

Warning system predicts outbreaks of dengue fever

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With the help of a warning system which measures the risk of dengue incidence using precipitation and air temperature, it is possible to forecast the outbreak of dengue fever up to 16 weeks in advance. This is what Yien Ling Hii concludes in the dissertation she is defending at Umeå University in Sweden on 3 May.

Dengue fever is an infectious disease caused by virus and transmitted to persons by mosquitoes. A person contracted dengue fever usually shows symptoms including sudden spike of [high fever](#), muscle ache, joint pain, rashes, and headache. An infected person normally recovers within a few weeks, but a small per cent of patients can develop fatal complications such as plasma leakage, severe bleeding, and severe organ impairments which can lead to death.

To date, there is no drug for treatment or vaccines to protect against dengue fever. Therefore, the most effective way to prevent dengue is to control the mosquito population.

Dengue fever is widespread in more than 100 countries in the tropical and [subtropical regions](#), where climate is warm and wet. In recent years, dengue fever has also become a threat in the southern Europe since a species of mosquitoes that is capable of spreading dengue has been found in the region. The European Centre for [Disease Prevention](#) and Control has reported more than a thousand dengue cases in Madeira in the outbreak in 2012. Dengue cases were also reported in France and Croatia in 2010.

Temperature and rainfall directly influence the biological development of mosquitoes. Higher temperature can accelerate mosquito development stages and increase dengue transmission; while rainfall produces more breeding sites for [mosquitoes](#).

According to the study carried out by Yien Ling Hii using data from Singapore, higher risk of dengue cases can occur in 3-4 months after favourable temperature and rainfall conditions take place. A statistical forecasting model was developed to estimate the risk of dengue outbreak in this period to provide an early warning that allows sufficient time for response. The forecasting model is sensitive to detect dengue outbreaks and non-outbreaks with up to twenty per cent chance of false alarm.

"An early warning of disease outbreak can help local authorities and community to implement preventive measures such as eliminating mosquito breeding habitats to control or even prevent the outbreak from happening," says Yien Ling Hii.

Provided by Umea University

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