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Project Title: Modeling Vaccine and other intervention strategies for Influenza in
Taiwan

Project Number: DOH95-DC-1407

Executing Institute: National Chung-Hsing University

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P.I. Position Title: Professor

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Abstract:

Mathematical models have been frequently used for quantitative analysis of infectious disease epidemiology (see "Infectious Diseases of Humans" by Anderson and May, 1991). Since 1997, the emergence of avian Influenza (H5N1) has resulted in high mortality in hundreds of cases in Asia and, more recently, in Africa and Europe. As of October 11, 2006, H5N1 has caused 148 deaths out of 253 documented cases (WHO). In order to sufficiently prepare for the potential of a world-wide flu pandemic, we make use of mathematical modeling to systematically explore the following objectives during the duration of the project from January 1 2006 to July 31, 2007: (1) Making use of an age-dependent model with differences in age groups' activity levels and preferences to study the role of interaction between age groups and the relative impact and effectiveness of vaccinating infants, schoolchildren, and elderly to lesson mortality and morbidity; (2) Using a mathematical model with asymptomatic infective class to explore the roles of asymptomatic infection and vaccination in spread of flu, and to estimate relevant model parameters. The model constructed for this research project can be useful for prospective study of the effectiveness and design of appropriate vaccine policy in case of a future pandemic.

Keyword: pandemic flu, vaccine, mathematical model, epidemiological parameter, basic reproduction number, age-dependence, asymptomatic infection, targeting