

# Warmer climate can give Europe dengue fever

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Large parts of Europe can suffer from the dreaded dengue fever unless climate change is attenuated. This is what Jing Helmersson shows in a new dissertation at Umeå University in Sweden. Mosquitoes transmit the disease, which needs some temperature and humidity to spread.

"Because we cannot stop travel between continents, the only safe way to prevent the spread of [dengue fever](#) is to prevent the establishment of mosquitoes that can carry the virus. For that, climate is a key factor," says Jing Helmersson, doctoral student at the Department of Public Health and Clinical Medicine at Umeå University.

In the course of her doctoral dissertation, Helmersson developed two mathematical models to calculate the potential of the dengue epidemic and dengue mosquito proliferation globally, with focus in Europe. It is partly concerns the mosquito's ability to transmit the [dengue virus](#) based on temperature, and partly on the density or establishment of the mosquitoes in relation to climate.

The most potent mosquito dengue vector is called *Aedes aegypti*. However, in order for a mosquito population in an area to become a carrier, the virus must first get there. The risk that people unknowingly carry the infection is partly because dengue does have symptoms in many cases. However, in order to spread the infection, a combination of viruses, the right kind of [mosquitoes](#), the suitable season and the right environment for mosquito to develop, suitable temperature, rainfall and breeding sites are required. This combination of conditions is fostered

by [climate change](#).

The secondary dengue mosquito, *Aedes albopictus*, is established in the Mediterranean region. The primary dengue mosquito, *Aedes aegypti*, is on the verge of invading the southernmost parts of Europe. Helmersson shows in her doctoral dissertation that if climate change is held within the framework of the Paris agreement at a maximum of two degrees of warming, the *Aedes aegypti* mosquito will only have the potential to spread in southern regions of Spain, Portugal, Italy and Greece.

However, if global warming continues beyond two degrees, dramatic expansion is predicted to take place to parts of southern and central Europe, and as a consequence, dengue epidemics. This would concern large parts of France, Spain, Italy, Portugal, Greece and the Balkans.

"My conclusions underline the importance of keeping global warming within the two degree goal. Reducing the potential area and time window for the spread of dengue therefore, goes hand in hand with the reducing of carbon dioxide emissions," says Jing Helmersson.

According to the World Health Organization WHO, Dengue fever is the world's most serious mosquito-borne viral disease. The disease has so far been limited to some tropical and subtropical areas in Africa, Asia and Latin America. Only two local outbreaks are known to date in Europe, in Athens in 1927 and in Madeira 2012. Yet there is no effective vaccine against [dengue](#) that can be used in uninfected areas.

**More information:** [umu.diva-portal.org/smash/record.jsf?pid=diva2%3A1172083&dswid=-9764](http://umu.diva-portal.org/smash/record.jsf?pid=diva2%3A1172083&dswid=-9764)

Provided by Umea University

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