1106-92-2407 **Scott W Greenhalgh*** (scott.greenhalgh@yale.edu), 135 College Street, Suite 200, New Haven, CT 06520, and **Jan Medlock** and **Alison Galvani**. *The dynamic modeling of disease extinction and immigration.*

Traditional differential equation models of disease transmission are often used to predict disease trajectories and evaluate the effectiveness of alternative intervention strategies. However, such models cannot account explicitly for probabilistic events, such as those that dominate dynamics when incidence numbers are low. Here we develop a novel approach, using the theory of control systems, to account for probabilistic processes, including extinction and immigration of infection, without the added analytical and computational complexity of a stochastic model. We apply our approach to analyze measles outbreaks from 1923 to 1938 in Iceland, providing insight on the temporary extinction of measles, the risk of re-emergence, and whether undocumented measles cases occurred. (Received September 16, 2014)