Project Details	
Project Code	MRCPHS24Ex Kelson
Title	Using modelling approaches to reduce inequality in physical activity interventions
Research Theme	Population Health Sciences
Summary	Physical activity promotes health & wellbeing. Policy makers seek interventions that increase population-level physical activity (e.g. traffic calming measures or cycle paths to promote active commuting). Many interventions however have differential impacts for different people. We propose combining advanced simulation & modelling approaches to provide estimates of effectiveness of various interventions & identify likely resulting inequalities.
Description	**Background** Physical activity is known to improve people's health and wellbeing. Policy makers at all levels are interested in promoting behaviours that are good for public health. Interventions to increase physical activity are often complex and intervening in a real-world system can often have unintended consequences, including exacerbating inequalities. There is therefore a growing need for analysis methods that can properly capture the complexity of health and social systems and model interventions within them. Hybrid simulation is one such approach. In hybrid simulation, two (or more) different types of simulation models are combined in order to harness the benefits of each. Here we propose combining agent based modelling (to allow for the rich and complex nature of humans living within societies) with system dynamics modelling, an approach which attempts to explicitly model higher level effects and the interplay of system-level features. The combination of these approaches would allow us to model complex physical activity interventions, such as traffic calming measures in a neighbourhood , and provide estimates of their effectiveness. **Key research question** Can we use hybrid simulation to provide evidence of effectiveness for population-level physical activity interventions and identify early evidence of inequalities in benefit? **Project aims** The specific objectives would be 1. To understand and build an agent-based model based on current resources and tailored to physical activity 2. To understand and build a system dynamics model to explore high level interventions 3. To develop a hybrid model that combines both approaches. 4. To test and validate the model using case studies that will be developed throughout the PhD **Areas for ownership** The case studies of application are deliberately left open for the student to steer the project towards particular areas of interest.
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