

# Use of a smartphone camera to assess pupil response to light in neurocritical care – comparison with pen torch

<b>Submission date</b> 23/02/2023	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 20/04/2023	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 20/04/2023	<b>Condition category</b> Other	<input type="checkbox"/> Individual participant data <input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

This study is designed to compare the accuracy of measuring eye pupil size. It will compare the current standard of care, which is a pentorch and subjective assessment by a bedside nurse, to a new smartphone application using the camera and light of the phone to measure pupil size and responsiveness.

### Who can participate?

Patients admitted to a specialist neurocritical care unit

### What does the study involve?

Participants will have their pupils assessed by both methods hourly (which is standard) for a maximum of 10 days, during the day only. Not measuring at night provides respite for the patient (they will still have pentorch assessments) and reduces research staffing resources.

### What are the possible benefits and risks of participating?

The interventions are non-invasive and as such there are no risks to participants. The proposed benefit is earlier identification of changes in pupil response, both in terms of improvement and deterioration.

### Where is the study run from?

John Radcliffe Hospital (UK)

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

October 2022 to April 2023

### Who is funding the study?

Solvemed Inc. (UK)

### Who is the main contact?

Dr Simon Raby, [simon.raby@ouh.nhs.uk](mailto:simon.raby@ouh.nhs.uk)

# Contact information

## Type(s)

Principal investigator

## Contact name

Dr Simon Raby

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# Additional identifiers

## Clinical Trials Information System (CTIS)

Nil known

## Integrated Research Application System (IRAS)

324539

## ClinicalTrials.gov (NCT)

Nil known

## Protocol serial number

IRAS 324539

# Study information

## Scientific Title

Smartphone Pupillometry in Neurocritical Care - Comparison against PenTorch: the SPIN\_CAT trial

## Acronym

SPIN-CAT

## Study objectives

Smartphone pupillometry is more accurate than pentorch assessment of pupil responsiveness in neurocritical care patients.

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Approval pending, South Central - Oxford C REC

**Study design**

Single-centre non-randomized trial

**Primary study design**

Interventional

**Study type(s)**

Diagnostic

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

Critically ill patients admitted to neurocritical care

**Interventions**

Patients will have pupillary assessments made by pentorch and smartphone pupillometry. Pentorch is routine and the smartphone application is the additional intervention. Each intervention will be performed hourly during the day shift, for a maximum of 10 days per patient.

Pupil traces will be processed by Solvemed to generate two indices per eye: baseline pupil diameter (millimetres), and pupil reactivity (binary – responsive or non-responsive). Measurement reliability for pentorch and Solvemed app (baseline diameter) will be computed independently, to give an r-squared statistic for each. The reliabilities will be compared using a Fisher-transformed Z-test. The validity of the app will be established by the correlation of the pentorch and app measures. The primary outcome is that the app offers improved reliability. To gauge efficiency, questionnaires to nursing staff will be analysed using qualitative nonparametric statistics.

**Intervention Type**

Device

**Phase**

Phase III

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

Solvemed Neurapeek

**Primary outcome(s)**

Pupil diameter (millimetres) and pupil reactivity (binary – responsive or non-responsive) measured using the two modalities (pentorch and Solvemed smartphone application), performed hourly during the day shift, for a maximum of 10 days per patient

**Key secondary outcome(s)**

There are no secondary outcome measures

**Completion date**

01/04/2023

# Eligibility

## Key inclusion criteria

Any patient admitted to neurocritical care

## Participant type(s)

Patient

## Healthy volunteers allowed

No

## Age group

Adult

## Sex

All

## Key exclusion criteria

Pupillary assessment not possible due to ocular pathology

## Date of first enrolment

01/04/2023

## Date of final enrolment

01/04/2024

# Locations

## Countries of recruitment

United Kingdom

England

## Study participating centre

**Oxford Radcliffe Hospital NHS Trust**

The John Radcliffe

Headley Way

Headington

Oxford

United Kingdom

OX3 9DU

# Sponsor information

**Organisation**  
Solvemed Inc.

## Funder(s)

**Funder type**  
Industry

**Funder Name**  
Solvemed Inc.

## Results and Publications

### Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study will be stored in a non-publicly available repository: Following video capture, the video is uploaded onto the company-owned Amazon S3 server storage space (the cloud storage), where the captured videos and any associated data are stored in Amazon SQL databases. To ensure the stored data is secure, company applies an industry-standard Hypertext Transfer Protocol Secure (HTTPS) encryption protocol for all traffic between its smartphones and AWS servers. In addition, company applies suitable company-level policies regarding the access levels and procedures regarding every Amazon AWS component, using appropriate Amazon roles and Amazon policies.

### IPD sharing plan summary

Stored in non-publicly available repository

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Protocol file</a>	version 1.0	03/08/2022	07/03/2023	No	No