

# Implementing a Malaria Vaccine in Malawi Using Spatial Methods

Sophia Giebultowicz, Cameron Taylor, Michael Emch, Irving Hoffman  
 A Collaboration of the Department of Geography and the School of Public Health  
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## Background

During the summer of 2009, UNC Project in Lilongwe, Malawi began a malaria vaccine trial aimed at children under five. Similar trials were also set to begin in a number of other Africa countries. What makes the Malawi trial unique, however, is the incorporation of spatial data and analysis for purposes of improving our understanding of vaccine efficacy.



Figure 1: Women at the clinic hear about the vaccine

A team of ten fieldworkers recruited women with eligible children for the study at a local health clinic (Fig 1).

Based on women's reported residence, eight villages were selected for the catchment area (Fig. 2). Despite being within urban Lilongwe, many were quite rural in nature (Fig. 3).

Hospital and Approximate Location of Villages Participating in Malaria Vaccine Trial

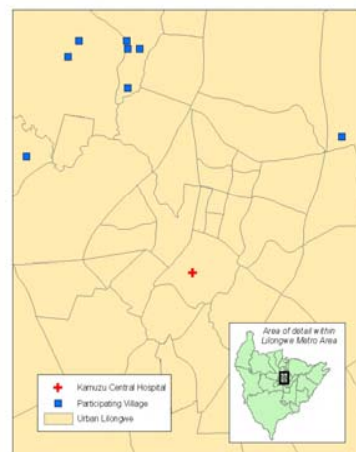


Figure 2: Map showing hospital/UNC Project and points representing center of villages from which participants come



Figure 3: Example of participant home in village

Using the women's reported location (Fig. 4), fieldworkers found the houses to take GPS points (Fig. 5.)



Figure 4 (left): Using forms filled out at clinic to locate household; Figure 5 (above): Taking down additional information after recording GPS point for household.



Figure 6: A GPS scavenger hunt, part of the training

## What is ArcReader?

- A free software designed for displaying spatial data
- Allows user to look at values associated with a location, e.g. point on map
- Helpful in targeting by age groups, genders, etc.; landmark data simplifies finding households

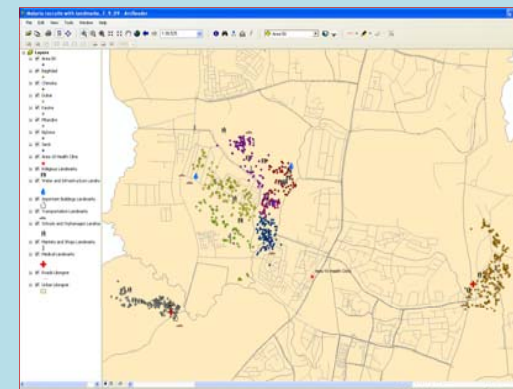


Figure 9: ArcReader screen shot. Points are household locations, color-coded by villages. Landmarks such as schools and markets are represented by symbols, shown on the left

## Ecological Questionnaire

- How do environmental and household factors affect the vaccine and malaria (Fig 10-12)?
- Every six months, visit patients and collect data on house type, bednet use, local environment
- Field test of survey showed variety amongst potential participants

## Goals Accomplished

- Trained fieldworkers in new GPS methods for easier navigation and greater accuracy (Fig. 6)
- Set up a database for recording participant locations, age, etc.
- Collected spatial data on village landmarks (Fig 7)
- Held additional training in data entry, database management, and ArcReader software (Fig. 8 & 9)
- Developed questionnaire to collect additional ecological data for analysis



Figure 7 (left): Taking GPS point of a school; Figure 8 (right): Computer-based database and ArcReader training for team



Figure 10 (top): example of rare household material; Figure 11 (middle): ditch near home where standing water may gather during rainy season; Figure 12 (bottom): household with nearby trees.

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