Who We Are

Catholic Relief Services is the official international agency of the Catholic church in the US and organizes programs including emergency response, HIV, health, agriculture, education, microfinance, and peacebuilding in 93 countries in five continents.
Context

Malaria is the leading cause of death for children under 5 years of age in Sierra Leone. Preventative measures, such as sleeping under a bed net and IRS, can protect against malaria. Improving access to health care can reduce the disease burden.
Background and Objectives

- 2013 Sierra Leone Malaria Indicator Survey: CRS, NMCP, SSL, ICF
- 2012 Knowledge, Attitudes, Practices survey

Objectives:
- Measure use of mosquito nets
- Assess coverage of preventative treatment programs protecting pregnant women
- Identify malaria treatment practices among children under five
- Measure prevalence of malaria and anemia among children age 6 months to 5 years
- Assess knowledge, attitudes, and behaviors of malaria in the general population
Methods: Data Collection

Diagram showing the flow of data collection through iFormBuilder, exporting to a central database, then to SQL, and finally to GIS visualizations and data quality reports, managed by Google Docs and project staff.
### Methods: Data Processing

This is preliminary data, prior to review by the Sierra Leone National Malaria Control Program.

<table>
<thead>
<tr>
<th>District</th>
<th>Unique Codes</th>
<th>Children who tested + for Malaria</th>
<th>Total Children Tested</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kailahun</td>
<td>11</td>
<td>208</td>
<td>478</td>
<td>44%</td>
</tr>
<tr>
<td>Kenema</td>
<td>12</td>
<td>213</td>
<td>451</td>
<td>47%</td>
</tr>
<tr>
<td>Kono</td>
<td>13</td>
<td>194</td>
<td>392</td>
<td>49%</td>
</tr>
<tr>
<td>Bombali</td>
<td>21</td>
<td>289</td>
<td>534</td>
<td>54%</td>
</tr>
<tr>
<td>Kambia</td>
<td>22</td>
<td>330</td>
<td>529</td>
<td>62%</td>
</tr>
<tr>
<td>Koinadugu</td>
<td>23</td>
<td>206</td>
<td>361</td>
<td>57%</td>
</tr>
<tr>
<td>Port Loko</td>
<td>24</td>
<td>233</td>
<td>443</td>
<td>53%</td>
</tr>
<tr>
<td>Tonkolili</td>
<td>25</td>
<td>307</td>
<td>583</td>
<td>53%</td>
</tr>
<tr>
<td>Bo</td>
<td>31</td>
<td>173</td>
<td>394</td>
<td>44%</td>
</tr>
<tr>
<td>Bonthe</td>
<td>32</td>
<td>178</td>
<td>597</td>
<td>30%</td>
</tr>
<tr>
<td>Moyamba</td>
<td>33</td>
<td>273</td>
<td>533</td>
<td>51%</td>
</tr>
<tr>
<td>Pujehun</td>
<td>34</td>
<td>187</td>
<td>505</td>
<td>37%</td>
</tr>
<tr>
<td>Western Rural</td>
<td>41</td>
<td>168</td>
<td>372</td>
<td>45%</td>
</tr>
<tr>
<td>Western Urban</td>
<td>42</td>
<td>99</td>
<td>327</td>
<td>30%</td>
</tr>
</tbody>
</table>
ArcGIS tools used

- Base maps
- Chloropeth maps to visualize Province and District-level data
- Displaying XY data from an imported table with Lat/Long points and creating shapefiles
- Geocoding
- Digitizing smaller roads
- Kernal density and point density
Questions to focus on for analysis

- Prevalence of malaria
- Access to care: proximity to roads and health facilities
- Assess knowledge, attitudes, and behaviors toward malaria
  - Use of bed nets
  - IRS
Results
Percentage of household members that slept under any net the night preceding the survey according to table 3.4
Percentage of households that own one net per every two people according to table 3.1
Percentage of children under 5 that had tested positive for malaria using microscopy according to table 4.5
Percentage of children under 5 that slept under any net the night preceding the survey according to table 3.6.
Percentage of caregivers of children under five that had experienced fever in the two weeks preceding the survey that received ACT the same of the next day according to table 4.1

Legend
Districts of Sierra Leone
% Children Under 5 with Fever
- 13.300000 - 17.400000
- 17.400001 - 21.500000
- 21.500001 - 31.200000
- 31.200001 - 43.900000
- 43.900001 - 54.400000
Percentage of caregivers of children under five that had experienced fever in the two weeks preceding the survey that received ACT according to table 4.1
Percentage of caregivers of children under five that had experienced fever in the two weeks preceding the survey that sought treatment according to table 4.1.
Percentage of women of child bearing age who recognize ACT as malaria treatment according to table 5.6

Legend

Districts of Sierra Leone
% Women of Child Bearing Age
- 44.200000
- 44.200001 - 58.700000
- 58.700001 - 67.700000
- 67.700001 - 79.600000
- 79.600001 - 90.100000
Percentage of women of child bearing age who recognize mosquito bites as a cause of malaria according to table 5.1
Observations
Prevalence of Malaria vs. % who own a bed net
Prevalence of Malaria vs. Sleeping under a net
Prevalence of Malaria vs. Knowledge of Recommended Treatment
Prevalence of Malaria vs. % who sought treatment
Prevalence of Malaria vs. Receiving Recommended Treatment
This is preliminary data, prior to review by the Sierra Leone National Malaria Control Program.
Challenges

• Standardization of data to join different tables together
  • Names of chiefdoms
  • Updated administrative boundary shapefiles online

• Availability of data

• Background information in interpreting data and maps

• Keeping it simple
Potential for Further Analysis

- Using density maps to highlight high concentration areas for variable of interest
  - Does not average over an entire administrative boundary

- Comparing the MIS data to the 2008 Demographic Health survey and additional comparisons with the Knowledge, Attitudes, and Practices survey can provide interesting information on trends over time

- Incorporating more the context of Sierra Leone in the data analysis (particularly access to care)
This map is based on preliminary data, prior to review by the Sierra Leone National Malaria Control Program.
Conclusion

Pattern of high prevalence of malaria in the north and low percentages of owning and sleeping under bed nets and knowledge of and access to recommended treatment.

GIS can be used to analyze patterns in relation to geographic location, identify areas of need and where to pilot initiatives.
Thank you!