UNIVERSITY OF CAMBRIDGE
Department of Veterinary Medicine

PhD Project: Evaluating the UK Vaccine Programme Holistically

Supervisor: Professor Caroline Trotter

The Project: This PhD project is embedded in the NIHR Health Protection Research Unit in Vaccines & Immunisation, a collaboration between the UK Health Security Agency (UKHSA), the London School of Hygiene & Tropical Medicine (LSHTM), University College London (UCL) and the University of Cambridge. Based at the University of Cambridge and supervised by Professor Caroline Trotter, the student will work closely with colleagues at UKHSA and other members of the HPRU.

The UK is a world leader in health protection through immunisation. UKHSA closely monitors the incidence of infectious diseases through its excellent surveillance systems. However, there is a tendency to consider each vaccine and disease separately. This could mean that we underestimate the value of the overall immunisation programme and make policy decisions that are not optimal. The overarching aim of this PhD project is to advance methods for considering the UK vaccine programme holistically. Two major objectives are (1) to quantify the number of lives saved to date by childhood immunisation in England and (2) to develop a framework for integrated decision making in the UK vaccine programme.

Shattock et al. (2024) estimated that the is a comprehensive quantitative modelling analysis evaluating the global public health impact of the World Health Organization's Expanded Programme on Immunization (EPI) from 1974 to 2024. The researchers estimated that global vaccination efforts averted approximately 154 million deaths over the 50-year period. Having an equivalent, scientifically sound estimate for the lives saved by vaccines in England, would be a powerful advocacy tool. The analysis proposed in objective 1 should reflect not just the benefits to the person getting the vaccine, but also the benefits to the whole population from reduced transmission of infections. In consultation, the student will identify and then quantify additional key markers of success in health and economic terms.

The NIHR HPRU has a vision of immunisation in the UK as a single, integrated, trusted and inclusive system. Improvements in one element can multiply benefits across the whole system. However, given the wide range of diseases covered by the immunisation programme, with corresponding differences in epidemiology and surveillance, in practice, the programme is not often viewed holistically. There are clearly synergies between antigens given as combination vaccines as well as operational and confidence aspects to achieving high coverage that cut across the programme. Assessments of the cost-effectiveness of new vaccines focus on the marginal cost-effectiveness of introducing that vaccine, rather than considering their contribution to the entire programme. The student will develop a framework for making decisions about vaccines that more formally considers the effect on the immunisation programme as a whole. They will then apply this draft framework to specific case studies and assess whether and how decision-making could be influenced, leading to further refinement.

The student will develop skills in infectious disease epidemiology, mathematical modelling of vaccine preventable diseases and health economics. The public are ultimately the 'vaccine consumers' and as such should be involved in framing and shaping vaccine research, so the student should also develop and execute a plan for public involvement and engagement.

Funding: Funding will be available to cover fees at the home fee rate plus a tax-free student maintenance starting at £20,199 for three years. This PhD is supported by the NIHR Health Protection Research Unit in Immunisation and covers research costs in addition to home fees and maintenance.

Start Date: January 2027
How to apply: Contact the Supervisor to discuss the project before submitting an official application.
Deadline to apply: 10th July 2026 (shortlisted applicants will be invited to interview before end of July 2026)
More info: on application process here: How to apply | Department of Veterinary Medicine