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Cauda equina syndrome early recognition study

Submission date
13/03/2026

Recruitment status
Recruiting

Registration date
13/04/2026

Overall study status
Ongoing

Last Edited
13/04/2026

Condition category
Nervous System Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Cauda equina syndrome (CES) describes the symptoms that occur when multiple lumbar and sacral nerve roots become compressed within the vertebral canal (at the bottom of the spinal cord). Its symptoms include low back pain, perineal sensory change, and bladder or bowel dysfunction. CES is a spinal emergency and the most common cause – a large central lumbar disc herniation – requires surgical decompression in almost all cases. CES commonly causes long-term disability, including permanent paralysis, impaired bladder and/or bowel control, and sexual dysfunction.
Nerve root viability declines after around 6 hours and prolonged compression rapidly leads to degeneration in motor and sensory nerve roots. As prognosis is likely worsened by delay between symptom onset and decompression, the consensus is that surgical intervention should be undertaken as soon as possible. The Society of British Neurological Surgeons (SBNS) and the British Association of Spine Surgeons (BASS) have published guidance that strongly emphasises the need for early diagnosis and decompression.

Unfortunately, making the diagnosis can be challenging and only around 0.1% of patients attending an Emergency Department with low back pain have CES. Nevertheless, there is good evidence that NHS services often fail to provide adequate care for patients with suspected CES. Although national guidelines recommend a very low threshold for MRI, many clinicians still rely on clinical judgement when assessing these patients and most hospitals cannot access MRI scanning outside normal working hours. As a consequence, patients with CES continue to experience unacceptable delays to surgery and failure to diagnose CES promptly costs the NHS around £33 million per year in litigation costs alone. It is for these reasons that the Royal College of Emergency Medicine (RCEM) highlighted the importance of “further research into the diagnosis of CES, both to define those clinical features which most accurately predict CES and the need for MRI”. There is therefore an urgent need to develop an evidence-based framework for the assessment of patients with low back pain in the ED.

The CESER study will try to determine whether any pattern of symptoms can help us work out which patients are very unlikely to have CES. It will also help determine how future patients should be treated when they arrive at an ED with symptoms that could be caused by CES.

Who can participate?
Adults aged 18 and over with suspected CES.

What does the study involve?
After consenting to join the study, participants will be asked to answer a series of short questionnaires about symptoms that can be experienced by people with CES. The questions will relate to pain, sensory changes, as well as bowel and bladder function. The completion of the questionnaires will be undertaken through a secure system on a computer or tablet. It should take about 10-15 minutes.
As part of usual standard care, participants will have an MRI scan and together with the doctor, a treatment plan will be made depending on any findings.
If the participant is then diagnosed with CES, the study team will contact them at 6 weeks and then again at 6 and 12 months after diagnosis. Participants will be asked to answer some further questions about pain, bowel and bladder function. They will also ask about their general quality of life. A web link will be sent for them to complete the questionnaires via email or text message. If participants are unable to access an electronic device, they can be contacted via telephone, or paper questionnaires can be sent out. It should not take more than 10-15 minutes to answer the questions.
If participants are not diagnosed with CES, they will not be asked to complete any further questionnaires. As part of the study, participants' hospital records will be reviewed after 12 months to see if participants had any other diagnoses or treatments related to their back pain.
Regardless of whether participants have been diagnosed with CES or not, they may also be asked if they are willing to provide contact details to be contacted by another researcher at a later date about taking part in an interview to discuss their experience of being assessed for CES. Taking part in the interview is optional, and any decision to take part will not affect inclusion in the CESER study or treatment.

What are the possible benefits and risks of participating?
There is no direct benefit in taking part in the study. The results of the study will help us determine how patients should be diagnosed when they arrive at an ED with symptoms that could be caused by CES.
Taking part in this study will not affect any part of the care participants will receive, so there will be no additional risks in taking part.
As part of the study, participants will be asked questions about their symptoms, which some people might find upsetting. If responding to the questionnaires provokes emotional and upsetting responses, the team will suggest that participants take a break and continue at a later time.

Where is the study run from?
The University of Oxford is sponsoring this study. It is being conducted by a research team at Oxford University led by Professor David Metcalfe, Chief Investigator and Associate Professor of Emergency Medicine.

When is the study starting and how long is it expected to run for?
April 2026 to April 2028.

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

Who is the main contact?
Mrs Kylea Draper- Trial Manager - ceser@ndorms.ox.ac.uk

Contact information

Type(s)
Public, Scientific

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Additional identifiers

Central Portfolio Management System (CPMS)
71001

National Institute for Health and Care Research (NIHR)
302219

Integrated Research Application System (IRAS)
356791

Study information

Scientific Title
The Cauda Equina Syndrome Early Recognition (CESER) Study: a mixed-methods study to improve diagnosis of cauda equina syndrome in the Emergency Department

Acronym
CESER

Study objectives
This study aims to determine whether patients with suspected CES can be risk-stratified using clinical features.
The secondary aims are to (1) report current outcomes for patients with confirmed CES, (2) describe variation in pathway design across the NHS, and (3) make recommendations about the optimal design of diagnostic pathways for patients with suspected CES.

