

# Climate change spurs typhus incidence in Laos

September 20 2021

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A community by the river in Laos. A new study reports that the increase in scrub and murine typhus cases in the country is linked to changing climate. Credit: Terry Sunderland/CIFOR (<https://flickr.com/photos/cifor/35362592914/>), CC BY-NC-ND 2.0 (CC BY-NC-ND 2.0)

Changing weather patterns in Laos may be responsible for an increase in bugs responsible for the neglected tropical diseases scrub typhus and murine typhus, a new study finds.

Scrub [typhus](#), also known as bush typhus, is caused by the *Orientia tsutsugamushi* bacterium and spread by the bites of infected chiggers (larval mites). Flea-borne (murine) typhus is caused by *Rickettsia typhi* bacterium and is spread to people by fleas through animals such as rats, cats or opossums.

Lead researcher Tamalee Roberts, from Lao-Oxford-Mahosot-Hospital-Wellcome Trust Research Unit in Vientiane, Laos, says little is understood about what contributes to the distribution of these common but severely neglected causes of fever. Scrub typhus occurs in the Asia-Pacific region and South America while murine typhus is a global [disease](#).

The study, published late in *PLOS Neglected Tropical Diseases*, included samples submitted from 2003 to 2017 to the Mahosot Hospital for [scrub typhus](#) and murine typhus. Analysis of patient data along with meteorological and environmental data showed 17 percent of patients tested positive for either scrub typhus (1,337 of 8,150 patients tested) or murine typhus (1,283 of 7,552 patients tested).

According to Roberts, researchers found that scrub typhus was highly seasonal, with cases two times more likely to occur during the wet season months of July to September than the dry season, while murine typhus peaks in the dry season.

Scrub typhus incidence was found linked to fluctuations in relative humidity whereas murine typhus was linked to variation in temperature, Roberts says. Patients with scrub typhus infection were more likely to come from villages with higher levels of surface flooding and vegetation in the 16 days leading up to diagnosis.

As cities expand, so will high-risk areas for murine typhus, says Roberts. "With global heating and risks of attendant higher precipitation, the data

suggest that the incidence and spatial distribution of both murine typhus and scrub typhus will increase."

She also stresses that further work is needed to assess whether the results can be replicated elsewhere. "These results can be used within the region to help predict changes in the distribution and seasonal timing of these diseases, to inform strategies to reduce their incidence and impact."

Changing [weather patterns](#) also may affect the lifecycle of the fleas and chiggers with heat causing faster breeding time for fleas and increased rain and surface water risking higher chigger density and hence raising the risk of scrub typhus, Roberts says.

Roberts says that "the evidence from this research suggests that we will see an increase of both these diseases not only in Laos but in other countries as well. The diseases may also spread to areas where they have not previously been found as temperatures rise."

Thomas Weitzel, a physician and faculty member at the Clinica Alemana de Santiago, Chile, and part of the Chilean Rickettsia and Zoonosis Working Group, tells SciDev.Net that the research is of high relevance because both infections belong to a group of vector-borne diseases, which have been neglected in the past decades.

"Mites and fleas as vectors are often overlooked and our knowledge gaps are much larger in comparison to diseases transmitted by mosquitoes and ticks. Therefore, we often underestimate the burden of mite- and flea-borne rickettsioses, which cause important clinical problems (morbidity and mortality) and are easily treatable."

The research results, Weitzel adds, indicate that climate will influence the epidemiology of these diseases. "Our understanding of the complex

ecology, however, including the interactions of bacterial pathogen, arthropod vectors, animal reservoirs, and human behavior is still limited, and it is, therefore, too early to draw concrete conclusions."

**More information:** Tamalee Roberts et al, A spatio-temporal analysis of scrub typhus and murine typhus in Laos; implications from changing landscapes and climate, *PLOS Neglected Tropical Diseases* (2021). [DOI: 10.1371/journal.pntd.0009685](https://doi.org/10.1371/journal.pntd.0009685)

Provided by SciDev.Net

Citation: Climate change spurs typhus incidence in Laos (2021, September 20) retrieved 14 May 2024 from <https://medicalxpress.com/news/2021-09-climate-spurs-typhus-incidence-laos.html>

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