



Title of PhD project	Modelling <i>Clostridium difficile</i> vaccination strategy for the UK	
Supervisor	Dr Laith Yakob	LSHTM
Co-Supervisor	Dr Timothy Planche	SGUL
Brief description of project	<p>Mathematical models are increasingly relied on as a critical epidemiological tool and have been at the forefront of public health decision making during the current pandemic. This new project will use cutting-edge approaches in mathematical modelling to inform vaccination strategy for the pathogen <i>Clostridioides (Clostridium) difficile</i>. This pathogen exerts a huge toll in global health burden and the Centres for Disease Prevention and Control list it as a leading antibiotic resistance threat.</p> <p>Recently, the pharmaceutical company Pfizer have developed a novel vaccine for <i>C. difficile</i>. Trials have demonstrated excellent efficacy and the intention is to roll the vaccine out in the UK within the next few years. The primary supervisor has an ongoing collaboration with Pfizer that will be capitalized upon to make the outputs relevant to industry as well as health policy.</p> <p>This PhD studentship will determine the priority groups for vaccinating within the UK and estimate the cost-effectiveness of alternative vaccination strategies. In doing so this project represents a unique opportunity for a student to become trained in cutting edge epidemiological modelling; develop excellent knowledge of a globally important pathogen; develop a network within industry as well academia; and, directly inform public health policy.</p> <p>LSHTM’s vision is to provide an inclusive research, education and working environment reflected through a community that everyone feels a part of, which is safe, respectful, supportive and enables all to reach their full potential. We strive to be proactive in closing inequitable outcome gaps through positive action and, for example, anti-racist strategies. LSHTM is proactive in championing LGBTQ+ equality worldwide. We do this because it enables a range of</p>	

	perspectives to be heard, recognising the global and diverse cultural contexts in which we work.
Skills we expect a student to develop/acquire whilst pursuing this project	They will develop cutting-edge abilities in mathematical modelling, including the robust incorporation of parameter uncertainty. They will gain experience with operating both within academia and industry with our industry partners, Pfizer. They will develop skills in science communication – both orally (through presentations) and written (via publications).
Particular <u>prior</u> educational requirements for a student undertaking this project	The student will need extant quantitative and computational skills e.g. a significant component of mathematical and/or computational modelling in their previous degrees. They will need to be proficient in a common-use programming language e.g. R, Python.
Project key words	Mathematical modelling Computational biology Infectious diseases Epidemiology Vaccination <i>C. difficile</i>
Possible under 1+4 route? Master's options identified.	Yes LSHTM - MSc Health Data Science LSHTM - MSc Epidemiology
MRC Core Skills developed through this project	Quantitative skills Interdisciplinary skills
MRC LID themes	Global Health Health Data Science Translational and Implementation Research Infectious Disease
Further reading	<p>European Society of Clinical Microbiology and Infectious Diseases: update of the diagnostic guidance document for <i>Clostridium difficile</i> infection</p> <p>Differences in outcome according to <i>Clostridium difficile</i> testing method: a prospective multicentre diagnostic validation study of <i>C difficile</i> infection</p> <p>The impact of the introduction of fidaxomicin on the management of <i>Clostridium difficile</i> infection in seven NHS secondary care hospitals in England: a series of local service evaluations</p> <p>A Phase 2 Study Evaluating the Safety, Tolerability, and Immunogenicity of Two 3-Dose Regimens of a <i>Clostridium difficile</i> Vaccine in Healthy US Adults Aged 65 to 85 Years</p>

[Optimal control of vaccination rate in an epidemiological model of *Clostridium difficile* transmission](#)