

Malaria Risk in Ghana: Data Visualization and Interactive Mapping

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Introduction

- The Malaria Atlas Project (MAP) at Telethon Kids analyzes worldwide malaria data to best estimate burden in endemic countries.
- MAP models and maps clinical incidence and parasite prevalence within endemic countries to aid in malaria control and elimination planning.

Objective of the Internship

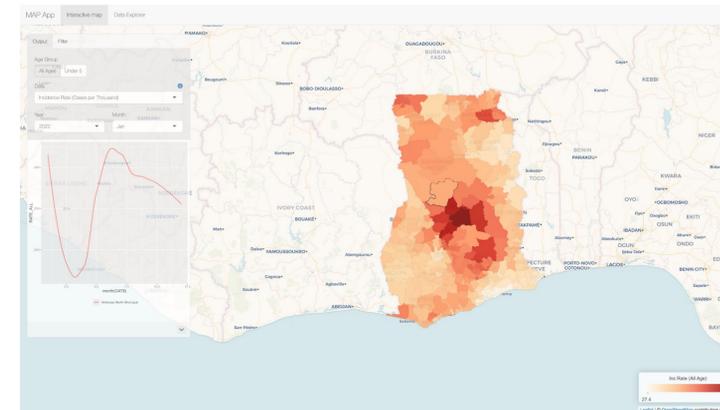
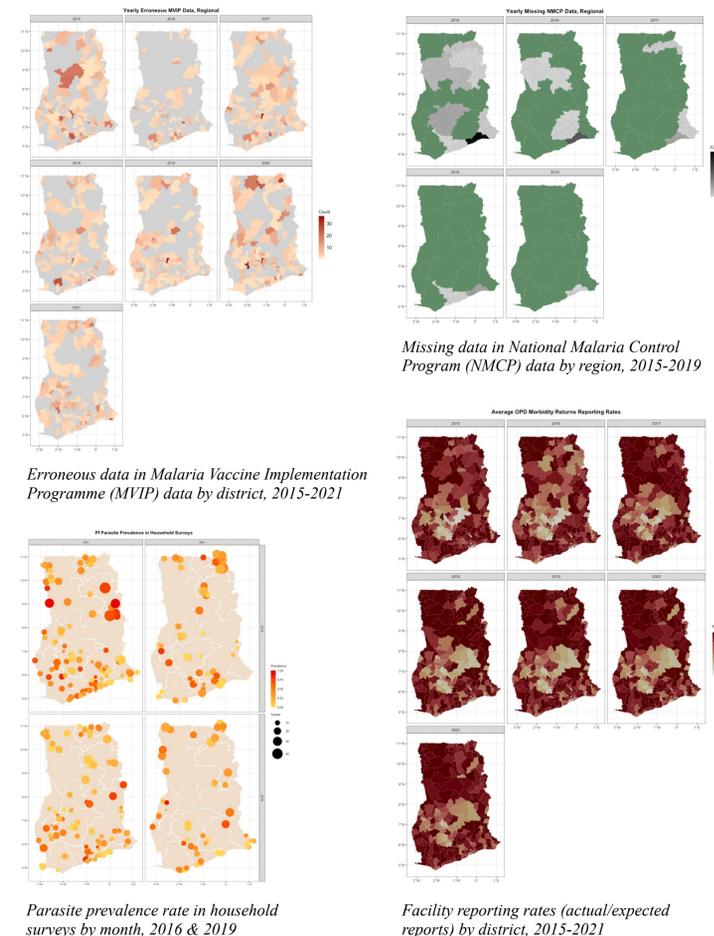
To explore raw data and create a set of principle visualizations that can support researchers in using it, and to build interactive visualizations of modelled outputs to support science translation to decision makers.

Methods

- Explore routine surveillance data and cross-sectional surveys from Ghana between 2015-2022 and model trends in erroneous data, missing information, and reporting bias.
- Use MAP's output data of prevalence and incidence in Ghana, build an application that allows users to interact with visualizations.

Results

Malaria research largely relies on two types of datasets: Routine surveillance data from health facilities and household surveys. Researchers aggregate and clean this data to model and map predicted incidence and prevalence rates. The following maps summarize raw data from specific sources and highlight geospatial trends in missingness, erroneous data, and reporting rates, intended to aid researchers in more easily identifying caveats and bias when estimating burden.



Screenshot of the application dashboard

The application was created using the Shiny R package and JavaScript library, Leaflet, and uses the predicted prevalence and incidence outputted for Ghana between 2015-2022 by MAP. The functionality of the application includes:

- Selecting & viewing information from specific regions/districts
- Filtering by year and month
- Displaying different outputs (incidence, prevalence, treatment-seeking population)
- Viewing data by region or district
- Changing color scheme (colorblind-friendly palettes)
- Plotting data trends and hovering to view detailed results
- Selecting multiple regions/districts and viewing plot lines simultaneously

Further Exploration

- Aggregating and summarizing large datasets takes time, and the application could be more efficient.
- Allowing users to upload data and shapefiles on the frontend, so it can be used for any country.

Questions

What steps can be taken to prevent erroneous data as a result of manual entry at the facility level? How can we more efficiently calculate mean values when summarizing data on the regional level?

Conclusion

The portion of data collected in endemic countries that is missing and/or unreliable is much larger than we realize, which makes mapping geospatial trends all the more important for creating accurate estimated outputs.

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