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## Joint Study Sheds New Light On The Cause Of Pandemic Influenza



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With the use of sophisticated mathematical modelling techniques, a mathematician at The Hong Kong Polytechnic University (PolyU) and his co-researchers have completed a study that explains the phenomenon of multiple waves of influenza pandemic in the last century.

Taking part in this advanced study is Dr Daihai He, Assistant Professor of PolyU's Department of Applied Mathematics. He has collaborated with four researchers in Canada to offer an explanation to the worst influenza pandemic in the history of mankind. The research team found that behavioural response has the largest impact among three primary factors causing the waves, thus paving the way for future enhancement on control strategies to the spread of influenza virus.

The 1918 flu epidemic was one of the world's deadliest natural disasters, causing the death of hundred thousands of people. Influenza pandemic appears to be characterized by multiple waves of incidence in one year, but the mechanism that explains this phenomenon has so far been elusive.

In explaining the deadly pandemic, Dr Daihai He and his teammates have incorporated in their mathematical model three contributing factors for multiple waves of influenza pandemic in England and Wales:

- (i) schools opening and closing,
- (ii) temperature changes during the outbreak, and
- (iii) changes in human behaviour in response to the outbreak.

Dr He and the researchers further applied this model to the reported influenza mortality during the 1918 pandemic in 334 British administrative units and estimate the epidemiological parameters. They have used information criteria to evaluate how well these three factors explain the observed patterns of mortality. The results indicate that all three factors are important, but behavioural responses had the largest effect.

The findings have recently been published in the journal Proceedings of the Royal Society Biological Sciences (July 2013 Issue). Dr He's expertise in advanced mathematics and statistics has helped improve our understanding of the spread of influenza virus at the population level and lead to improved strategies to control and minimize the spread of influenza virus.

Source: [The Hong Kong Polytechnic University](#)

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