



Title of PhD project	<b>Using routinely collected hospital data to investigate the impacts of static and dynamic treatment regimes, with an application to ventilation strategies for COVID-19 patients</b>	
Supervisor	<a href="#">Professor Ruth Keogh</a>	LSHTM
Co-Supervisor	<a href="#">Dr Karla Diaz-Ordaz</a>	LSHTM
Brief description of project	<p>Over 0.5 million people have been hospitalised due to Covid-19 in the UK to date, and over 43,000 have required intensive care. Around 40% of Covid-19 patients admitted to intensive care have received invasive ventilation, however, there is debate over whether and when to introduce invasive ventilation in Covid-19 patients.</p> <p>This PhD project will use routinely collected hospital data (from University College London Hospitals NHS Foundation Trust hospital) to investigate the impact of invasive versus non-invasive ventilation on outcomes of patients with Covid-19, including if and when patients should be transferred from non-invasive to invasive ventilation based on their current clinical status. To address this question will require careful control for confounding. A specific challenge presented by hospital data is that measurements of patients' clinical status are made at high frequency, and that the frequency of measurements is informative.</p> <p>This project will also investigate and develop statistical methods based on 'causal inference' for answering questions about treatment effects from routinely collected hospital data and tackling the challenges that such data arise pose. This will entail use of simulation studies to evaluate and compare different methods of analysis.</p> <p>Clinicians and data scientists from UCL will provide additional supervisory and advisory support for this project, and the student will have the opportunity to work with other early-career researchers making use of the same data source. A range of training and skills development opportunities will also be available.</p> <p>Applicants should have a first class or upper second class undergraduate degree in a subject with a substantial</p>	

	<p>quantitative component (e.g. Maths, Statistics), and an MSc in Medical Statistics, Health Data Science, Statistics, or a related field, with a strong component of quantitative training and strong computational skills. Applicants with equivalent skills and experience will also be considered.</p> <p>The student will be based in the medical statistics department, which has a diverse community of PhD students. Applications from under-represented groups and from international students are encouraged.</p> <p>In advance of finalising their application, potential applicants are warmly invited and encouraged to contact the main supervisor Ruth Keogh by email (<a href="mailto:ruth.keogh@lshtm.ac.uk">ruth.keogh@lshtm.ac.uk</a>), who will be pleased to provide more information about the project and will be able to point towards reading material that can support the application.</p>
Skills we expect a student to develop/acquire whilst pursuing this project	<p>The student will develop skills in:</p> <ul style="list-style-type: none"> <li>• analysis of longitudinal hospital data</li> <li>• using and developing causal inference methods</li> <li>• management of databases conforming to the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM)</li> <li>• using simulation studies to evaluate statistical methods</li> <li>• producing reproducible computer code</li> <li>• working with clinical collaborators</li> </ul>
Particular <u>prior</u> educational requirements for a student undertaking this project	<p>MSc in Medical Statistics, Health Data Science, Statistics, or a related field, with a strong component of quantitative training and strong computational skills.</p> <p>First class or upper second class undergraduate degree in a subject with a substantial quantitative component (e.g. Maths, Statistics).</p>
Project key words	<p>Causal inference          Covid-19          Intensive care          Hospital data          Simulation study          Survival analysis</p>
Possible under 1+4 route? Master's options identified.	No
MRC Core Skills developed through this project	<p>Interdisciplinary skills          Whole organism physiology</p>
MRC LID themes	Health Data Science
Further reading	<a href="#">Using Big Data to Emulate a Target Trial When a Randomized Trial Is Not Available</a>

[Emulating a trial of joint dynamic strategies: An application to monitoring and treatment of HIV-positive individuals](#)

[Covid-19: When to start invasive ventilation is “the million dollar question”](#)