchair, occurrence at sports and athletics area
407101000000105	U1054	clegg-falls	[X]Fall involving wheelchair, occurrence on street and highway
423721000000100	U1055	clegg-falls	[X]Fall involving wheelchair, occurrence at trade and service area
406761000000107	U1056	clegg-falls	[X]Fall involving wheelchair, occurrence at industrial and construction area

394651000000104	U1057	clegg-falls	[X]Fall involving wheelchair, occurrence on farm
476021000000109	U105y	clegg-falls	[X]Fall involving wheelchair, occurrence at other specified place
460561000000102	U105z	clegg-falls	[X]Fall involving wheelchair, occurrence at unspecified place
387701000000103	U1060	clegg-falls	[X]Fall involving bed, occurrence at home
476391000000109	U1061	clegg-falls	[X]Fall involving bed, occurrence in residential institution
475851000000102	U1062	clegg-falls	[X]Fall involving bed, occurrence at school other institution and public administrative area
436221000000102	U1063	clegg-falls	[X]Fall involving bed, occurrence at sports and athletics area
475931000000100	U1064	clegg-falls	[X]Fall involving bed, occurrence on street and highway
475941000000109	U1065	clegg-falls	[X]Fall involving bed, occurrence at trade and service area
391391000000103	U1066	clegg-falls	[X]Fall involving bed, occurrence at industrial and construction area
456791000000107	U1067	clegg-falls	[X]Fall involving bed, occurrence on farm
432861000000105	U106y	clegg-falls	[X]Fall involving bed, occurrence at other specified place
391421000000109	U106z	clegg-falls	[X]Fall involving bed, occurrence at unspecified place
403191000000106	U1070	clegg-falls	[X]Fall involving chair, occurrence at home
444911000000108	U1071	clegg-falls	[X]Fall involving chair, occurrence in residential institution
420261000000106	U1072	clegg-falls	[X]Fall involving chair, occurrence at school other institution and public administrative area
403201000000108	U1073	clegg-falls	[X]Fall involving chair, occurrence at sports and athletics area
407901000000108	U1074	clegg-falls	[X]Fall involving chair, occurrence on street and highway
461551000000107	U1075	clegg-falls	[X]Fall involv chair, occurrence at trade and service area
449371000000103	U1076	clegg-falls	[X]Fall involving chair, occurrence at industrial and construction area
437381000000107	U1077	clegg-falls	[X]Fall involving chair, occurrence on farm
388921000000109	U107y	clegg-falls	[X]Fall involving chair, occurrence at other specified place
407921000000104	U107z	clegg-falls	[X]Fall involving chair, occurrence at unspecified place
448321000000106	U108.	clegg-falls	[X]Fall involving other furniture
476251000000109	U1080	clegg-falls	[X]Fall involving other furniture, occurrence at home
394511000000102	U1081	clegg-falls	[X]Fall involving other furniture, occurrence in residential institution
475781000000104	U1082	clegg-falls	[X]Fall involving other furniture, occurrence at school other institution and public administrative area
423161000000107	U1083	clegg-falls	[X]Fall involving other furniture, occurrence at sports and athletics area
406581000000105	U1084	clegg-falls	[X]Fall involving other furniture, occurrence on street and highway
475811000000101	U1085	clegg-falls	[X]Fall involving other furniture, occurrence at trade and service area
394521000000108	U1086	clegg-falls	[X]Fall involving other furniture, occurrence at industrial and construction area
387571000000103	U1087	clegg-falls	[X]Fall involving other furniture, occurrence on farm
436081000000108	U108y	clegg-falls	[X]Fall involving other furniture, occurrence at other specified place
445011000000108	U108z	clegg-falls	[X]Fall involving other furniture, occurrence at unspecified place
395341000000105	U10A.	clegg-falls	[X]Fall on and from stairs and steps

476691000000103	U10A0	clegg-falls	[X]Fall on and from stairs and steps, occurrence at home
