University Hospitals of Derby and Burton
NHS Foundation Trust

Multimorbidity and cardiovascular risk factors after Renal Transplant	
Multimorbidity and cardiovascular risk factors after Renal Transplant (MCaRT)	
Version and Date of Protocol:	V1.1 13/08/2025
Sponsor:	University Hospitals of Derby and Burton NHS Foundation Trust
Chief Investigator:	Professor Nicholas Selby
Local Study Reference:	UHDB/2025/044
IRAS Number:	354911
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Funder(s):	N/A
This protocol has regard for the HRA guidance	

Confidentiality Statement

This document contains confidential information that must not be disclosed to anyone other than the Sponsor, the Investigator Team, host NHS Trust, regulatory authorities, and members of the Research Ethics Committee.

SIGNATURE PAGE

The undersigned confirm that the following protocol has been agreed and accepted and that the Chief Investigator agrees to conduct the study in compliance with the approved protocol and will adhere to the principles outlined in the Declaration of Helsinki, the Sponsor's SOPs, and other regulatory requirement.

I agree to ensure that the confidential information contained in this document will not be used for any other purpose other than the evaluation or conduct of the investigation without the prior written consent of the Sponsor.

I also confirm that I will make the findings of the study publically available through publication or other dissemination tools without any unnecessary delay and that an honest accurate and transparent account of the study will be given; and that any discrepancies from the study as planned in this protocol will be explained.

Protocol V1.1 13/08/2025 authorisation signatures:

Chief Investigator:

Signature: ……..

Date: ……/……/……

Name (please print): ……..

For and on behalf of the Study Sponsor (if required):

Signature: ……..

Date: ……/……/……

Name (please print): ……..

Position: ……..

KEY STUDY CONTACTS

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Funder(s):	N/A
Study Statistician:	Investigating team

STUDY SUMMARY

Study Title:	**Cardiovascular risk factors and multimorbidity after renal transplant**
Local Study Reference:	UHDB/2025/044
Study Design:	Prospective cohort study
Study Participants:	Patients after renal transplants, who are adults (age ≥ 18)
Planner Number of Sites:	1 site
Planned Sample Size:	30 patients
Treatment Duration:	Not applicable
Follow Up Duration:	1 year
Planned Start Date:	01/08/2025
Planned Recruitment End Date:	Patient recruitment will begin once all necessary approvals are in place, with an anticipated recruitment period of 12 months, to finish 01/08/2026
Planned Study End Date:	The study will end when the last patient completes their study visit. Total duration of the study will be 24 months, to finish 01/08/2027
Research Question/ Aims:	To better understand patterns of development of cardiovascular risk factors and multimorbidity in the year after renal transplant

FUNDING AND SUPPORT IN KIND

Funder(s)	Financial and Non-Financial Support Given
N/A	

ROLES & RESPONSIBILITIES

Sponsor

The Sponsor, University Hospitals of Derby & Burton NHS Foundation Trust, take on overall responsibility for appropriate arrangements being in place to set up, run and report the research project.

Study Management Committees

The Centre for Kidney Research and Innovation (CKRI) at the University of Nottingham will be overseeing the study.

Protocol Contributors

The Chief Investigator and co-investigators have been involved in the development of this protocol. Protocol contributors are responsible for inputting into the design of the study, ensuring that it is designed rigorously, transparently and efficiently.

