ISRCTN25527914 https://doi.org/10.1186/ISRCTN25527914

Randomised evaluation of sodium dialysate levels on vascular events

Submission date 10/01/2023	**Recruitment status** No longer recruiting	[X] Prospectively registered [_] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [X] Record updated in last year
Registration date 22/03/2023	**Overall study status** Ongoing	
Last Edited 13/08/2025	**Condition category** Urological and Genital Diseases	

Plain English summary of protocol

Background and study aims
In the UK 8000 people a year suffer permanent kidney failure and start dialysis. Dialysis sustains life, but at enormous cost, both in terms of healthcare spending and more importantly in terms of poor quality of life and drastically shortened life expectancy. The most common form of dialysis, haemodialysis, cleans the blood and removes excess water, but must be performed three times a week. It is a difficult and unpleasant treatment, with many patients continuing to suffer from excess fluid build-up, swelling, shortness of breath and fatigue. In addition, the build-up of salt (sodium) contributes to the high rates of heart attacks, strokes, and heart failure that affect people receiving long-term dialysis.
Currently, most dialysis centres set the dialysate sodium (the amount of salt in the fluid that washes the blood) between 135 mmol/l and 140 mmol/l and all patients in a given centre will have the same (default) dialysis sodium set on their machines for each session. Small studies suggest that sodium levels closer to the lower end of this range may increase the removal of excess salt from the body and reduce fluid build-up, which in turn may reduce the risks of heart disease and strokes. However, these same studies also suggest that levels closer to the upper end of the range may make the dialysis procedure more stable and lower the chance of blood pressure dropping during the dialysis session. This study will determine if a lower or higher dialysate sodium setting is preferable in terms of improving heart health and life expectancy.

Who can participate?
Dialysis units that mostly dialyse adults (aged 18 years old and over) receiving maintenance haemodialysis

What does the study involve?
Dialysis units are randomly allocated to use either a dialysate sodium of 137mmol/l or a dialysate sodium of 140mmol/l for about 3 years. Using information collected by the NHS and the UK Renal Registry, the number of people at each centre suffering a heart attack, stroke, heart failure, hospitalisation and death will be tracked to determine what is the best sodium setting to use to benefit the greatest number of patients.

What are the possible benefits and risks of participating?
This is a pragmatic study so there are no additional risks to the participants. The benefits are for

forthcoming participants who undergo dialysis as this may provide an accurate national default sodium level.

Where is the study run from?
University College London (UK)

When is the study starting and how long is it expected to run for?
June 2022 to May 2026

Who is funding the study?
National Institute for Health and Care Research (NIHR) (UK)

Who is the main contact?
Dr Rumana Jalil-Rahman, cctu.resolve@ucl.ac.uk

Contact information

Type(s)
Scientific

Contact name
Dr Hannah Sims

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

Integrated Research Application System (IRAS)
317616

ClinicalTrials.gov (NCT)
NCT02823821

Protocol serial number
CPMS 53987, IRAS 317616

Study information

Scientific Title

Randomised Evaluation of SOdium dialysate Levels on Vascular Events

Acronym
RESOLVE

Study objectives
This global study will establish whether treatment with a default dialysate sodium concentration of 137 mmol/l compared with 140 mmol/l reduces major cardiovascular events and death in adult patients receiving haemodialysis in centres employing a default dialysate sodium.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 01/11/2022, South Central - Berkshire Research Ethics Committee (Bristol REC Centre, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6PN, UK; +44 (0)207 104 8178, +44 (0)207 104 8182; berkshire.rec@hra.nhs.uk), ref: 22/SC/0280

Study design
Randomized; Interventional; Design type: Treatment, Other

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Renal disorders

Interventions
The RESOLVE study will randomly allocate 100 dialysis units across the UK to use either a dialysate sodium of 137mmol/l or a dialysate sodium of 140mmol/l for approximately 3 years. Using information collected by the NHS and the UK Renal Registry, the number of people at each centre suffering a heart attack, stroke, heart failure, hospitalisation and death will be tracked to determine what is the best sodium setting to use to benefit the greatest number of patients.

