

## Applying structured population models to epidemic data: Empirical studies during the 2009 influenza pandemic

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In addition to mathematical formulation of the physiologically structured population models, mathematical modelers apply the proposed models to empirical datasets, thereby assessing the validity of the models, deriving new insights into the population dynamics, and offering useful contributions of practical relevance to an academic field. Epidemiological models of infectious diseases have been most widely employed to analyze the actual epidemic data, recognized as indispensable for objectively describing any empirical observations. Apart from long-lasting series of epidemiological studies particularly enhanced from mid-20th century, recent epidemics and pandemics of novel infectious diseases, such as BSE (bovine spongiform encephalopathy), FMD (foot and mouth disease), SARS (severe acute respiratory syndrome) and pandemic influenza H1N1-2009, have provided us with the most precious opportunities to analyze epidemiological data in an emergency setting and give a real-time research response to the epidemics, closely working with medical and public health experts.

The 2009 influenza pandemic has yielded critical lessons for the analysis and interpretation of empirical data, which will lead a guideline for the real-time observation and analysis of epidemic records in near future. The following topics have been generated from actual practical needs in analyzing epidemiological data, and are thus planned to be covered in this talk.

- Heterogeneous transmission and early estimation of the transmission potential.
- Difficulties in applying a renewal equation to early growth data: (i) continuous importation of cases and (ii) unstable infection-age distribution.
- Estimation of the incubation period among international travelers.
- Defining a new epidemiological measure for assessing severity at an individual level.

### References

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