

Use of Remote Sensing/Geographical Information Systems (RS/GIS) to identify the distributional limits of soil-transmitted helminths (STHs) and their association to prevalence of intestinal infection in school-age children in four rural communities in Boaco, Nicaragua

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Selection:

GIS Mapping, Global Health Surveillance and Public Policy

Background:

STHs can infect all members of a population but school-age children living in poverty are at greater risk. Infection can be controlled with drug treatment, health education and sanitation. Helminth control programs often lack resources and reliable information to identify areas of highest risk to guide interventions and to monitor progress.

Objectives:

To use RS/GIS to identify the environmental variables that correlate with the ecology of STHs and with the prevalence of STH infections.

Methods:

Geo-referenced *in situ* prevalence data will be overlaid over an ecological map derived from the RS environmental data using ESRI's ArcGIS 9.3. Prevalence data and RS environmental data matching at the same geographical location will be analyzed for correlation and those RS environmental variables that better correlate with prevalence data will be included in a multivariate regression model. Temperature, vegetation, and distance to bodies of water will be inferred using data from the Moderate-Resolution Imaging Spectroradiometer (MODIS) onboard the Terra and Aqua satellites, and Thematic Mapper (TM) and Enhance Thematic Mapper Plus (ETM+) satellite sensors onboard Landsat 5 and Landsat 7 respectively. Elevation will be estimated with data from The Shuttle Radar Topography Mission (SRTM). Prevalence and intensity of infections will be determined by parasitological survey (Kato Katz) of children enrolled in rural schools in Boaco, Nicaragua, in the communities of El Roblar, Cumaica Norte, Malacatoya 1, and Malacatoya 2).

Expected Results:

Associations between RS environmental data and prevalence *in situ* data will be determined and their applications to public health will be discussed.

Discussion/Conclusions:

The use of RS/GIS data to predict the prevalence of STH infections could be useful for helminth control programs, providing improved geographical guidance of interventions while increasing cost-effectiveness.

Learning Objectives:

- To identify the RS environmental variables that can help predict the prevalence of STH infections.
- To understand potential applications of RS/GIS to national helminth control programs.
- To assess the applicability of RS/GIS to control STH infections.

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