1. Study posters and patient leaflets will be available in the participating dialysis units. Additional information can be requested from unit staff and a ‘Study Information Sheet’ will be available. In addition, the study posters and patient leaflets will have a QR code with a link to the RESOLVE UK website where further information will be available about the study.
2. At this point patients can decide to opt out of data collection.
3. If the patient decides to allow data collection, then this visit and future visits to the unit will remain as normal. The duration and timing of dialysis will be unchanged.
4. Baseline data will be collected on patients, who don’t opt-out, from existing unit records. This does not require any input from the patients.
5. Site will be randomised.
6. Site will change its machines to use the allocated dialysate sodium as a default.
7. As all study data will be extracted from routine clinical data collection systems or registries (namely the UK Renal Registry and NHS Digital), participants will not be subjected to any additional questionnaires, medical tests, physical examinations or doctor’s visits.

8. All patients at the site (regardless of whether they opt out or not) will receive the allocated dialysate sodium per usual unit practice unless their doctor directs that a different sodium dialysate be prescribed. Patients who do not opt out, and who have their dialysate sodium individualised will remain in the study to maximise study generalisability and ensure a valid answer to the primary research question that concerns whether patient outcomes differ between units employing a higher or lower dialysate sodium.

Intervention Type
Other

Phase
Phase IV

Primary outcome(s)
The composite of hospitalised myocardial infarction, hospitalised stroke, and all-cause death, all measured using NHS Digital data at annual timepoints

Key secondary outcome(s))
1. Hospitalised heart failure measured using NHS Digital data at annual timepoints
2. The time between these events (hospitalised acute myocardial infarction, hospitalised stroke, hospitalised heart failure and death) measured using NHS Digital data at annual timepoints
3. Health economics will be performed to calculate potential costs and health-related outcomes in patients undergoing dialysis with a sodium concentration of 137 mmol/l vs sodium concentration of 140 mmol/l over the duration of the study

Completion date
01/05/2026

Eligibility

Key inclusion criteria
The principal SITE inclusion criteria are dialysis units that:
1. Predominantly dialyse adults (≥18 years old) receiving maintenance haemodialysis
2. Rates of withdrawal within the first two years of commencing dialysis for social reasons have been less than 15% for the 2 years prior to recruitment and are not expected to increase above 15%
3. Has a minimum of 10 dialysis recipients at the time of randomisation
4. Utilises a default dialysate sodium concentration at the time of recruitment (i.e. a substantial majority of dialysis sessions are conducted with the default dialysate sodium concentration)
5. Is a self-contained unit (i.e. unit patients do not regularly rotate through another unit. Brief trips by patients to a parent or other unit do not exclude a site). Note: If two or more sites have regularly rotating patients, these sites may be randomised together as a cluster.
6. Willing to accept randomisation to either intervention (as determined by the nominated Director of Unit)
7. Is not a home dialysis training or support unit (sites that include both in-centre or satellite dialysis patients and home patients may participate but the study procedures and assessments will only be conducted in the in-centre/satellite component of the site)

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Sex
All

Key exclusion criteria
The principal SITE exclusion criteria are dialysis units that are:
1. Not able to comply with data collection methods

Date of first enrolment
27/03/2023

Date of final enrolment
31/07/2024

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Royal Free London NHS Foundation Trust
Royal Free Hospital
Pond Street
London
United Kingdom
NW3 2QG

Study participating centre
Barts Health NHS Trust
The Royal London Hospital
80 Newark Street
London
United Kingdom
E1 2ES

Study participating centre
North Bristol NHS Trust
Southmead Hospital
Southmead Road
Westbury-on-trym
Bristol
United Kingdom
BS10 5NB

Study participating centre
Manchester University NHS Foundation Trust
Cobbett House
Oxford Road
Manchester
United Kingdom
M13 9WL

Study participating centre
Royal Devon University Healthcare NHS Foundation Trust
Royal Devon University NHS Ft
Barrack Road
Exeter
United Kingdom
EX2 5DW

Study participating centre
East Kent Hospitals University NHS Foundation Trust
Kent & Canterbury Hospital
Ethelbert Road
Canterbury
United Kingdom
CT1 3NG

