Chikungunya challenge gets a close review by Los Alamos experts

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To improve forecasts of emerging diseases, the Defense Advanced Research Projects Agency (DARPA) launched the 2014–2015 DARPA Chikungunya Challenge to forecast the number of cases and spread of chikungunya disease in the Americas. Participant submissions were evaluated by a team of non-competing subject matter experts from Los Alamos National Laboratory, judging the 38 entries based on numerical accuracy and methodology.

Although rarely fatal, chikungunya is an emerging, debilitating viral disease that is transmitted among humans by mosquitoes. There is no specific treatment for the disease, although palliative care has been shown to reduce its severity and duration. The chikungunya virus (CHIKV) was originally detected in Tanzania in 1952, with the name meaning 'to become contorted' in the Kimakonde language of Mozambique, referring to the effects of severe joint pain. Chikungunya expanded to Asia and the Indo-Pacific islands, causing notably large outbreaks over the past 10-20 years.

Emerging pathogens such as Zika, chikungunya, Ebola, and dengue viruses are serious threats to national and global health security. Accurate forecasts of emerging epidemics and their severity are critical to minimizing subsequent mortality, morbidity, and economic loss. For this challenge, participants provided predictions of chikungunya epidemics across the Americas for a six-month period, from September 1, 2014 to February 16, 2015, to be evaluated by comparison with incidence data reported to the Pan American Health Organization (PAHO).

Cursory analyses suggest due to the reporting biases, which can be implicitly captured in statistical models, simpler models appear to outperform more complex approaches that included, for example, demographic information and transportation dynamics. Mosquito-dynamics, population specific information, and dengue-specific information correlated best with prediction accuracy.

The team concluded that with careful consideration and understanding of the relative advantages and disadvantages of particular methods, implementation of an effective prediction system is feasible. However, there is a need to improve the quality of the data in order to more accurately predict the course of epidemics.

Summary results of the [2014-2015 DARPA Chikungunya challenge](#) in BMC Infectious Diseases.