Primary objective: To determine the diagnostic characteristics of signs and symptoms that may predict which patients have cauda equina compression

Secondary objectives:
1. To determine the prevalence of cauda equina compression amongst patients with suspected CES
2. To describe variation in time to sentinel events in the care pathway for patients with CES, such as MRI, transfer, and decompression.
3. To describe the function and quality of life of patients with confirmed CES
4. To determine the prevalence of alternative diagnoses of patients confirmed not to have CES
5. To describe the patient experience of CES symptoms, health-seeking activity, emergency care, diagnosis, treatment, and the early phase of recovery
6. To compare the costs and potential consequences of different strategies for managing suspected CES within the UK NHS and to estimate the resource utilisation associated with each strategy

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 05/03/2026, East Midlands - Nottingham 2 Research Ethics Committee (2 Redman Place, Stratford, London, E20 1JQ, United Kingdom; -; nottingham2.rec@hra.nhs.uk), ref: 26/EM/0025

Primary study design
Observational

Secondary study design
Cohort study

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Cauda equina syndrome (CES)

Interventions

The study is a multi-centre prospective diagnostic cohort study.

The study will recruit up to 2000 patients with suspected CES from approximately 12 trial locations in the UK. Participants with confirmed CES will be followed up on throughout the course of their assessment, management, and recovery. A record check will be completed for participants who do not have CES.

Patients will be identified in a consultant-led, 24-hour service at the major A&E of participating hospitals. Research staff will
identify and flag any potentially eligible patients and briefly introduce the idea of the study to the patients. Participants will then be approached about the study for the informed consent discussions by a member of the local research team or a clinician in the ED, such as the doctor designated to undertake their clinical assessment.

Once eligibility has been confirmed by the clinical team, the patient will be informed of the study and given access to the Patient Information Sheet (PIS). If happy to proceed, the patient will sign an electronic informed consent form (ICF).

Participants will be registered by the site research team using an online system. Baseline data will be collected after the participant has consented and been registered. Data will be entered into an online system by the participant, assessing clinician, and local research team.

All participants will complete questionnaires at baseline. Follow-up will be completed at 6 weeks, 6 months and 12 months by participants with confirmed CES through electronic, paper or telephone questionnaires. Patient experience of symptoms, diagnosis and emergency care will be sought through qualitative interviews with up to 30 participants recruited from the study. All patients who consent to take part in the cohort study will be informed of the qualitative study at a later time point and will have time to consider whether they would like to take part in this aspect of the trial. Those who are interested in taking part in an interview will provide consent to be contacted and their contact details will be shared with the qualitative researcher. Interviews will take place within three months of the patient initially presenting to the emergency department with suspected CES. The interview may be conducted using online software, such as Microsoft Teams, or by telephone.

Intervention Type
Other

Primary outcome(s)
1. Cauda equina compression reported on MRI scan measured using data collected from MRI reports, Clinical Assessment Case Report Forms (CRF) and Participant Baseline CRF at baseline-initial MRI scan

Key secondary outcome(s))
1. Cauda equina compression reported on MRI scan measured using timings from hospital records at baseline

2. Time to MRI, transfer to neurosciences centre, start of surgical decompression, and discharge home measured using completed CESCOS questionnaire at 6 weeks, 6 and 12 months

3. CESCOS measured using hospital records at 12 months

4. Diagnosis and complications measured using patient experiences at up to 3 months

5. Patient experience described during qualitative interviews measured using the prevalence of CES, clinical pathway descriptions, and publicly available reference costs for services at up to 12 months

6. Facilities audit and population level data from this cohort study measured using timings from hospital records at baseline

Completion date
01/04/2028

Eligibility

Key inclusion criteria
1. They are aged 18 years or over
2. They have a suspected diagnosis of CES, defined by a clinician who routinely assesses such patients and considers it appropriate to organise an MRI to confirm or exclude this diagnosis
3. They are willing and able to give informed consent

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 years

Upper age limit
120 years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. The MRI scan for suspected cauda equina compression had been undertaken before the clinical assessment
2. There is a suspected spinal fracture
3. There is evidence that the patient will be unable to adhere to trial procedures or participate in follow-up, including life expectancy of less than 12 months

Date of first enrolment
01/04/2026

Date of final enrolment
01/05/2027

Locations

Countries of recruitment
United Kingdom

England

Scotland

Wales

Study participating centre
John Radcliffe Hospital
Headley Way
Headington
Oxford
England
OX3 9DU

Study participating centre
Royal Liverpool University Hospital
Prescot Street
Liverpool
England
L7 8XP

Study participating centre
Airedale General Hospital
Skipton Road
Steeton
Keighley
England
BD20 6TE

Study participating centre
St Thomas' Hospital
Westminster Bridge Road
London
England
SE1 7EH

Study participating centre
Cambridge University Hospitals NHS Foundation Trust
Cambridge Biomedical Campus
Hills Road
Cambridge
England
CB2 0QQ

Study participating centre
Betsi Cadwaladr University Lhb
Executive Offices, Ysbyty Gwynedd
Penrhosgarnedd
Bangor
Wales
LL57 2PW

Study participating centre
Lothian
Waverleygate
2-4 Waterloo PLACE
Edinburgh
City of Edinburgh
Scotland
EH1 3EG

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

Study participating centre
Kettering General Hospital Laboratory
Kettering General Hospital
Rothwell Road
Kettering
England
NN16 8UZ

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

Study participating centre
Freeman Road Hospital
Freeman Road
High Heaton
Newcastle upon Tyne
England
NE7 7DN

Study participating centre
Kings Mill Hospital
Mansfield Road
Sutton-in-ashfield
England
NG17 4JL

Sponsor information

Organisation
University of Oxford

Funder(s)

Funder type
Government

Funder Name
National Institute for Health and Care Research

Alternative Name(s)
National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

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?
Participant information sheet	version 2.0	04/03/2026	17/03/2026	No	Yes