476701000000103	U10A1	clegg-falls	[X]Fall on and from stairs and steps, occurrence in residential institution
475861000000104	U10A2	clegg-falls	[X]Fall on and from stairs and steps, occurrence at school other institution and public administrative area
394571000000107	U10A3	clegg-falls	[X]Fall on and from stairs and steps, occurrence at sports and athletics area
394581000000109	U10A4	clegg-falls	[X]Fall on and from stairs and steps, occurrence on street and highway
436231000000100	U10A5	clegg-falls	[X]Fall on and from stairs and steps, occurrence at trade and service area
448121000000108	U10A6	clegg-falls	[X]Fall on and from stairs and steps, occurrence at industrial and construction area
415211000000107	U10A7	clegg-falls	[X]Fall on and from stairs and steps, occurrence on farm
420251000000108	U10Ay	clegg-falls	[X]Fall on and from stairs and steps, occurrence at other specified place
415221000000101	U10Az	clegg-falls	[X]Fall on and from stairs and steps, occurrence at unspecified place
415231000000104	U10B0	clegg-falls	[X]Fall on and from ladder, occurrence at home
391431000000106	U10B1	clegg-falls	[X]Fall on and from ladder, occurrence in residential institution
403211000000105	U10B2	clegg-falls	[X]Fall on and from ladder, occurrence at school, other institution and public administrative area
444921000000102	U10B3	clegg-falls	[X]Fall on and from ladder, occurrence at sports and athletics area
415261000000109	U10B4	clegg-falls	[X]Fall on and from ladder occurrence on street and highway
423431000000106	U10B5	clegg-falls	[X]Fall on and from ladder, occurrence at trade and service area
476191000000106	U10B6	clegg-falls	[X]Fall on and from ladder, occurrence at industrial and construction area
477141000000103	U10B7	clegg-falls	[X]Fall on and from ladder, occurrence on farm
395821000000109	U10By	clegg-falls	[X]Fall on and from ladder, occurrence at other specified place
395831000000106	U10Bz	clegg-falls	[X]Fall on and from ladder, occurrence at unspecified place
2617007	U10C.	clegg-falls	[X]Fall on and from scaffolding
394801000000101	U10C0	clegg-falls	[X]Fall on and from scaffolding, occurrence at home
436451000000106	U10C1	clegg-falls	[X]Fall on and from scaffolding, occurrence in residential institution
423471000000108	U10C2	clegg-falls	[X]Fall on and from scaffolding, occurrence at school, other institution and public administrative area
476261000000107	U10C3	clegg-falls	[X]Fall on and from scaffolding, occurrence at sports and athletics area
448331000000108	U10C4	clegg-falls	[X]Fall on and from scaffolding, occurrence on street and highway
447981000000107	U10C5	clegg-falls	[X]Fall on and from scaffolding, occurrence at trade and service area
475791000000102	U10C6	clegg-falls	[X]Fall on and from scaffolding, occurrence at industrial and construction area
475801000000103	U10C7	clegg-falls	[X]Fall on and from scaffolding, occurrence on farm
394531000000105	U10Cy	clegg-falls	[X]Fall on and from scaffolding, occurrence at other specified place
436051000000102	U10Cz	clegg-falls	[X]Fall on and from scaffolding, occurrence at unspecified place
14047009	U10D.	clegg-falls	[X]Fall from, out of or through building or structure
406591000000107	U10D0	clegg-falls	[X]Fall from, out of or through building or structure, occurrence at home
394541000000101	U10D1	clegg-falls	[X]Fall from, out of or through building or structure,

			occurrence in residential institution
460371000000102	U10D2	clegg-falls	[X]Fall from, out of or through building or structure, occurrence at school, other institution and public administrative area
436091000000105	U10D3	clegg-falls	[X]Fall from, out of or through building or structure, occurrence at sports and athletics area
432971000000106	U10D4	clegg-falls	[X]Fall from, out of or through building or structure, occurrence on street and highway
415321000000108	U10D5	clegg-falls	[X]Fall from, out of or through building or structure, occurrence at trade and service area
