National Institute of Environmental Health Sciences

Effectiveness of malaria control during changing climate conditions in Eritrea, 1998-2003

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Abstract:

OBJECTIVE: To assess the effectiveness of impregnated mosquito nets, indoor residual spraying and larval control relative to the impacts of climate variability in the decline of malaria cases in Eritrea. METHODS: Monthly data on clinical malaria cases by subzoba (district) in three zobas (zones) of Eritrea for 1998-2003 were used in Poisson regression models to determine whether there is statistical evidence for reduction in cases by DDT, malathion, impregnated nets and larval control used over the period, while analysing the effects of satellite-derived climate variables in the same geographic areas. RESULTS: Both indoor residual spraying (with DDT or malathion) and impregnated nets were independently and significantly negatively associated with reduction in malaria cases, as was larval control in one zoba. Malaria cases were significantly positively related to differences in current and previous months' vegetation (NDVI) anomalies. The relationship to rainfall differences 2 and 3 months previously was also significant, but the direction of the effect varied by zoba. Standardized regression coefficients indicated a greater effect of climate in the zoba with less intense malaria transmission. CONCLUSION: The results support the view that both indoor residual spraying and impregnated nets have been independently effective against malaria, and that larval control was also effective in one area. Thus climate, while significant, is not the only explanation for the recent decline in malaria cases in Eritrea. If appropriate statistical approaches are used, routine surveillance data from cases attending health facilities can be useful for assessing control programme success and providing estimates of the effectiveness of individual control measures. Effectiveness estimates suitable for use in cost-effectiveness analysis have been obtained.

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Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Precipitation

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Africa

African Region/Country: African Country

Other African Country: Eritrea

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

Outcome Change Prediction

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