A Compartmental Model for Zika Virus with Dynamic Human and Vector Populations  The Zika virus (ZIKV) outbreak in South American countries and its potential association with microcephaly in newborns and Guillain-Barré Syndrome led the World Health Organization to declare a Public Health Emergency of International Concern. To understand the ZIKV disease dynamics and evaluate the effectiveness of different containment strategies, we propose a compartmental model with a vector-host structure for ZIKV. The model utilizes logistic growth in human population and dynamic growth in vector population. Using this model, we derive the basic reproduction number to gain insight on containment strategies. We contrast the impact and influence of different parameters on the virus trend and outbreak spread. We also evaluate different containment strategies and their combination effects to achieve early containment by minimizing total infections. This result can help decision makers select and invest in the strategies most effective to combat the infection spread. The decision-support tool demonstrates the importance of “digital disease surveillance” in response to waves of epidemics including ZIKV, Dengue, Ebola and cholera. This work is joint with the Centers for Disease Control and Prevention. It was named the 2016 Distinguished paper award by the American Medical Informatics Association.