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Modelling how disease dynamics, strategic interactions, and social learning determine the course of a vaccine scare

Chris Bauch *
cbauch@uoguelph.ca

Mortality due to infectious diseases continues to decline in many countries, thanks to growing access to vaccines. However, as accessibility recedes as a barrier to elimination, vaccine refusal is re-emerging as a stubborn problem. Increasingly, mathematical models of disease spread are incorporating human behaviour, with the intention of addressing problems like vaccine refusal. In this talk I will present several models that couple disease dynamics to population vaccinating behaviour for pediatric infectious diseases, and discuss how their dynamics bear on certain questions around vaccine refusal. I will also present the results of attempts to empirically validate such models against data on vaccine coverage and case notifications from the whole cell pertussis vaccine scare in the UK of the 1970s, and the MMR vaccine scare in the UK of the 1990s, including a test of their predictive abilities.

This is joint work with Samit Bhattacharyya.

*Department of Mathematics and Statistics, University of Guelph, 50 Stone Road East, Guelph, ON, N1G 2W1, CANADA.