

# Research finds a hot summer leads to more malaria deaths the following year

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Malaria was once thought to be caused by the smell of stagnant water (hence the name male aria = bad air). Credit: Goran Vignjević

As climate change accelerates, it is becoming increasingly important to study the impact of climate change on human health. A new thesis from the University of Gothenburg examines church records and historical weather data in the Nordic countries to show that the risk of dying from malaria was higher if the previous summer was a hot one.

The growing impact of [climate change](#) on human health is an acute global threat in the 21st century. The rise in certain types of extreme weather events is not only affecting individuals, but also putting

ecosystems that are closely linked to our health under pressure.

"As the climate grows warmer, there is a risk of [insect-borne diseases](#) returning to areas from which they were previously eradicated. Malaria was prevalent in the Nordic countries up until the start of the 20th century, and we can learn from historical malaria outbreaks to improve resilience in the future," says Tzu-Tung Chen, a doctoral student at the University of Gothenburg who has examined the link between [weather conditions](#) and malaria deaths in the Nordic countries in the pre-industrial era.

## **The impact of climate on mortality**

The findings reveal that climate had a clear impact on both malaria transmission and mortality in Denmark, Sweden and Finland. Malaria outbreaks were able to be linked to [warm summers](#) in the preceding year, while higher all-cause mortality followed if the spring was cold. Precipitation played a lesser role in this context.

"The higher mortality rate after a cold spring may be due to people being less resilient as a result of food shortages when harvests failed. A warm summer in the previous year allowed more malaria-infected mosquitoes to hatch, which then overwintered indoors before starting to bite people the following year," says Tzu-Tung Chen.

## **Parish registers**

Tzu-Tung Chen established the link between malaria deaths and weather conditions by examining data on causes of death from church registers kept in each parish together with weather data for the period studied, 1749–1859. There was a clear link, although it is likely that other factors such as overcrowding also contributed to the variations in these complex

connections.

"But at least 20 percent of variations in malaria deaths can be explained by climate. Dying of malaria was quite common in this period. It is estimated that about 1–2 percent of all deaths was caused by the mosquito-borne virus, often called 'chills' in church registers," says Tzu-Tung Chen.

## Several perspectives

The impact of a warmer climate in the Nordic countries on insect-borne diseases involves several factors. Firstly, there will be a larger area in the Nordic region where the environment becomes suitable for disease spreading insects; secondly, the season in which these insects are active and can spread the disease will be longer, and finally, the risk of seeing more infected cases may become higher.

"We are already seeing [dengue fever](#), Zika virus and West Nile virus moving further north in Europe as the tiger mosquitoes that carry these diseases become established."

**More information:** Thesis: Tzu-Tung Chen, [Climate-associated human health effects—Lessons from historical malaria and mortality records in the pre-industrial Nordic countries](#)

Provided by University of Gothenburg

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