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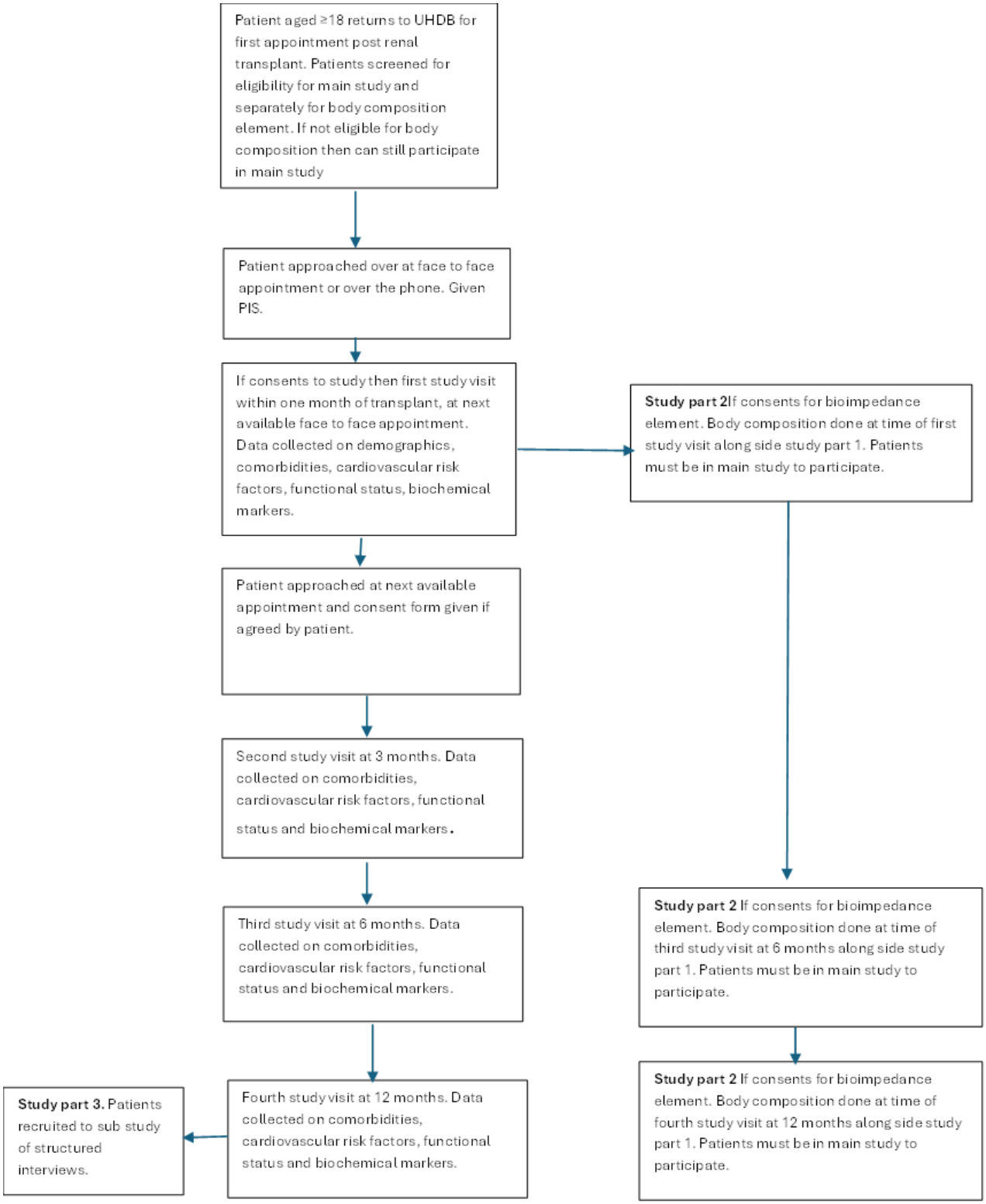
LIST OF ABBREVIATIONS

AE	Adverse Event
CI	Chief Investigator
CRF	Case Report Form
DMEC	Data Monitoring and Ethics Committee
GCP	Good Clinical Practice
GMP	Good Manufacturing Practice
ICF	Informed Consent Form
ICH	International Conference on Harmonisation of technical requirements for registration of pharmaceuticals for human use.
ISF	Investigator Site File
ISRCTN	International Standard Randomised Controlled Trials
NHS R&D	National Health Service Research & Development
PI	Principal Investigator
PIC	Participant Identification Centre
PIS	Participant Information Sheet
QA	Quality Assurance
QC	Quality Control
RCT	Randomised Control Trial
REC	Research Ethics Committee
SAE	Serious Adverse Event
SDV	Source Data Verification
SOP	Standard Operating Procedure
TMG	Trial Management Group
TSC	Trial Steering Committee
TMF	Trial Master File

