National Institute of Environmental Health Sciences

Modeling the influence of local environmental factors on malaria transmission in Benin and its implications for cohort study

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Abstract:

Malaria remains endemic in tropical areas, especially in Africa. For the evaluation of new tools and to further our understanding of host-parasite interactions, knowing the environmental risk of transmission--even at a very local scale--is essential. The aim of this study was to assess how malaria transmission is influenced and can be predicted by local climatic and environmental factors.As the entomological part of a cohort study of 650 newborn babies in nine villages in the Tori Bossito district of Southern Benin between June 2007 and February 2010, human landing catches were performed to assess the density of malaria vectors and transmission intensity. Climatic factors as well as household characteristics were recorded throughout the study. Statistical correlations between Anopheles density and environmental and climatic factors were tested using a three-level Poisson mixed regression model. The results showed both temporal variations in vector density (related to season and rainfall), and spatial variations at the level of both village and house. These spatial variations could be largely explained by factors associated with the house's immediate surroundings, namely soil type, vegetation index and the proximity of a watercourse. Based on these results, a predictive regression model was developed using a leave-one-out method, to predict the spatiotemporal variability of malaria transmission in the nine villages.This study points up the importance of local environmental factors in malaria transmission and describes a model to predict the transmission risk of individual children, based on environmental and behavioral characteristics.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3251550

Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Other Climate Scenario

Other Climate Scenario: seasonal variation in precipitation

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Precipitation

Geographic Feature:

resource focuses on specific type of geography

Other Geographical Feature

Other Geographical Feature : subtropical climate

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Africa

African Region/Country: African Country

Other African Country: Benin

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Population of Concern: A focus of content

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Short-Term (

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content