

Departmental Colloquium

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**Thursday, November 10, 2016
4:00-5:00 pm, HH-3017**

Is there a risk of Chikungunya outbreak with autochthonous transmission in Canada?

Abstract:

Chikungunya is a mosquito-borne disease (MBD) first identified during an outbreak in Tanzania in 1952. Humans get infected from the bites of infected female mosquitoes. Most commonly, *Aedes aegypti* and *Aedes albopictus* are the vectors, two species of mosquitoes can also transmit other MBDs, including dengue and Zika. Since 1999–2000 the large outbreak in Democratic Republic of the Congo, the virus kept spreading and as of April 2015, over 1.3 Million suspected cases of Chikungunya have been recorded in the Caribbean islands, Latin American countries, and the USA with autochthonous transmission being seen in the south of the States. Recent years there has been increasing imported cases of Chikungunya in Canada. In this talk, I will introduce our modeling studies to assess the risk of Chikungunya transmission in Canada. We formulate a weather driven model with maturation delay, extrinsic incubation delay and intrinsic incubation delay to reflect the impact of average temperature. Dynamical analysis shows that maturation delay may destabilize the infected steady state through Hopf bifurcation and stable periodic oscillation. However, extrinsic incubation delay and intrinsic incubation delay do not affect the dynamics of system. Finally, the risk of Chikungunya transmission is estimated in Canada and our results suggest that the local outbreak becomes possible when the climate keeps warming up.

This study will also help risk assessment of other MBDs (dengue, Zika) in Canada. This is a joint work with Nicholas Ogden, Min Weng, Erin Rees and Huaiping Zhu.