

University of Leicester – PhD project

Funding Source: Self-funded

Proposed start date: negotiable

Closing date for applications: open until filled

Eligibility: UK/EU/International

Tuition fees for overseas: 2025/26 academic year: £23,650 - £38,300 per year

Department/School: Population Health Sciences / Diabetes Research Centre

Supervisors: Dr Claire Meek cm881@leicester.ac.uk

Project Title: The role of 24-hour behaviours in optimising the clinical management of diabetes in pregnancy.

Project Description

1.	This studentship will provide comprehensive and novel data on the role of 24-hour behaviours in the management of diabetes in pregnancy, embedded in a large multicentre observational study of 800 women with type 1 or type 2 diabetes in pregnancy.
2.	This studentship will collect quantitative data on the effect of ethnicity and socioeconomic deprivation upon 24-hour behaviours, potentially providing new opportunities to improve outcomes in women from under-represented groups.
3.	Using data from wearable technologies such as continuous glucose monitoring alongside accelerometry provides the opportunity for detailed characterisation of patterns of behaviour (or combinations of behaviours) upon glycaemia, providing important information for intervention development.

Background:

Diabetes in pregnancy affects 20 million women internationally per year, and is associated with suboptimal maternal and neonatal outcomes. Suboptimal outcomes are more likely to occur in under-represented groups, such as women from ethnic minority groups or those who experience socioeconomic deprivation, but the reasons for this are unclear. Accessible, equitable and sustainable interventions which can improve glycaemia and pregnancy outcomes in women with diabetes in pregnancy are urgently needed.

Lifestyle modifications are an important aspect to managing glucose levels, but there is minimal evidence on which lifestyle modifications are most impactful and sustainable in the pregnant population. In non-pregnant adults with diabetes, lifestyle modifications influencing

24-hour behaviours such as sleep, sitting, stepping, sweating, and strengthening result in improved glycaemia and clinical outcomes. A similar approach in pregnancy has not been attempted, but has equivalent potential to improve maternal and neonatal clinical outcomes in the UK and internationally, while reducing inequity.

Aim:

To assess the relationship between 24-hour behaviours and glycaemia and other outcomes in pregnant women with type 1 or type 2 diabetes.

Objectives:

- 1: To complete a systematic review of 24-hour behaviours and their association with glycaemia and clinical outcomes in women with diabetes in pregnancy.
- 2: To assess 24-hour behaviours in women with type 1 and type 2 diabetes in pregnancy using wearable technologies, and how these behaviours differ by gestation, socioeconomic status and ethnicity.
- 3: To investigate the ideal 24-hour behaviour composition to optimise glycaemia and/or clinical outcomes in women with diabetes in pregnancy.

Methods:

The student will collect and analyse data collected as part of a new observational study, Diabetes in pregnancy Optimising Maternal and Infant Outcomes (DOMINO). Women with type 1 or type 2 diabetes in early pregnancy will be recruited at antenatal clinics to participate in the study from over 20 sites nationally. Data will be collected on habitual diet and meal timing, physical activity, sedentary time and sleep (accelerometry), medications and glycaemia (continuous glucose monitoring).

Expected outcomes and impact:

This PhD programme will provide a comprehensive understanding of the role of 24-hour behaviours (such as sleep, sitting, stepping, sweating) in managing diabetes in pregnancy and its broader implications for both maternal and child health, potentially addressing inequalities and shaping future clinical guidelines. In addition, the student will have the opportunity to develop skills in systematic review, qualitative and quantitative methodology within a supportive team.

References:

Murphy HR, Howgate C, O'Keefe J, Myers J, Morgan M, Coleman MA, et al. Characteristics and outcomes of pregnant women with type 1 or type 2 diabetes: a 5-year national population-based cohort study. *Lancet Diabetes Endocrinol.* 2021;9(3):153-64.

Feig DS, Donovan LE, Corcoy R, Murphy KE, Amiel SA, Hunt KF, et al. Continuous glucose monitoring in pregnant women with type 1 diabetes (CONCEPTT): a multicentre international randomised controlled trial. *Lancet*. 2017;390(10110):2347-59.

Misra S, Ke C, Srinivasan S, Goyal A, Nyriyenda MJ, Florez JC, et al. Current insights and emerging trends in early-onset type 2 diabetes. *Lancet Diabetes Endocrinol*. 2023;11(10):768-82.

Sattar N, Rawshani A, Franzén S, Svensson AM, Rosengren A, McGuire DK, et al. Age at Diagnosis of Type 2 Diabetes Mellitus and Associations With Cardiovascular and Mortality Risks. *Circulation*. 2019;139(19):2228-37.

Covenant A, Yates T, Rowlands AV, Dempsey PC, Edwardson CL, Hall AP, Davies MJ, Henson J. Replacing sedentary time with sleep and physical activity: associations with physical function and wellbeing in Type 2 diabetes. *Diabetes Res Clin Pract*. 2024 Oct 5;217:111886. doi: 10.1016/j.diabres.2024.111886. Epub ahead of print. PMID: 39369857.

Henson J, Covenant A, Hall AP, Herring L, Rowlands AV, Yates T, Davies MJ. Waking Up to the Importance of Sleep in Type 2 Diabetes Management: A Narrative Review. *Diabetes Care*. 2024 Mar 1;47(3):331-343. doi: 10.2337/dci23-0037. PMID: 38394635.

Entry requirements:

Applicants are required to hold/or expect to obtain a UK Bachelor Degree 2:1 or better in a relevant subject.

The University of Leicester [English language](#) requirements apply where applicable.

Application advice:

To apply please refer to <https://le.ac.uk/study/research-degrees/research-subjects/health-sciences>

With your application, please include:

- CV
- Personal statement explaining your interest in the project, your experience, why we should consider you in addition to confirmation of how you will pay your fees.
- Degree Certificates and Transcripts of study already completed and if possible transcript to date of study currently being undertaken
- Evidence of English language proficiency if applicable
- In the reference section please enter the contact details of your two academic referees in the boxes provided or upload letters of reference if already available.

In the funding section please specify that you wish to be considered for Leicester Lifestyle and Health

In the proposal section please provide the name of the supervisors and project title (a proposal is not required)

Project / Funding Enquiries: Claire Meek cm881@leicester.ac.uk

Application enquiries to cls-pgr@le.ac.uk