STUDY FLOW CHART



STUDY PROTOCOL

1. BACKGROUND

At the end of 2022 39,874 adult patients in the UK were living with a kidney transplant, representing 56.2% of the population on kidney replacement therapy[1]. Kidney transplant remains the gold standard of renal replacement therapy and confers benefits in survival and quality of life over dialysis[2]. Short term survival post-transplant is good, with 94% adjusted 5 year survival in the UK for a transplant from a living donor and 87% for a deceased donor from the most recent UK renal registry data[1].

A high proportion of renal transplant patients have a high burden of comorbidities[6]. Increasing multimorbidity has been shown in the general population to increase risk of premature death and hospital admissions and is associated with poorer function and greater economic costs[7]. Much of the data in kidney transplant recipients focusses on comorbidity burden at time of transplant and the predictive use of this data for outcomes. There is little available data on the patterns and progression of multimorbidity for patients living with renal transplant. An assessment of the wider CKD cohort was undertaken using medical records and self reporting to understand multimorbidity, with a group of 176 transplant patients in the UK and showed that 92% had at least one comorbidity in addition to CKD[1]. The most common comorbidity was hypertension (60.1%), followed by musculoskeletal conditions (40.9%) and then cardiovascular disease and diabetes[1]. However, there is no data available, in this study or others, on the longitudinal development of comorbidities after transplant receipt. There is also no data available on the impact of multimorbidity on the quality of life of kidney transplant recipients. Although there is evidence for development of specific conditions, this has not been examined within the context of multiple long term health conditions.

There is no consensus on the measurement of multimorbidity, and no consensus on which comorbid conditions should be used in a count[2]. Expert reviewers suggest the conditions used to define multimorbidity should be guided by health impact and may be tailored to a study population[2,3]. No such work has taken place in the kidney transplant population.

A major comorbidity at time of transplantation and in post transplantation is cardiovascular disease and this is a major cause of death for patients with a renal transplant[45]. Although the risk of adverse cardiovascular outcomes is decreased compared to patients on dialysis it is significantly increased compared to the general population[3]. In addition, there is a high prevalence of both hypertension and diabetes within the transplant population[4,5]. As well as these being common comorbidities to have at time transplant, patients commonly develop post-transplant diabetes[5]. Alongside these factors, the risk of cardiovascular disease is also increased by raised BMI and lipid levels, which are commonly raised in renal transplant patients[3]. The interaction between these risk factors and transplant specific factors such as immunosuppressive medication and post-transplant weight gain contribute to significant cardiovascular risk. There is no consensus on specific post-transplant treatment targets or interventions[3]. Much of the evidence available for the timeline of development of cardiovascular risk factors is limited to retrospective cohort data and does not place cardiovascular disease within the context of multimorbidity[6]. In addition, much of the data predates current immunosuppression strategies and cardiovascular management strategies.

Obesity is a significant factor in development of multimorbidity in the wider population[7]. In particular it is associated with development of cardiovascular risk factors and cardiovascular disease in the wider

chronic kidney disease population as well as the transplant population[3,8]. In the general population obesity contributes to frailty, and poor health-related quality of life, and can lead to worsening multimorbidity[9]. There is also significant sarcopenia within the CKD and transplant population[10]. Weight gain over the first year post transplant has been well recognised. However, assessing this using only body mass index (BMI) has limitations in the CKD and transplant populations as it does not take into account the possible normalisation of a pre-existing malnourished state[11]. Using body composition techniques such as bio-impedance has shown changes in body composition post renal transplant, which has been related to muscle strength and fat distribution although this has not been correlated with function, multimorbidity, or development of cardiovascular risk factors. [11].

