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Modelling Antimicrobial De-escalation: Implications for Stewardship Programs

Sequential antimicrobial de-escalation aims to minimize resistance to high-value broad-spectrum empiric antimicrobials by switching to alternative drugs when testing confirms susceptibility. Though widely practiced, the effects de-escalation are not well understood. Definitions of interventions and outcomes differ among studies. We develop a high-dimensional ordinary differential equation system model of the transmission and evolution of Pseudomonas aeruginosa in an intensive care unit to assess the effect of de-escalation on a broad range of outcomes, and clarify expectations. With broad ranges of undetermined parameters and limited hospital data, we statistically analyze the numerical simulation results in order to direct future model simplification and mathematical analysis.