Project Title: " Mathematical Modeling of Infectious Diseases: Dynamics and Control of Swine Influenza"

The impact of infectious diseases on human and animal is enormous, both in terms of suffering and social and economic consequences, especially when the new swine flu virus (H1N1) has sparked a deadly outbreak in some countries and spread into other (or rest) parts of the world. Mathematical modeling is an essential tool in studying a diverse range of such diseases. Basic aims in studying the spread of these diseases are to gain a better understanding of transmission mechanisms and those features that are most influential in that spread, so as to enable predictions to be made, and to determine and evaluate control strategies. Our concern in this project is with the role that mathematical models (based on ordinary and delay differential equations) play in modeling of infection diseases. Practical illustration, using real data, will be used to convey more general insight to biologists. The expected results will be of interest to a wide range of mathematicians and specialists in immunology, epidemiology and infectious disease.

A central objective is to make our mathematical models qualitatively and quantitatively consistent with the nature and dynamics of the underlying infection diseases process. This objective will be achieved by a novel exploitation of nonlinear numerical parameter estimation, structural identification procedures and by dynamical system analysis. Scientific theories and experimental work will be used to direct the development and verification of the models.

The duration of the project is 2 years.

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