2. RATIONALE

In this exploratory study we aim we aim to understand what happens to multimorbidity over the first year following transplant, including modifiable cardiovascular risk factors. We would then plan to plan and undertake a larger prospective longitudinal study over a alonger period of time based on these findings.
We aim to explore the development of multimorbidity on patients after kidney transplantation- the patterns of multimorbidity across conditions, common comorbidities, and progression of multimorbidity. We plan to use a functional measure to understand how this might relate patient's experience.

We aim to measure the baseline characteristics of cardiovascular risk factors in the patient population as they return from transplant surgery to their referring centre, and then how these develop in the first year. The results of the study would aim to contribute to an evidence base regarding cardiovascular risk factors and identify targets for intervention within the first year. Early identification of modifiable risk factors can contribute to improvement of cardiovascular outcomes and graft survival.

We plan to use bioelectrical impedance to assess body composition and further understand the nature of weight gain post-transplant and how this relates to function, multimorbidity, exercise and other cardiovascular risk factors.

We also plan to recruit some patients into a qualitative study to help us understand possible barriers to improving modifiable cardiovascular risk factors with the aim of improving the effectiveness of any targeted interventions.

3. OBJECTIVES AND OUTCOME MEASURES/ ENDPOINTS

3.1. Objectives

Primary aims:

•

• To assess the changes over time of multimorbidity in the one year post kidney transplantation.

Secondary aims:

- To assess the changes over time of cardiac risk factors in the one year post kidney transplantation.

- Understand the barriers to improved cardiovascular health and impact of multimorbidity using structured interviews.
- Understand body composition changes over the one-year post transplant and how this relates to functional status.

3.2. Outcome

Primary outcomes:

1. To measure the number and type of comorbidities of patients in the one year post renal transplantation.
2. To measure the cardiovascular risk factors over one year post transplant. (Blood pressure, lipid levels, BMI, HbA1c.).

Secondary outcomes:

1. Use bioimpedance to estimate body composition changes over the year post transplantation
2. Use functional measures to assess impact on patient of multimorbidity, body composition and time out from transplantation.

3. Use qualitative methods in a structured interview format to understand barriers to improved cardiovascular health and impact of multimorbidity.

4. STUDY DESIGN

Study Part 1

The study is a prospective cohort study. Patients returning for follow up at the study centre post hospital discharge will be screened for eligibility. Demographic information will be recorded at baseline. This includes primary renal diagnosis, if participant had been on dialysis, type of dialysis and dialysis vintage. At each study visit the following data will be collected: eGFR (using the creatinine-based formula (CKD-EPI)), HbA1c, lipid levels, urine ACR, clinic blood pressure, weight, height, smoking status, functional status using the KDQOL 36 and sit to stand, comorbidities, medications. This will be done at the baseline visit, three months, 6 months and one year after initial study visit.

Study Part 2

For those participating in the body composition element of the study this will take place at the baseline study visit, and at 6 months and one year after initial study visit. Patients must enter part 2 of the study at the first study visit. Patients must be entered into part 1 of the study to enter into part 2. All patients who enter the study will be offered part 2 of the study unless they are ineligible.

Study Part 3

At the one-year study visit we will recruit for the structured interview element of the study. This will take place as soon as can be arranged after this visit. The interviews will be carried out face to face. We aim to recruit 10 participants for the interview. They will be recorded using trust recording equipment and transcribed and analysed by the research team. We will use content analysis to understand the themes of barriers to healthy lifestyle and perceptions of health after renal transplantation. We will screen and consent all participants until 10 are recruited for this element of the study.

5. STUDY SETTING

Study visits will be at the Royal Derby Hospital in the renal outpatient unit where participants attend for their usual renal outpatient appointments. Patients will be recruited from transplant coordinator data as they return from transplant.

6. ELIGIBILITY CRITERIA

6.1. Inclusion Criteria

- Age ≥ 18 years old
- Capable of giving informed consent
- In receipt of a single organ renal transplant and being followed up by UHDB as the referring team.

