

# CLIMATE CHANGE AND DENGUE: ANALYSIS OF HISTORICAL HEALTH AND ENVIRONMENT DATA FOR PERU

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## Background and Aims:

Dengue, a mosquito-borne viral infection that is the most common cause of hemorrhagic fever globally, is rapidly spreading worldwide. An estimated 40% of the world's population is at risk for this disease that is transmitted by *Aedes sp.* mosquitoes (WHO 2009). The *Aedes* mosquito-Dengue virus lifecycle varies with temperature, and climate change may increase the risk of Dengue epidemics in the future (Watts et al. 1987). We examined whether changes in sea surface temperature (SST) along the Peruvian coast were associated with dengue incidence from 2002-2010. In Peru the effects of the El Niño cycle on weather conditions are pronounced, providing an ideal place to study fluctuations in climate and dengue incidence.

## Methods:

We used negative binomial models (Hilbe 2007) to examine the relationship between Dengue cases and changes in SST across regions of Peru. Spearman's rank test was used to determine the lagged SST term that was most correlated with Dengue incidence in each region. The negative binomial models included terms for the optimum lagged SST and a term for the trend of increasing Dengue incidence over the study period.

## Results:

The magnitude and sign of the correlation coefficient of dengue and SST varied between the 15 regions of Peru with Dengue cases. 9 provinces had positive correlations between the two while 6 had negative correlations. The optimum lag ranged from 0 months to 6 months. In all of the regions but 1 lagged SST was a significant predictor of Dengue cases in the negative binomial model.

## Conclusions:

The relationship between dengue and sea surface temperature in Peru appears to be significant across the country. Given the varied nature of the relationship between regions it is not possible to make accurate generalisations about this relationship in Peru. Accounting for additional climatic variables such as precipitation may help in improving the predictive model.

## References:

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