

Stopping the dengue threat

November 16 2017



Credit: Queensland University of Technology

Improved disease surveillance at Australian ports and borders is needed to prevent the growing threat of dengue infection spreading across the country, with a new QUT study identifying potential risk factors linked to dengue outbreaks beyond climatic conditions.

First author of the study published in *PLOS One*, Rokeya Akter from QUT's Institute of Health and Biomedical Innovation (IHBI), said

overseas and interstate travellers posed a significant threat in the transmission of dengue across Australia.

"Dengue is a major public health concern, with the severity of incidence increasing globally 30-fold in the past 50 years," she said.

"We know [climatic conditions](#) are closely linked to outbreaks of dengue infections in Australia and overseas.

"This study, has for the first time, looked beyond weather patterns (temperatures and rainfall) to identify trends in other risk factors linked to [dengue infection](#).

"Overall, an increasing trend of dengue and in potential socio-demographic factors such as overseas arrivals, having rainwater tanks, house types and economic status were found across Australia."

Ms Akter said because dengue was a mosquito-borne disease transmitted from human-to-human by the bite of an Aedes mosquito, travellers entering Australia from dengue endemic countries posed a significant threat to outbreaks.

Dengue is spread by two species of mosquito of the Aedes type and transmitted by a mosquito bite from an infected human to a non-infected human.

"In addition, illegal shipping and cargo vessels increase the chance of virus distribution to other non-exposed states and also increase the risk of exotic mosquito importation into Australia.



QUT researcher Rokeya Akter. Credit: Queensland University of Technology

"Even with upgraded inspection protocols placed in different ports in Australia, this study raised concern about the re-emergence of the *Aedes* mosquito due to a history of incursion and the extreme survival capacity of the *Aedes* eggs."

Ms Akter said there were several mosquito control programs and strategies in place in Australia to monitor and eliminate the *Aedes* species including the use of traps, briquettes, insect growth regulators and bio-controls.

"However, current programs focus on dengue risk areas and not the risk posed by returned travellers from dengue endemic countries, especially

during times of outbreak.

"One option is to increase surveillance and monitoring of travellers arriving in Australia to control the importation and transmission of [dengue virus](#)."

Other social factors raised in the study that may pose a risk to increased spread of infection include:

- Rainwater tanks, which many have been found to be non-complaint with Australian safety standards
- Terraced Queenslanders, which may provide a perfect breeding ground for mosquitos
- Economic advantage, or people financially able to travel and holiday to overseas dengue endemic countries such as Bali, Indonesia.

Ms Akter said while more than 53 per cent of dengue cases were found in Queensland, it was the absence of the Aedes mosquito that prevented other states and territories from experiencing similar dengue infection rates.

"The climatic conditions in NSW, Northern Territory and Western Australia follow similar trends and we have also found similar patterns in social factors," she said.

"If the distribution of Aedes mosquitoes expands to other parts of the country under changed climate and owing to availability of socio-ecological factors, this poses a future threat on local transmission of [dengue](#) across Australia.

"Therefore, it is essential to consider the importance of placing upgraded mosquito surveillance at different ports to reduce the chance of disease-

transmitting [mosquitoes](#) being imported all over the country."

More information: Rokeya Akter et al. Socio-demographic, ecological factors and dengue infection trends in Australia, *PLOS ONE* (2017). [DOI: 10.1371/journal.pone.0185551](https://doi.org/10.1371/journal.pone.0185551)

Provided by Queensland University of Technology

Citation: Stopping the dengue threat (2017, November 16) retrieved 30 April 2024 from <https://medicalxpress.com/news/2017-11-dengue-threat.html>

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