Study participating centre
St George's University Hospitals NHS Foundation Trust
St George's Hospital
Blackshaw Road
London
United Kingdom
SW17 0QT

Study participating centre
Sheffield Teaching Hospitals NHS Foundation Trust
Northern General Hospital
Herries Road
Sheffield
United Kingdom
S5 7AU

Study participating centre
East and North Hertfordshire NHS Trust
Lister Hospital
Coreys Mill Lane
Stevenage
United Kingdom
SG1 4AB

Study participating centre
Northern Care Alliance NHS Foundation Trust
Salford Royal
Stott Lane
Salford
United Kingdom
M6 8HD

Study participating centre
Imperial College Healthcare NHS Trust
The Bays
St Marys Hospital
South Wharf Road
London
United Kingdom
W2 1BL

Study participating centre
South Tees Hospitals NHS Foundation Trust
James Cook University Hospital
Marton Road
Middlesbrough
United Kingdom
TS4 3BW

Study participating centre
The Shrewsbury and Telford Hospital NHS Trust
Mytton Oak Road
Shrewsbury
United Kingdom
SY3 8XQ

Study participating centre
University Hospitals of North Midlands NHS Trust
Newcastle Road
Stoke-on-trent
United Kingdom
ST4 6QG

Study participating centre
University Hospitals Coventry and Warwickshire NHS Trust
Walsgrave General Hospital
Clifford Bridge Road
Coventry
United Kingdom
CV2 2DX

Study participating centre
Kings College Hospital NHS Foundation Trust
Kings College Hospital
Denmark Hill
London
United Kingdom
SE5 9RS

Study participating centre
Epsom and St Helier University Hospitals NHS Trust
St Helier Hospital
Wrythe Lane
Carshalton
United Kingdom
SM5 1AA

Study participating centre
East Suffolk and North Essex NHS Foundation Trust
Colchester Dist General Hospital

Turner Road
Colchester
United Kingdom
CO4 5JL

Study participating centre
The Royal Wolverhampton NHS Trust
New Cross Hospital
Wolverhampton Road
Heath Town
Wolverhampton
United Kingdom
WV10 0QP

Study participating centre
University Hospitals Birmingham NHS Foundation Trust
Queen Elizabeth Hospital
Mindelsohn Way
Edgbaston
Birmingham
United Kingdom
B15 2GW

Study participating centre
University Hospitals Sussex NHS Foundation Trust
Worthing Hospital
Lyndhurst Road
Worthing
United Kingdom
BN11 2DH

Study participating centre
Mid and South Essex NHS Foundation Trust
Prittlewell Chase
Westcliff-on-sea
United Kingdom
SS0 0RY

Study participating centre
York and Scarborough Teaching Hospitals NHS Foundation Trust
York Hospital

Wigginton Road
York
United Kingdom
YO31 8HE

Study participating centre
Hull University Teaching Hospitals NHS Trust
Hull Royal Infirmary
Anlaby Road
Hull
United Kingdom
HU3 2JZ

Study participating centre
Gloucestershire Hospitals NHS Foundation Trust
Cheltenham General Hospital
Sandford Road
Cheltenham
United Kingdom
GL53 7AN

Study participating centre
James Paget University Hospitals NHS Foundation Trust
Lowestoft Road
Gorleston
Great Yarmouth
United Kingdom
NR31 6LA

Study participating centre
Norfolk and Norwich University Hospitals NHS Foundation Trust
Colney Lane
Colney
Norwich
United Kingdom
NR4 7UY

Study participating centre
Bradford Teaching Hospitals NHS Foundation Trust
Bradford Royal Infirmary
Duckworth Lane

Bradford
United Kingdom
BD9 6RJ

Sponsor information

Organisation
University College London

ROR
https://ror.org/02jx3x895

Funder(s)

Funder type
Government

Funder Name
NIHR Evaluation, Trials and Studies Co-ordinating Centre (NETSCC); Grant Codes: NIHR134660

Results and Publications

Individual participant data (IPD) sharing plan
The data-sharing plans for the current study are unknown and will be made available at a later date

IPD sharing plan summary
Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
HRA research summary			28/06/2023	No	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes