

# A point of care test to aid in diagnosis of suspected sepsis and optimal use of antibiotics in adults presenting to A & E

<b>Submission date</b> 13/12/2019	<b>Recruitment status</b> No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 19/12/2019	<b>Overall study status</b> Completed	<input checked="" type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 02/04/2025	<b>Condition category</b> Infections and Infestations	<input type="checkbox"/> Individual participant data <input checked="" type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Sepsis (also known as septicaemia or blood poisoning) is a common, potentially life-threatening complication of infection. The optimal treatment for sepsis includes early recognition, prompt antibiotics and fluids into a vein (intravenous/IV). Currently, clinicians assess severity in patients in the Emergency Department (ED) with a scoring system based on simple to measure observations: the National Early Warning Score (NEWS2). NEWS2 helps clinicians identify the sickest patients. It is not specific and tends to over-diagnose sepsis leading to over-prescribing of antibiotics and promoting antimicrobial resistance. It is the best we have and currently used in over 70% of English hospitals. Adults with suspected sepsis fall into one of three categories: a) those looking ill needing urgent IV antibiotics and fluids within 1 hour, b) those that are unwell, but will not come to harm if IV antibiotics are not administered within 1 hour, allowing time for further assessment prior to starting antibiotics within 3 hours, c) those not critically unwell who may or may not need IV antibiotics. Procalcitonin (PCT), a blood test not widely used in the NHS, helps to identify bacterial infection. The National Institute for Health and Care Excellence (NICE) recommended further research on PCT testing in EDs for guiding antibiotic use in people with suspected sepsis.

In this study, we will conduct a randomised controlled trial to compare PCT-supported assessment with standard care of suspected sepsis in adults presenting to the ED, and measure whether this approach reduces prescriptions of antibiotics without increasing mortality by decreasing uncertainty in the group who may not need IV antibiotics urgently within 1 hour, or not need antibiotics at all.

### Who can participate?

Patients  $\geq 16$  years presenting to the ED with suspected sepsis.

### What does the study involve?

Adult patients with suspected sepsis will be randomly assigned to current standard of care or PCT-supported care. In the PCT group, a bedside test (taking 20 minutes) is performed plus the NEWS2 assessment. Depending on the result of the PCT plus the NEWS2, patients will receive IV

antibiotics and fluids within the current recommended time frame depending on severity. Doctors and patients will know what treatment arm they are in. An analysis will be done to understand how well clinicians follow the recommendations, ease of use of the additional test in a busy ED, and its cost effectiveness. A sample of patients interviewed at 90 days follow up will assess experiences of care.

What are the possible benefits and risks of participating?

Participants who do not have sepsis will avoid being given IV antibiotics unnecessarily and therefore might avoid side effects. Taking part in the trial will mean that participants may have to give up some of their time to complete some follow up questionnaires. There are no other disadvantages or risks in taking part in the trial.

Where is the study run from?

University of Liverpool (UK)

When is the study starting and how long is it expected to run for?

December 2019 to April 2024

Who is funding the study?

National Institute for Health Research (NIHR), UK

Who is the main contact?

Dr Joanne Euden, eudenj@cardiff.ac.uk

## Contact information

**Type(s)**

Public

**Contact name**

Dr Joanne Euden

**ORCID ID**

<https://orcid.org/0000-0002-2844-6878>

**Contact details**

Centre for trials Research  
7th floor, Neaudd Meirionnydd  
Cardiff University  
Heath Park  
Cardiff  
United Kingdom  
CF14 4YS  
+44 (0)2922510771  
eudenj@cardiff.ac.uk

## Additional identifiers

**EudraCT/CTIS number**

Nil known

**IRAS number**

268723

**ClinicalTrials.gov number**

Nil known

**Secondary identifying numbers**

17/136/13, IRAS 268723, UoL001520

## **Study information**

**Scientific Title**

PROcalcitonin and NEWS2 evaluation for Timely identification of sepsis and Optimal use of antibiotics in the Emergency department.

**Acronym**

PRONTO

**Study objectives**

The addition of procalcitonin measurement to NEWS2 scoring will lead to a reduction in intravenous antibiotic initiation in ED patients managed as suspected sepsis, with at least no increase in 28-day mortality compared to NEWS2 scoring alone (in conjunction with local standard care pathways).

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Approved 21/07/2020, Wales Research Ethics Committee 2 Cardiff (Health and Care Research Wales Castlebridge 4 15-19 Cowbridge Road East Cardiff, CF11 9AB, UK; +44 (0)2920 785738; Wales.REC2@wales.nhs.uk), REC ref: 20/WA/0058

**Study design**

Multi-centre parallel two-arm open-label individually randomised controlled trial with two co-primary endpoints

**Primary study design**

Interventional

**Secondary study design**

Randomised controlled trial

**Study setting(s)**

Hospital

**Study type(s)**

Diagnostic

**Participant information sheet**

Not available web format, please use contact details to request a participant information sheet.

## **Health condition(s) or problem(s) studied**

Suspected sepsis

## **Interventions**

A procalcitonin (PCT) point-of-care test (testing equipment provided by ThermoFisher) used in combination with NEWS2 assessment of adult patients with suspected sepsis in emergency departments, using a stratification algorithm.

Individual patients will be screened for eligibility and randomised in a 1:1 ratio to either standard clinical management (control) or standard clinical management plus the Procalcitonin biomarker guided assessment (intervention). This will be implemented in a secure 24-h web-based randomisation programme controlled centrally by the Centre for Trials Research in Cardiff. In the intervention arm, levels of procalcitonin will be detected from a small blood sample which is read in a BRAHMS PCT Direct machine, taking 20 min. The result will aid in clinician's diagnosis of sepsis.

Adults in the control arm will not have the procalcitonin test performed and will simply have NEWS2 assessment for suspected sepsis as per standard care.

## **Intervention Type**

Device

## **Phase**

Phase III

## **Drug/device/biological/vaccine name(s)**

BRAHMS PCT Direct (ThermoFisher)

## **Primary outcome measure**

Co-primary outcomes:

1. IV antibiotics initiation at 3 hours (superiority endpoint)
2. Mortality at 28 days (non-inferiority endpoint)

## **Secondary outcome measures**

Current secondary outcome measures as of 03/05/2022:

1. Time until initiation of IV antibiotic therapy: time of antibiotic initiation, antibiotic type, dose and duration are taken at admission and daily as required
2. Late IV antibiotic initiation: antibiotics commenced after 3 hours, time of IV antibiotic initiation, dose and duration are taken as required
3. Number of days on IV antibiotics: type, dose and duration of antibiotic taken during admission and total over the first 28 days as required
4. Number of days on any antibiotic: type, dose, and duration of antibiotic taken during admission and total over the first 28 days as required
5. Number of days on broad-spectrum antibiotics (IV and oral), defined by the number of days on an Access group of antibiotics as defined by the WHO AWaRe Classification Database (type, dose and duration of broad-spectrum antibiotic during admission and total over the first 28 days as required)
6. ICU admission: date and details of admission to ICU at any point during admission
7. Length of ICU stay: number of days in ICU taken from medical notes
8. Length of hospital stay: number of days of admission taken from medical notes

9. Adverse antibiotic outcomes: date and type of adverse events taken from medical notes as required
10. Readmission to hospital within 90 days: ICU re-admissions post-discharge date
11. Mortality within 90 days: date and description of death and time until death in days from admission
12. Health utility measured using EQ-5D/5L at 28 and 90 days
13. Health resource usage: patient reported medical costs and resource use collected at 28 and 90 days
14. Feasibility of implementing PCT testing alongside NEWS2 scoring in EDs assessed using qualitative interviews with HCPs throughout the duration of the trial
15. Acceptability of implementing PCT testing alongside NEWS2 scoring in EDs, to patients, carers and clinicians, assessed using qualitative interviews with HCPs throughout the duration of the trial
16. Total average cost per patient per arm and cost per gained (health-adjusted) life year, taken from patient-reported questionnaires and patient medical notes as required

Previous secondary outcome measures:

1. Total duration of all antibiotics (IV and oral). (Number of days on any antibiotics up to day 28)
2. Type of antibiotic (defined by the number of days on Access group broad-spectrum IV and/or oral antibiotics during the 28-day follow-up period, as defined by WHO AWaRe Classification Database). Type, dose and duration recorded in medical notes daily
3. Readmissions (number of times participant readmitted to ICU during the 28-day follow up period. Monitored daily)
4. Antibiotic-associated side effects. (Recorded in medical notes and observation charts. Daily observation)
5. Health utility (EQ-5D/5L) at 90 days. (patient-reported questionnaire collected on day 28 and day 90)
6. Feasibility of implementing Procalcitonin testing alongside NEWS2 scoring in Emergency Departments (EDs) (qualitative interviews with HCPs during the internal pilot phase)
7. Acceptability of implementing Procalcitonin testing alongside NEWS2 scoring in EDs, to patients, carers and clinicians, (qualitative interviews with clinicians towards the end of the trial)

