

Mathematical modelling with applications to controlling emerging infectious diseases and measuring the success of interventions in antimicrobial stewardship.

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Abstract

The first part of the talk will be a brief overview about our work in the surveillance, control, and treatment strategies of emerging infectious diseases, the modelling and analysis methods include age-structured partial differential equations, delay differential equations, stability and bifurcation theory in dynamical systems. The second part of the talk will focus on using mathematical modelling to improve our understanding of antimicrobial de-escalation. Antimicrobial de-escalation is a commonly practiced treatment strategy that aims to reduce the impact of resistance on empiric therapy, but the overall impact on patients is not well understood on the clinical study level. This work, jointly developed with physicians in hospitals, provides insight into possible unintended consequences of antimicrobial de-escalation, with implications for measurement of the impact of antimicrobial stewardship interventions.

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