3 Year PhD Studentship available for September 2019

Department: Health Sciences

Supervisors: Dr Rhiannon Owen (Health Sciences) rhiannon.owen@le.ac.uk, Dr Sylwia Bujkiewicz (Health Sciences) sylwia.bujkiewicz@le.ac.uk & Dr Terry Quinn (Institute of Cardiovascular & Medical Sciences, University of Glasgow, & Cochrane Dementia and Cognitive Improvement Group) Terry.Quinn@glasgow.ac.uk

Eligibility: UK/EU applicants only

Project Title: Use of electronic health records for efficient evaluation of biomarkers as diagnostic tools and surrogate endpoints in Alzheimer’s disease

Project Description: Dementia is recognised as one of the greatest public health threats of our time, both in the UK and globally. Alzheimer’s disease is the most common cause of dementia, but drug development has recently failed [1]. Critical evaluation of the drug development pathway in Alzheimer’s’ disease is therefore essential. In light of scientific advances in Alzheimer’s’ disease, stakeholders, such as FDA, are keen to incorporate the use of biomarkers not only at the diagnosis stage but also in clinical evaluation. Early and less costly surrogate markers of treatment effect can help speed up drug development thus encouraging investment and innovation. This is particularly important in the development of interventions aiming to prevent the emergence of clinical dementia, when measuring the effect of new treatments at early stages of clinical development. The project will set out to develop Bayesian statistical methodology for integration of multiple sources of data for improved diagnosis of patients with, or at risk of, Alzheimer’s disease dementia [2], as well as more efficient clinical trials of new interventions using surrogate endpoints [3].

The project will develop and utilize novel analytics to demonstrate optimal use of existing digital health records for modernising public health, enhancing clinical trial design, healthcare policy, and decision making in Alzheimer’s disease. These methodological developments will be generalizable to a broad range of disease areas. The following key objectives of this project focus on the development of statistical methodology using existing electronic health records (EHR) such as Dementias Platform UK (DPUK) and Alzheimer’s Disease Neuroimaging Initiative (ADNI):

- to jointly model dependencies between sequential diagnostic tests (e.g. biomarkers followed by assessment of cognitive function) to optimise diagnostic pathways

- to evaluate the utility of dynamic test thresholds (i.e. the cut-point with which a patient is deemed test positive) to maximise diagnostic ability of sequential tests
• to exploit data from EHR as a source of long-term follow up data, in evaluating biomarkers as candidate surrogate endpoints as predictors of clinical benefit (traditionally evaluated using short-term outcome data from randomized controlled trials only)

• to evaluate simultaneously multiple surrogate endpoints measured sequentially (e.g. biomarker followed by change in cognitive function) as predictors of treatment effect on the final clinical outcome

• To combine individual participant data from EHR with summary data from meta-analyses of randomised controlled trials and observational data to make the best use of available data for healthcare decision making

This research will **quantify the uncertainties** related to the impact (both positive and negative) of the use of such biomarkers on decision making and potentially increase the uptake of more efficient diagnostic tools and reliable surrogate markers to improve clinical efficiency, and reduce opportunity cost and resource waste for the NHS.

**References:**


**Funding details:**
The College of Life Sciences (CLS) HDRUK Studentship will provide a tax-free stipend at RCUK rates (£15,009 for 2019/20) and UK/EU fees for 3 years.

**Entry requirements:**
Applicants are required to hold/or expect to obtain a data science related UK Bachelor Degree 2:1 or better (e.g. Computer Science, Bioinformatics, Biostatistics), and preferably also a similar MSc qualification. The University of Leicester [English language requirements](#) apply where applicable.

**How to apply:**
You should submit your application using our [online application system](#).

Apply for a PhD in **Health Sciences Research**

In the funding section of the application please indicate you wish to be considered for a **CLS HDRUK Studentship**

In the proposal section please provide the **name of the supervisor and project** you want to be considered for – please list both your **first and second choices**.
Project / Funding Enquiries: Dr Rhiannon Owen rhiannon.owen@le.ac.uk

Application enquiries to pgradmissions@le.ac.uk

Closing date for applications: 3rd April 2019

Interviews are likely to be week commencing 8th or 15th April 2019