

Agent-based modelling for health economic evaluations and healthcare policy decisions

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In this talk, we will introduce agent-based models (ABMs) and their use in economic evaluation of healthcare interventions. ABMs are often used in theoretical approaches with explanatory goals in mind. However, the flexibility of ABMs along with their ability to integrate diverse data sources also lends to a data-driven approach that can be used to model healthcare with predictive goals, to inform policy and decision making. That is the realm of health-economics, which has been primarily concerned with measuring the effectiveness, value, and efficiency of healthcare systems, services, and interventions. However, increasing demand for evidence-based decision making globally is driving a need for innovation in the field. For example, most trial data on the efficacy of interventions comes from high income countries, and we need to contextualize evaluations to consider local populations and healthcare systems. Furthermore, we have new goals and criteria in mind: The United Nation's Sustainable Development Goals have highlighted the importance of measuring the distribution of health in the population and the fairness of interventions. Working with ABMs provides modelling flexibility that can help in these areas.

Our goal is to understand whether and how ABMs can contribute to healthcare evaluations and planning in sub-Saharan Africa and globally. We will use IndiaSim—a data-driven ABM of the Indian population and its utilization of the healthcare system—and its application in economic evaluations as an example. IndiaSim has been used to publish evaluations of interventions such as public financing of epilepsy treatment, developing water and sanitation infrastructure to reduce the burden of diarrheal disease, and expanding India's Universal Immunization Programme. We will reflect on the challenges posed by working with data-driven ABMs; these challenges are particularly acute in low- and middle-income countries, where data is often limited. We will also suggest useful resources for beginning to work with ABMs.

Keywords: agent-based models, healthcare interventions, health-economics, evidence based decision making