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Behavioural Responses to Epidemics: Report from a Virtual Experiment (poster)

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I. Introduction

Existing epidemiological models have largely tended to neglect the impact of individual behaviour on the dynamics of diseases. However, awareness of the presence of illness can cause people to change their behaviour by, for example, staying at home and avoiding social contacts [2, 6-8]. Such changes can be used to control epidemics but they exact an economic cost [3]. We present results from a study that involved mathematical modelling, computer science and health psychology [5]. In our model, disease spread is controlled by allowing susceptible individuals to temporarily reduce their social contacts in response to the presence of infection within their local neighbourhood. We ascribe an economic cost to the loss of social contacts, and weigh this against the economic benefit gained by reducing the impact of the epidemic. We designed and carried out a series of experiments involving participants playing a computer game in which they could respond to epidemic threats by changing their behavior [1,4]. These choices were fed into a simulation model which updated the threats in response to participant actions. The experimental setup involved participatory simulation [9] using a back-end agent-based simulation model implemented in NetLogo [10].

The results show that participants responded to increasing infection load in their local neighbourhood by reducing their social contacts, as they would be expected to do in reality. There was a large variability in their response, both among the participants and within each game. We used an agent based model to scale up from the individual to the population behaviour. We show that the most common response was to maximize the individual gains by attempting to remain uninfected for as long as possible. However, this individual behaviour leads to a high level of disease prevalence at the population level.

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