

A Mathematical model with Multiple Strategies for Combating HIV/AIDS

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Abstract:

Economic epidemiology is a field at the intersection of epidemiology and economics. The two fields of economics and epidemiological disease modelling have tended to work independently of each other despite their common reliance on the language of mathematics and exploration of similar questions related to human behavior and infectious disease. This paper incorporates incentives for healthy behavior and their attendant behavioral responses into an epidemiological context to better understand how diseases are transmitted and explores the benefits of incorporating simple economic principles of individual behavior and resource optimization into epidemiological models. The paper also helps improve policy responses to epidemic diseases by giving policymakers and health-care providers clear tools for thinking about how certain actions can influence the spread of disease transmission. A review of related research is carried out showing the idea of prevalence-dependence which suggests that individuals change their behavior as the prevalence of a disease changes. The role of externalities, global disease commons and how individuals' incentives can influence the outcome and cost of health interventions is highlighted with special reference to HIV/AIDS. The exploration of the interplay between human behavior and economic incentives suggest important directions for future collaborations that benefit many people at no cost to themselves. We have employed an interdisciplinary approach-weaving together the techniques of economics cost-effectiveness analysis.

Key words: Economic epidemiology, disease modelling, healthy behaviour, economic principles, prevalence dependence, cost-effectiveness