6.2. Exclusion Criteria

Exclusion criteria for main study

- Graft failure before return to follow up

Exclusion criteria for body composition

- Pregnancy
- Subjects with known neuromuscular diseases, e.g. myopathy, muscular dystrophy, muscular atrophy Patients with pacemakers

7. STUDY PROCEDURES

7.1. Recruitment

7.1.1. Patient Identification

Patients will be identified by the transplant coordinator on return to UHDB after transplant. All patients receiving a transplant will be screened and assessed by the eligibility criteria.

7.1.2. Screening

Once identified, the investigators will ask the potential participants if they were interested in the study, and a PIS will be provided at the time. Patients will be contacted either at a face-to-face clinic visit or via phone call for recruitment. The participants will be given time to read the PIS and at agreed time, recontacted to discuss any queries and check if they would like to consent for participation.

7.2. Consent

Informed consent must be obtained prior to the participant undergoing procedures that are specifically for the purposes of the study (including the collection of identifiable participant data, unless the study has prior approval from the Confidentiality Advisory Group (CAG) and the REC).

Once potential participants have had sufficient time to consider the PIS and opportunity to discuss any questions, the investigator will take informed, written consent. Participants may withdraw consent at any point and will be withdrawn from the study.

Translation services via the clinical setting (language line) will be available for those whom English is not their first language for all aspects of the study. Translation services for information sheets and consent forms will be available in other languages and also for study visits, phone calls and structured interviews if required.

The Principal Investigator (PI) retains overall responsibility for the informed consent of participants at their site and must ensure that any person delegated responsibility to participate in the informed consent process is duly authorised, trained and competent according to the REC approved protocol and applicable guidelines and regulations.

7.3. Study Assessments

Data will be collected from medical records, confirmed with participants and entered into the CRF: Participants will have demographic information recorded at baseline. This will include age, primary renal diagnosis, dialysis modality and vintage, and transplant details including deceased or living donor, induction regime, and length of hospital stay for transplant operation.

At each study visit collect the following data: eGFR (using the creatinine-based formula (CKD-EPI)), HbA1c, lipid levels, urine ACR, standardised office blood pressure, weight, height, smoking status, functional status, comorbidities, medications.

Functional status will be assessed using the KDQOL SF 36 and a sit-to-stand test. This is a validated survey assessing quality of life for patients with kidney disease. KDQOL has been translated and validated in a number of languages and if these are available will be used when applicable, alongside translation services in place in the renal department when needed.

For those in group 2 bioimpedance will be done at baseline, 6 months, and one year. Bioimpedance will involve the Inbody bioimpedance machine in the UHDB renal outpatients department. These involves participants wearing light clothing and takes approximately 5 minutes. This measures body composition, which divides weight into different components.

The structured interview will take approximately 20 minutes, and will take place at the closest available outpatient clinic appointment to the one year follow up visit. This will be recorded via already available transcription devices and transcribed by the study team.

Study visits will be aligned to the closest clinic appointment. Study visits will be at the first available opportunity after return to follow up at UHDB, then subsequently at one month, three months, six months and one year after this visit. Blood tests will be taken as part of usual standard of care and data collected from these results resulting in no extra blood tests for the patient.

There will be no compensation for participants. We will offer refreshments for the study assessments from within the department. If a patient requires transport this will be part of their normal clinic arrangements. We discussed the format of the assessments with our local PPIE group who felt that the arrangements were satisfactory.

7.4. Withdrawal Criteria

Participants will be withdrawn from the study if they withdraw consent to participate at any time. Participants do not have to provide a reason for withdrawal of consent. Subjects will also be withdrawn if it is deemed unsafe or is found to be impossible to proceed in the opinion of the investigators.

The participants will be made aware that this will not affect their future care. Participants will be made aware (via the information sheet and consent form) that should they withdraw the data collected to date cannot be erased and may still be used in the final analysis.