474701000000105	U10D6	clegg-falls	[X]Fall from, out of or through building or structure, occurrence at industrial and construction area
436701000000101	U10D7	clegg-falls	[X]Fall from, out of or through building or structure, occurrence on farm
460841000000100	U10Dy	clegg-falls	[X]Fall from, out of or through building or structure, occurrence at other specified place
395021000000100	U10Dz	clegg-falls	[X]Fall from, out of or through building or structure, occurrence at unspecified place
408011000000107	U10H.	clegg-falls	[X]Other fall from one level to another
449461000000102	U10H0	clegg-falls	[X]Other fall from one level to another, occurrence at home
477241000000108	U10H1	clegg-falls	[X]Other fall from one level to another, occurrence in residential institution
408021000000101	U10H2	clegg-falls	[X]Other fall from one level to another, occurrence at school, other institution and public administrative area
389041000000105	U10H3	clegg-falls	[X]Other fall from one level to another, occurrence at sports and athletics area
437631000000104	U10H4	clegg-falls	[X]Other fall from one level to another, occurrence on street and highway
461801000000109	U10H5	clegg-falls	[X]Other fall from one level to another, occurrence at trade and service area
424601000000104	U10H6	clegg-falls	[X]Other fall from one level to another, occurrence at industrial and construction area
477431000000103	U10H7	clegg-falls	[X]Other fall from one level to another, occurrence on farm
437711000000101	U10Hy	clegg-falls	[X]Other fall from one level to another, occurrence at other specified place
424611000000102	U10Hz	clegg-falls	[X]Other fall from one level to another, occurrence at unspecified place
389201000000104	U10J.	clegg-falls	[X]Other fall on same level
449281000000105	U10J0	clegg-falls	[X]Other fall on same level, occurrence at home
461471000000104	U10J1	clegg-falls	[X]Other fall on same level, occurrence in residential institution
437281000000103	U10J2	clegg-falls	[X]Other fall on same level, occurrence at school, other institution and public administrative area
395691000000106	U10J3	clegg-falls	[X]Other fall on same level, occurrence at sports and athletics area
395731000000100	U10J4	clegg-falls	[X]Other fall on same level, occurrence on street and highway
437311000000100	U10J5	clegg-falls	[X]Other fall on same level, occurrence at trade and service area
449301000000106	U10J6	clegg-falls	[X]Other fall on same level, occurrence at industrial and construction area
476161000000100	U10J7	clegg-falls	[X]Other fall on same level, occurrence on farm
448301000000102	U10Jy	clegg-falls	[X]Other fall on same level, occurrence at other specified place
436401000000105	U10Jz	clegg-falls	[X]Other fall on same level, occurrence at unspecified place
394781000000102	U10z.	clegg-falls	[X]Unspecified fall
40104005	U10z0	clegg-falls	[X]Unspecified fall, occurrence at home
436411000000107	U10z0	clegg-falls	[X]Unspecified fall, occurrence at home

406731000000102	U10z1	clegg-falls	[X]Unspecified fall, occurrence in residential institution
448151000000103	U10z2	clegg-falls	[X]Unspecified fall, occurrence at school, other institution and public administrative area
394621000000109	U10z3	clegg-falls	[X]Unspecified fall, occurrence at sports and athletics area
406741000000106	U10z4	clegg-falls	[X]Unspecified fall, occurrence on street and highway
387651000000106	U10z5	clegg-falls	[X]Unspecified fall, occurrence at trade and service area
387661000000109	U10z6	clegg-falls	[X]Unspecified fall, occurrence at industrial and construction area
460501000000101	U10z7	clegg-falls	[X]Unspecified fall, occurrence on farm
475971000000103	U10zy	clegg-falls	[X]Unspecified fall, occurrence at other specified place
436261000000105	U10zz	clegg-falls	[X]Unspecified fall, occurrence at unspecified place
217773000	U131.	clegg-falls	[X]Drowning and submersion following fall into bath-tub