**Overall study start date**

01/12/2019

**Completion date**

30/04/2024

## Eligibility

**Key inclusion criteria**

Patients  $\geq 16$  years presenting to the ED with suspected sepsis

**Participant type(s)**

Patient

**Age group**

Adult

**Lower age limit**

16 Years

**Sex**

Both

**Target number of participants**

7,676

**Total final enrolment**

7676

**Key exclusion criteria**

1. Currently on intravenous antibiotics
2. Current use of any chemotherapy agent associated with myeloablation/suppression
3. History of solid organ transplantation, allogeneic bone marrow or stem cell transplantation within 3 months prior to consent
4. Patients known to require urgent surgical intervention (within the course of current admission)
5. Presence of an advance directive to withhold life-sustaining treatment (patients not wishing to receive Cardiopulmonary Resuscitation (CPR) may qualify provided they receive all other resuscitative measures e.g. respiratory support, fluid resuscitation)

**Date of first enrolment**

01/11/2020

**Date of final enrolment**

01/11/2023

**Locations****Countries of recruitment**

England

United Kingdom

**Study participating centre**

**Royal Liverpool University Hospital**

Prescot St

Liverpool

United Kingdom

L7 8XP

**Study participating centre**

**St James's University Hospital**

Beckett St

Leeds

United Kingdom

LS9 7TF

**Study participating centre****Hull Royal Infirmary**

Anlaby Rd  
Hull  
United Kingdom  
HU3 2JZ

**Study participating centre****Royal Hampshire County Hospital**

Romsey Rd  
Winchester  
United Kingdom  
SO22 5DG

**Study participating centre****Queen Alexandra Hospital**

Southwick Hill Road  
Cosham  
Portsmouth  
United Kingdom  
PO6 3LY

**Study participating centre****Royal Sussex County Hospital**

Eastern Rd  
Brighton  
United Kingdom  
BN2 5BE

## **Sponsor information**

**Organisation**

University of Liverpool

**Sponsor details**

University of Liverpool / Liverpool Joint Research Office  
2nd Floor Block C Waterhouse Building  
3 Brownlow Street  
Liverpool

England  
United Kingdom  
L69 3GL  
+44 (0)151 794 8373  
sponsor@liverpool.ac.uk

**Sponsor type**

University/education

**Website**

<https://www.liverpool.ac.uk/>

**ROR**

<https://ror.org/04xs57h96>

## **Funder(s)**

**Funder type**

Government

**Funder Name**

National Institute for Health 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**

**Publication and dissemination plan**

All publications and presentations relating to the trial will be authorised by the Trial Management Group and will be in accordance with the trial's publication policy. The trial protocol will be published, and the trial will be registered with ISRCTN. At the end of the study, a final report will be published in The Health Technology Assessment Journal. The results of this study will be disseminated locally, nationally and internationally amongst scientific, clinical and lay groups. At the local level, we will interact with and promote the



research findings through wider NHS Trusts (Health Boards in Wales), the NIHR Clinical Research Network: North West Coast, North West Coast CLAHRC, North West Coast AHSN (Innovation Agency). The Innovation Agency is the national lead within AHSNs for sepsis through the Patient Safety Collaborative.

Nationally, we will engage with NICE, the Royal College of Physicians, The Royal College of Emergency Medicine, The British Society for Antimicrobial Chemotherapy, The British Infection Association, NHS Improvement and the UK Sepsis Trust. Internationally, we will disseminate our findings at high impact conferences such as European Congress of Clinical Microbiology and Infectious Diseases, Federation of Infection Societies, The Interscience Conference on Antimicrobial Agents and Chemotherapy, The International Society for Pharmacoeconomics and Outcomes Research, and The European Health Economics Association. We anticipate publication outputs reporting the effectiveness and cost-effectiveness findings in high impact Journals such as The Lancet, The Journal of the American Medical Association, The British Medical Journal and Lancet Infectious Diseases. We will set up a study website and produce an annual NEWS letter for clinicians, academics and policy makers.

We will engage with patient groups and the wider public through our involvement as members of the UK Sepsis Trust, Antibiotic Action (a public awareness group of the British Society for Antimicrobial Chemotherapy), and the Meningitis Research Foundation, and publicise the study through these channels, and seek to present study updates at their annual conferences. We will use press releases and social media outlets (Facebook and Twitter) to publicise the study and disseminate findings. We will also feedback study findings to participants, their families and clinicians. We will use public engagement officers based at the University of Liverpool and participating hospital trusts to develop and disseminate public messages.

**Intention to publish date**  
01/04/2025

**Individual participant data (IPD) sharing plan**  
The datasets generated during and/or analysed during the current study are/will be available upon request from Cardiff Centre for Trials Research by contacting the study manager (Dr Joanne Euden) at PRONTO@cardiff.ac.uk. Anonymised data will be provided upon production of the requestor’s study protocol and agreement by Centre of Trials Research and study sponsor (University of Liverpool).

**IPD sharing plan summary**  
Available on request

**Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Protocol article</a>	version 2.0	13/06/2022	15/06/2022	Yes	No
<a href="#">HRA research summary</a>			28/06/2023	No	No
<a href="#">Statistical Analysis Plan</a>		03/12/2024	19/03/2025	No	No