7.5. Storage and Analysis of Samples

No samples will be stored. Routine laboratory tests will be undertaken as per clinical practice in an NHS laboratory and samples destroyed after analysis. No additional research specific samples will be taken, the results from routine clinical tests will be used.

7.6. End of Study

The end of study will be defined as when the last 12 month follow-up visits are complete. The CI will notify the Sponsor, participating sites and REC within 90 days of the end of study. The clinical study report will be written within 12 months of the end of study.

8. SAFETY REPORTING

Not applicable

9. DATA HANDLING

9.1. System and Compliance

All data will be collected on a paper CRF for each participant where each participant will be assigned a unique ID. CRFs will be held securely in the renal research office, a locked room with storage cabinets. The electronic results system will be the source document for haematological and biochemical laboratory test results. This will be collated on secure trust server Excel document, which will be password protected. Only study staff shall have access to study documentation other than the regulatory requirements listed below. The investigators will keep records of all participating patients, all original signed informed consent forms and copies of the CRF pages in the Investigator Site File. Data will be added into the CRF directly and therefore it will act as a source document.

9.2. Source Data

Refer to section 9.1

9.3. Data Workflow

The CRF will be managed by the investigatory team and data from the CRF will be entered into an electronic database (excel) by participant ID which will be held will be held securely and password protected. All data will be stored on a secure dedicated web server (University Hospitals of Derby and Burton NHS Foundation Trust). Access will be restricted by user identifiers and passwords (encrypted using a one-way encryption method). Information about the study in the participant's medical records / hospital notes will be treated confidentially in the same way as all other confidential medical information. Electronic data will be backed up every 24 hours to both local and remote media in encrypted format as per the standard server backup process.

9.4. Data Access and Security

Only the CI and co-investigators will have access to the anonymised data.
Direct access will be granted to authorised representatives from the Sponsor, host institution and the regulatory authorities to permit study-related monitoring, audits and inspections.

9.5. Archiving

At the end of the study, following completion of the end of study report, UHDB will securely archive all centrally held study related documentation for a minimum of 5 years. At the end of the defined archive period arrangements for confidential destruction will be made. It is the responsibility of each PI to ensure that data and all essential documents relating to the study are retained securely for a minimum of 5 years after the end of study, and in accordance with national legislation.

UHDB will notify sites when study documentation held at sites may be archived and then destroyed. All archived documents must continue to be available for inspection by appropriate authorities upon request.

10. STATISTICS AND DATA ANALYSIS

10.1. Sample Size Calculation

As prospective cohort study no formal power calculation to determine sample size is required.

10.2. Planned Recruitment Rate

There are approximately 30 renal transplants per year who return to follow up to UHDB, we aim to recruit over one year. Therefore, the aim is to recruit approximately 25 patients.

10.3. Statistical Analysis

10.3.1. Summary of Baseline Data and Flow of Patients

Descriptive statistics will be presented to summarize the distribution of baseline variables across each of the randomisation groups. The continuous baseline variables (age, height, weight and blood pressure, eGFR, BMI) will be reported with means & 95% confidence intervals (95% CI), if shown to be normally distributed, otherwise will be reported with medians & Interquartile Ranges (IQR). The categorical variables (gender, ethnicity, comorbidities) will be reported with frequencies & percentages. We will record and report the numbers lost to follow up and the reasons for this.

10.3.2. Outcome Analysis

We plan to assess the data regarding changes to cardiovascular risk factors initially using visual methods. We will use descriptive statistics across the different time frames. We will compare values for the outcomes for different time points using longitudinal modelling.

For the interviews we will use content analysis to analyse themes within the interviews. Data will be recorded, transcribed and coded by the research team. The data will then be anonymised and stored, accessed, archived and deleted as per section 9 of the protocol.

10.3.3 Interim analysis

We are not planning any interim analysis in this observational study.

10.3.4 Analysis groups

There are no pre-specified groups for analysis.

10.4 Procedure(s) to Account for Missing or Spurious Data

Missing data will be reported as absent given the small sample size and nature of the study.
Imputation will not be used.

