Area of Excellence Scheme - Control of Pandemic and Inter-pandemic Influenza
(Project number AoE/M-12/06)

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Abstract: Pandemic influenza remains the pre-eminent emerging infectious disease threat to global health and Hong Kong is located at an epicenter of pandemic emergence. In addition to pandemics that appear at irregular and unpredictable intervals, annual seasonal influenza epidemics cause a significant burden of morbidity and mortality. Many key questions about the emergence, transmission and pathogenesis of pandemic and seasonal influenza remain unanswered. This project (2008-2017) was a multi-disciplinary and multi-institutional research program in Hong Kong to address this single virus disease of global relevance so as to contribute towards improved national, regional and global public and animal health. The dedicated efforts of the team have led to important advances in understanding influenza.

Summary of project objectives:
- Understand the factors that allow the emergence and spread avian and other animal influenza viruses in Asia so as to identify animal viruses of potential risk to humans
- Understand the determinants and mechanisms underlying virus transmission and causation of disease
- Identify evidence-based options for control of influenza in humans and animals
- Develop novel diagnostics, vaccines and therapeutics

Major highlights of research findings include the following:
- Provided understanding of how the 2009 H1N1 pandemic virus emerged from precursor swine influenza viruses
- Provided insights on the spread of pandemic and seasonal influenza in humans and on the effectiveness of measures such as vaccines, hand hygiene, masks and school closures in reducing transmission of pandemic and seasonal influenza.
- Provided understanding of the emergence, spread and human disease caused by avian influenza H7N9.
- Provided evidence based options for poultry market interventions that reduce avian influenza virus transmission and reduce risks to humans.
- Discovered a new class of antivirals for influenza and new strategies for influenza vaccines that are broadly protective against multiple strains and subtypes. These studies included collaborations with industry.

Impacts of research:
- Provided options for mitigating impact of influenza epidemics and pandemics.
- Provided evidence for effectiveness of interventions (rest days in live poultry markets, ban on holding poultry overnight in live poultry markets, effectiveness of poultry vaccines) that reduce risk of human infections from avian flu. These measures have now been also applied in mainland China.
- Contribute to WHO risk assessment of animal viruses for pandemic threat.
- Patents for new influenza drugs and vaccines and collaborations with industry
- Trained a total of 126 postgraduate students, including 90 PhDs, 34 MPhils and 2 MScs

**The above summary is written mainly by the project team. The views expressed in the summary do not necessarily represent those of the University Grants Committee/ Research Grants Council.*