

The Pregnancy Physiology Pattern Prediction Study (4P Study)

Submission date 01/09/2014	Recruitment status No longer recruiting	☐ Prospectively registered ☒ Protocol
Registration date 29/12/2014	Overall study status Completed	☐ Statistical analysis plan ☒ Results
Last Edited 11/01/2021	Condition category Pregnancy and Childbirth	☐ Individual participant data

Plain English summary of protocol

Background and study aims

The two most recent Confidential Enquiries into Maternal Deaths reports in the UK have highlighted an urgent need to develop a national Modified Obstetric Early Warning System (known as MEOWS) to make sure that women who are developing life threatening complications of pregnancy are identified quickly, and referred and treated accordingly. Modified Early Obstetric Warning Charts (MEOWS) assign increasing scores (or colours) to each individual physiological measurement (blood pressure, heart rate, temperature, breathing rate and amount of oxygen in the blood) as they become more abnormal. If either the sum of scores for several physiological measurements, or a score for a single physiological measurement exceed set thresholds, an alert is triggered. We want to develop a database of physiology of pregnancy and the postpartum period (period from just after birth to around 6 weeks after birth) from which an evidence-based, robust early warning score can be developed.

Who can participate?

Pregnant women aged at least 16 without any underlying medical condition known to affect vital signs, that is blood pressure, heart rate, temperature, oxygen saturation levels (amount of oxygen in the blood) and respiratory (breathing) rate.

What does the study involve?

Participants have their vital signs measured by a research midwife at selected points throughout their pregnancy. After pregnancy they are required to carry out home monitoring of their own vital signs using a set of home monitoring equipment for approximately 2 weeks. Each participant is likely to be involved in the study from around 14 weeks of pregnancy to around 14 days postnatal (maximum 30 weeks to allow for women who deliver at 42 weeks). Vital signs data are collected from patients on a monthly basis from their recruitment to the study (at the first routine antenatal appointment or the nuchal scan) to two weeks postpartum. This is a combination of data recorded at regular antenatal visits, any in-hospital stay during pregnancy, delivery and immediately after birth, and data recorded by home monitors in the two weeks immediately after birth. Resting observations for the standard physiological variables used in the current MEOWS charts are recorded from each mother. Demographic, laboratory and medication data which may be related to vital signs is also collected. As a result, a large database of maternal and postpartum physiology will be assembled, from which an evidence-based,

national MEOWS will be developed for all stages of pregnancy, the intrapartum (during childbirth) and postpartum periods. A pregnancy stage specific alerting system will be created for use in monitored areas and hospital environments.

What are the possible benefits and risks of participating?
Not provided at time of registration

Where is the study run from?

The 4P study has been set up by the University of Oxford and runs from The Oxford University Hospitals NHS Trust. Guys and St. Thomas Hospital London and The Newcastle Upon Tyne Hospitals NHS Foundation Trust are in the process of being set up as recruiting sites.

When is the study starting and how long is it expected to run for?
November 2014 to August 2017

Who is funding the study?
Biomedical Research Centre (BRC) (UK)

Who is the main contact?
Dr Peter Watkinson
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Contact information

Type(s)
Scientific

Contact name
Dr Peter Watkinson

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Additional identifiers

Protocol serial number
1.0 - 26 June 2014

Study information

Scientific Title

The Pregnancy Physiology Pattern Prediction Study (4P Study): an observational cohort study

Acronym

4P

Study objectives

The two most recent Confidential Enquiries into Maternal Deaths in the UK have highlighted an urgent need to develop a national Modified Obstetric Early Warning System (known as MEOWS) to aid the more timely recognition, treatment and referral of women who are developing life-threatening complications of pregnancy. The problem is complicated by the normal changes in maternal physiology that occur both during pregnancy and immediately after delivery. Very limited information exists from which to develop an evidence-based early warning system that is adapted to alert appropriately for the stage of pregnancy or postpartum period.

Although several local Modified Obstetric Early Warning Systems have been developed an evidence-based approach to identifying when women have become physiologically abnormal for their stage of pregnancy is required, to achieve widespread acceptance of a national MEOWS chart.

Ethics approval required

Old ethics approval format

Ethics approval(s)

NRES Committee South East Coast - Brighton & Sussex, 13/08/2014, ref: 14/LO/1312

Primary study design

Observational

Study design

Two year multi-centre prospective observational cohort study

Study type(s)

Prevention

Health condition(s) or problem(s) studied

Vital signs during pregnancy, intrapartum and two weeks post partum

Interventions

Vital signs, including oxygen saturation levels, blood pressure, heart rate, respiration rate and temperature will be recorded onto a tablet and smartphone throughout pregnancy at 4-6 week intervals and daily for two weeks in the immediate postpartum period. The recordings are uploaded to a database under the participant's unique study number.

Intervention Type

Other

Primary outcome(s)

To create a comprehensive database of physiological values during pregnancy, the intrapartum and postpartum periods for 1000 participants.

Key secondary outcome(s)

1. To develop a centile-based early warning score for pregnancy and the postpartum period.
2. To investigate new patterns within vital signs data in pregnancy

Completion date

31/08/2017

Eligibility

Key inclusion criteria

1. Over 16 years of age (parental consent to be obtained for participants <18 years old)
2. Pregnant with an intent to deliver in hospital
3. Able to understand written or spoken English or has their own interpreter willing to translate
4. Willing and able to use the home monitoring equipment
5. Within category 1 of the American Society of Anaesthesiologists' classification of physical status at enrolment (normal healthy patient without any clinically important comorbidity and without a clinically significant past/present medical history).

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Lower age limit

18 Years

Sex

Female

Total final enrolment

1041

Key exclusion criteria

Any known medical condition expected by the recruiting clinician to alter maternal vital signs

Date of first enrolment

01/11/2014

Date of final enrolment

31/10/2016

Locations

Countries of recruitment

United Kingdom

England

Study participating centre
The Nuffield Department of Clinical Neurosciences
Oxford
United Kingdom
OX3 9DU

Sponsor information

Organisation
University of Oxford (UK)

ROR
<https://ror.org/052gg0110>

Funder(s)

Funder type
Research council

Funder Name
Biomedical Research Council (UK)

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/03/2020	07/02/2020	Yes	No
Results article	results	01/02/2021	11/01/2021	Yes	No
Protocol article	protocol	01/09/2017		Yes	No
HRA research summary			28/06/2023	No	No

Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
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Study website	Study website	11/11/2025	11/11/2025	No	Yes
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