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Novel ellipsoid spatial analysis for determining malaria risk at the village level
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Abstract

The distribution patterns of malaria incidence at a village level in Thailand were demonstrated with the use of a geographical information system (GIS), and provided the study of the malaria situation at a household level. Mosaic imageries from aerial photographs were used to create maps that contained X and Y coordinates. These digitized base maps were kept as computerized files. Standard Distance Ellipse (SDE) was used to measure the prevalence of dispersion around the mean center of malaria cases and points. Households in the SDE were at greater risk of malaria infection than those located outside the SDE. The spatial pattern of malaria incidence was investigated using spatial autocorrelation using Geary's ratio and Moran's index. Five of seven villages had a clustered spatial distribution of malaria incidence, the vector point of which had a 2-3. km range from the patient's houses. Only one village had a significant clustered spatial distribution of malaria incidence ($p < 0.05$). Control efforts should be focused on high-risk areas, especially those households with the heaviest caseloads. This approach would probably be more cost effective than the conventional malaria control methods. This SDE analytical technique would be a novel and useful epidemiological control method for use by public health administrators. The ellipsoidal areas required malaria control intervention. © 2010 Elsevier B.V.

Author Keywords

Ellipsoid distribution; Geographical information system (GIS); Malaria risk; Spatial analysis; Village level

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