11. MONITORING, AUDIT & INSPECTION

The Investigator(s) must ensure that source documents and other documentation for this study are made available to study monitors, the REC or regulatory authority inspectors. Authorised representatives of the Sponsor may visit the participating sites to conduct audits/ inspections.

Monitoring and source data verification will be conducted by the Sponsor according to the study monitoring plan. The extent and nature of monitoring will be determined by the study objectives, purpose, design, complexity, blinding, number of patients and sites, and endpoints.

12. ETHICAL AND REGULATORY CONSIDERATIONS

12.1. Assessment and Management of Risk

The risks associated with the study are low as no treatment invention is proposed. Participants who will be having body composition assessed with BIA will be screened to ensure they do not have a pacemaker prior, which is an exclusion criteria to this area of the study due to possible electromagnetic interference. Participants will be encouraged to discuss any concerns about venepuncture for laboratory tests when consenting for the study. This is to allow minimalizing venepuncture where possible (for instance checking study tests with the required clinic visit bloods for CKD monitoring at the same time).

12.2. Public and Patient Involvement

This study was discussed with the renal departments public and patient involvement group, who commented that they thought that this area of research was a 'really good idea'. They felt the proposed visits were 'for most people it won't feel like more than the loving care and attention they normally get'.

They commented on weight gain after transplant and the impact of health burden on their quality of life, and felt a study assessing some of these issues would be beneficial.

Previous PPIE meetings on similar study designs in our department have identified clinic visits as a convenient time to conduct research visits. Usually, clinic visits in nephrology involve observations check with the nursing team, followed by clinician review, possible dietitian review and finally venepuncture. Integrating study discussion and visit in this session would allow participation without another trip to hospital.

PPIE will continue throughout all stages of the study in the Derby Renal Research Patient and Public Involvement group meetings. PPIE representatives will also be involved at the point of dissemination. Patient representatives will be supported to report the findings of the study and the experience of their involvement in patient publications and on patient and public-facing websites and invited to participate in conference presentations.

12.3. Research Ethics Committee (REC) & Regulatory Considerations

The study will be conducted in compliance with the approved protocol and the Declaration of Helsinki. The protocol and all related documentation (e.g. informed consent form, participant information sheet, questionnaires) have been reviewed and received approval by a Research Ethics Committee (REC). The investigator will not begin any participant activities until approval from the HRA and REC has been obtained and documented. All documentation and correspondence must be retained in the trial master file/investigator site file. Substantial amendments that require HRA and REC (where applicable) review will not be implemented until the HRA and REC grants a favourable opinion (with the exception of those necessary to reduce immediate risk to participants).

It is the responsibility of the CI to ensure that an annual progress report (APR) is submitted to the REC within 30 days of the anniversary date on which the favourable opinion was given, annually until the study is declared ended. The CI is also responsible for notifying the REC of the end of study (see Section 6.9) within 90 days. Within one year of the end of study, the CI will submit a final report with the results, including any publications/abstracts to the REC.

Before any site can enrol a patient into the study confirmation of capacity must be sought from the site's research and development (R&D) department. In addition, for any amendment that will potentially affect the site's permission, the research team must confirm with the site's R&D department that permission is ongoing (Section 12.9).

12.4. Protocol Compliance / Non-compliance Reporting

The investigator is responsible for ensuring that the study is conducted in accordance with the procedures described in this protocol. Prospective, planned deviations and/or waivers to the protocol are not acceptable, however accidental protocol deviations (non-compliances) may happen and as such these must be recorded. Non-compliances should be recorded in the CRF and/or a non-compliance log kept in the ISF. All non-compliances should be reviewed and assessed by the PI (or appropriately delegated individual) to determine if they meet the criteria of a "serious breach" (Section 12.6). Non-compliances which are found to frequently recur are not acceptable, will require immediate action, and could potentially be classified as a serious breach.

