



# Data Visualization of Schistosomiasis Community Health Data Using Google Maps and Google Visualization



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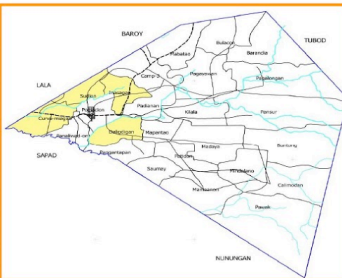
## Abstract

Salvador, Lanao del Norte is part of the Philippines' Schistosomiasis Control Program that aims to increase the coverage of mass treatment of the population to 85%. However, the percentage of the population who comply with mass drug administration is less than the target percentage. The Municipal Health Office (MHO) conducted a health survey to capture information regarding households' compliance to the program. Data visualization was then developed to manage and visualize the gathered data. This study conducted data preparation which includes designing and development of the database model and transforming the raw data into variables that are usable in the analyses. The study then identified the data visualization needs and implemented appropriate visualization tools which will address the needs of the MHO in identifying which areas need intervention. The data gathered from the health survey were visualized through markers, heat maps, pie chart, bar chart, and area chart by integrating Google Maps and Google Visualization API in a web-based information system.

**Keywords:** Data Visualization, Google Maps, Google Visualization, Schistosomiasis

## Introduction

Data visualization aids public health professionals by making use of software solutions so that users can understand the significance of presented health data in visual context. Through the use of visual tools like maps and charts, health professionals that deal with large volume of data can select appropriate views of visualization that will aid them in decision making. Schistosomiasis is a parasitic disease endemic among communities with bodies of water. Deaths amounting to 280,000 and severe disabilities for 20 million people are attributed to this disease per year. Salvador, Lanao del Norte is a municipality endemic for Schistosomiasis. As of 2014, it has an exposed population of 3,722 and an estimated prevalence rate of 3.75% in 4 endemic barangays. The Municipal Health Office (MHO) through its schistosomiasis survey has information regarding household compliance to the schistosomiasis control program. With the availability of schistosomiasis survey data gathered by the MHO of Salvador, Lanao del Norte, the first objective of this study is to conduct data preparation by developing a database model based on sections of the Schistosomiasis survey. The second objective is to identify data visualization needs and implement these visualizations in a web-based information system.



Vicinity Map of Salvador, Lanao del Norte with barangays endemic of Schistosomiasis being highlighted.

## Methodology

Schistosomiasis Survey

Data Preparation

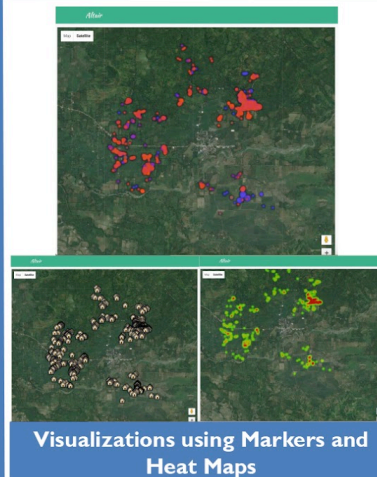
Visualization Identification

Visualization Implementation

## Results & Findings

**A. Schistosomiasis Community Survey and Data Preparation.** The schistosomiasis survey deployed by the MHO of Salvador is composed of two sections: first, the basic information section containing the household information and second, the survey section composed of survey questions and their corresponding answers. The basic information section contains personal household information which includes address details, latitude and longitude coordinates of the house. Data regarding the household location in terms of the latitude and longitude coordinates of the house were identified to be the spatial data of the survey. The second section which is the survey section is grouped into categories namely: Knowledge which includes symptoms, transmission and prevention; Attitudes which includes testing and treatment; and Practices which includes lifestyle and participation to mass drug administration. A scoring system was formulated for the survey section that will quantify how relatively near or far the response is to the correct answer for the question. Descriptive data from the two sections were identified to be percentage of sex, age groups, income, educational attainment, attitude, and percentage of positive and negative answers.

**B. Visualization Identification and Visualization Implementation.** Geographically referenced data like the identified spatial data as well as the aggregate answers to the survey sections need to be associated with a map so the MHO can identify which locations need specific interventions. Graphical map overlays, supported by the Google Maps API like Markers can represent the household locations and Heatmaps can visualize the range of correctness among survey sections based on the formulated scoring system. For other household information which are descriptive in nature like age, income, sex and educational attainment, the MHO need to come up with analyses from the aggregate of these data. The identified descriptive data can be visualized using bar, area, and pie charts supported by the Google Visualization API. With these charts, the MHO can easily monitor the population in a specific description.



Visualizations using Pie, Bar and Area Charts

## Conclusion and Recommendation

The schistosomiasis community health data of Salvador, Lanao del Norte was successfully prepared so that it can be processed by appropriate data visualization tools. Google Maps and Google Visualization API was able to present the health data in a visual context. The data visualization developed in this research enabled the MHO of Salvador to manage the survey data and to present it as map and chart visualizations. The data visualization was used to locate areas in need of intervention. Visualization results of the study were used by the MHO to come up with intervention decisions, contextualized information and education campaign to increase awareness and compliance to mass drug administration. The study also enabled the MHO to identify which factors are more likely to affect the knowledge, attitude and practices of the people towards Schistosomiasis. Furthermore, the data visualization presented design opportunities for other developers to replicate the data visualization on other endemic diseases such as dengue and malaria. A statistical subsystem will also be ideal to analyze correlations and relationships of data through time.

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