434801000000102	U131.	clegg-falls	[X]Drowning and submersion following fall into bath-tub
405191000000105	U1310	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence at home
474381000000101	U1311	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence in residential institution
422131000000105	U1312	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence at school other institution and public administrative area
474621000000107	U1313	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence at sports and athletics area
405661000000108	U1314	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence on street and highway
386861000000106	U1315	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence at trade and service area
459491000000106	U1316	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence at industrial and construction area
435801000000101	U1317	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence on farm
387311000000100	U131y	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence at other specified place
459871000000105	U131z	clegg-falls	[X]Drowning and submersion following fall into bath-tub, occurrence at unspecified place
225054009	Ua1AN	clegg-falls	Fall onto outstretched hand
242078003	X70yh	clegg-falls	Fall from railway vehicle in motion
242079006	X70yi	clegg-falls	Fall from stationary railway vehicle
242109009	X70zC	clegg-falls	Fall down stairs of motor bus while boarding or alighting
242111000	X70zE	clegg-falls	Fall from car in street while boarding or alighting
242112007	X70zF	clegg-falls	Fall from car while boarding or alighting due to tripping on seat belt
242185001	X710V	clegg-falls	Fall on wet deck on board vessel
242227000	X711B	clegg-falls	Fall from aircraft on ground
242389003	X713k	clegg-falls	Fall due to wet surface
242390007	X713l	clegg-falls	Fall due to polished surface
242391006	X713m	clegg-falls	Fall due to discarded object
242392004	X713n	clegg-falls	Fall in bath or shower
242393009	X713o	clegg-falls	Fall due to defective pavement
242394003	X713p	clegg-falls	Fall due to accidental trip by another person
242395002	X713q	clegg-falls	Fall due to trip on loose carpet
242396001	X713r	clegg-falls	Fall due to uneven surface indoors
242398000	X713t	clegg-falls	Fall due to loss of equilibrium
242399008	X713u	clegg-falls	Fall due to failure of support

242400001	X713v	clegg-falls	Fall due to failure of rail
242401002	X713w	clegg-falls	Fall due to leaning on insecure furniture
242402009	X713x	clegg-falls	Fall on same level due to accidental impact with another person
242404005	X713z	clegg-falls	Fall due to impact against pedestrian conveyance
242405006	X7140	clegg-falls	Fall due to impact against pram
242406007	X7141	clegg-falls	Fall due to impact against supermarket trolley
242407003	X7142	clegg-falls	Fall due to impact against wheelbarrow
242414001	X7149	clegg-falls	Fall from stool
242415000	X714A	clegg-falls	Fall from hospital trolley
242417008	X714C	clegg-falls	Fall from ambulance stretcher
56307009	X714D	clegg-falls	Fall from table
242419006	X714E	clegg-falls	Fall from toilet seat
242423003	X714I	clegg-falls	Fall into canal
269699007	XE21s	clegg-falls	Fall on same level from impact against object
274919008	XM1Ff	clegg-falls	Fall on same level due to impact against another person
279992002	Xa1GP	efi-falls	Recurrent falls
288296009	Xa41x	clegg-falls	Fall - collision/push/shove
298343000	Xa6uG	efi-falls	Observation of falls
298344006	Xa6uH	efi-falls	Elderly fall
408561005	XaJHb	clegg-falls	Falls caused by medication
247541000000106	XaLqJ	efi-falls	Referral to falls service
248451000000109	XaMGj	efi-falls	Referral to elderly falls prevention clinic
294231000000103	XaN4s	efi-falls	Provision of telecare community alarm service
1075011000000102	Y3356	efi-falls	Unable to get off floor
391002003			Number of falls in last year (observable entity)