12.5. Notification of Serious Breaches to GCP and/or the Protocol

A "serious breach" is a departure from the protocol, Sponsor procedures (i.e. SOPs), or regulatory requirements which is likely to effect to a significant degree –

(a) The safety or physical or mental integrity of the subjects of the study; or
(b) The scientific value of the study.

If the PI (or delegate) is unsure if a non-compliance meets these criteria, they should consult the Sponsor for further guidance.
If a serious breach is identified the investigator should notify the Sponsor immediately (i.e. within 1 working day) using the 'Non-CTIMP Notification of a Serious Breach' form. The report will be reviewed by the Sponsor and CI, and where appropriate, the Sponsor will notify the REC within 7 calendar days of being made aware of the breach.

12.6. Data Protection and Patient Confidentiality

The study will be conducted in accordance with the Data Protection Act 2018. The investigator must ensure that participant's anonymity is maintained throughout the study and following completion of the study. Participants will be identified on all study specific documents (except for the informed consent form and enrolment log) only by the participants study specific identifier (and initials if deemed necessary). This identifier will be recorded on documents, biological samples and the database. The Investigator Site File will hold an enrolment log detailing the study specific identifier alongside the names of all participants enrolled in the study.
All documents will be stored securely with access restricted to study staff and authorised personnel.

Professor Nicholas Selby will act as the custodian of the data generated in the study.

12.7. Financial and Other Competing Interests for the Chief Investigator, Principal Investigators at Each Site and Committee Members for the Overall Study Management

No competing interests

12.8. Indemnity

As UHDB is acting as the research Sponsor for this study, NHS indemnity applies. NHS indemnity provides cover for legal liabilities where the NHS has a duty of care. Non-negligent harm is not covered

by the NHS indemnity scheme. UHDB, therefore, cannot agree in advance to pay compensation in these circumstances. In exceptional circumstances an ex-gratia payment may be offered.

All equipment provided for participants will be calibrated and purchased from an approved supplier.

12.9. Amendments

If changes to the study are required these must be discussed with the Sponsor, who is responsible for deciding if an amendment is required and if it should be deemed substantial or non-substantial. Substantial amendments will be submitted to the relevant regulatory bodies (REC, HRA) for review and approval. The amendments will only be implemented after approval and a favourable opinion has been obtained. Non-substantial amendments will be submitted to the HRA for their approval/ acknowledgment. Amendments will not be implemented until all relevant approvals are in place.

12.10. Access to Final Study Dataset

The final dataset will be limited to the CI and co-investigators as well as authorised sponsor personal. External investigators will be required to submit a formal request to the sponsor for access to data.

13. DISSEMINATION POLICY

13.1. Dissemination Policy

Upon completion of the study and End of Study report will be generated and submitted to REC within 12 months of the end of the study. As sponsor, UHDB will own all data arising from the study. The results of this study will be submitted to peer-reviewed journals for publication, including an open access journal as soon as data analysis is completed. The results will also be presented at conferences. Participants will not be identified in any publications. However, participants will be informed of the results of the study via a departmental research newsletter, which is made available to all patients.

13.2. Authorship Eligibility Guidelines and any Intended Use of Professional Writers

Authorship will be led by Dr Samuel Strain and will include the CI and co-investigators.

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15. APPENDICES

15.1. Appendix 1 – Schedule of Assessments

Procedures	Visits				
	Screening	**Baseline visit at one month post-transplant**	**3 months**	**6 months**	**1 year**
Informed consent	x				
Eligibility assessment	x				
Demographics		x			
Medical history		x			
Co-morbidities		x	x	x	x
Blood pressure		x	x	x	x
Bloods, functional assessment		x	x	x	x
Concomitant medications		x	x	x	x
Bio-impedance (Study group 2)		x		x	x
Interview					x

Amendment No.	**Protocol version no.**	**Date issued**	**Author(s) of changes**	**Details of changes made**

Detail all protocol amendments. Protocol amendments must be submitted to the Sponsor for approval prior to submission to the REC.