A Geographic Analysis of Knowledge, Awareness and Attitudes of Rabies in Kasula and Kibondo Districts, Tanzania

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6-Year UCD-CUHAS Collaboration & Partnership
UCD-CUHAS Collaboration

- Three primary research-based projects
  - Two currently funded through NIH and Touch Foundation
- GIS training module developed and delivered 4 times in open source software
- 29 CUHAS students and 17 U.S. students have participated in activities
  - 10 independent UCD student projects, including 1 masters thesis, 3 honors theses, 3 capstone projects, 2 undergraduate research opportunity projects, and 1 PhD dissertation
  - 4 Tanzanian MPH student theses supervised
Rabies Project Connection

- 1st and 3rd year medical students 2-3 weeks of community health assessment in the field
- August 2012, the 3rd year students worked in Kisulu and Kibondo Districts in western Tanzania with a focus on rabies
- Mapping was one component and Caroline Croyle (graduate from UCD/geography) joined in the field work to support this aspect of the project
In the written reports they only mention August 2012, not the specific dates.
Outline

• Background of rabies
• The study
  – Methods
  – Results
  – Implications
• Future directions
Background: Global Burden

- 55,000 deaths per year
  - 99% of human deaths due to rabies are in developing countries
- 56% of rabies cases occur in children
- 85-99% of human cases come from domestic dog bites
- Rabies is 100% preventable
  - Post-exposure prophylaxis
  - Vaccination of dog population
Background: Burden in Tanzania

• Rabies is endemic in Tanzania
  – 10.8 deaths per year, but estimates as high as 1,499 per year in some Tanzanian regions

• Over 70% of the regions in Tanzania report a rabies case due to a dog bite every year

• Studies consistently indicate rabies as a serious public health concern
  – High risk populations, particularly young boys

• Little is known about the actual prevalence and the perception of rabies in rural Tanzania
Primary Objective

Using survey data collected in August, 2013, we evaluate trends in knowledge, attitudes and awareness of rabies in Kasulu & Kibondo Districts, Tanzania.

Additional Aims:
1. Enhance capacity building
2. Inform future educational initiatives for rabies by mapping prevalence rates of knowledge using geographic information systems (GIS)
One More Objective
Methods

• Cross-sectional survey
  – Kasulu District (n=548)
  – Kibondo District (n=178)
  – Total population (n=726)
  – Analyze rabies perception knowledge, awareness, attitudes, and beliefs about rabies, dog ownership, and dog vaccination

• Survey merged with spatial location of health facilities, canine vaccination rates, and canine bite cases in Kibondo District
  – Analyze proximity of health facilities and population with aforementioned variables
Survey Overview

• Basic demographic information
  – Age, gender, occupation, marital status etc…
• Ownership of dogs
• Knowledge of rabies
  – Symptoms, danger, transmission, vaccinations (canine and human)
• Awareness of risk factors
• Key Questions:
  – “Have you ever heard of rabies?”
  – “Have you ever been bitten by a dog”?
  – “Did you know that the vaccination of dogs is an effective control measure of rabies”? 
## Respondents

<table>
<thead>
<tr>
<th>District</th>
<th>Characteristics</th>
<th>Survey Data</th>
<th>2012 Census</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kibondo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of People</td>
<td>178</td>
<td>261,331</td>
</tr>
<tr>
<td></td>
<td>Mean Age</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% Female</td>
<td>60</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>% Agricultural</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% ≥ 4 Children</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean Household Size</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>Kasulu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of People</td>
<td>548</td>
<td>425,794</td>
</tr>
<tr>
<td></td>
<td>Mean Age</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% Female</td>
<td>49</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>% Agricultural</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% ≥ 4 Children</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean Household Size</td>
<td>4.9</td>
<td></td>
</tr>
</tbody>
</table>
Have You ever Heard of Rabies?

- **Kibondoo District**: 12.9% Yes, 87.1% No
- **Kasulu District**: 23.2% Yes, 76.8% No

- Statistically significant difference in having heard of rabies between district (p=0.03)
What is Rabies?

- Disease due to dogs: 21%
- Disease of dogs: 13.8%
- Resembles Cerebral Malaria: 13.4%
- Don’t know: 40.8%

Kibondo District:

- Disease due to dogs: 41.3%
- Disease of dogs: 13.4%
- Resembles Cerebral Malaria: 0.97%
- Don’t know: 24%

Kasulu District:

- Disease due to dogs: 40%
- Disease of dogs: 24%
- Resembles Cerebral Malaria: 0.97%
- Don’t know: 40.8%
Additional Information

- Kasulu & Kibondo
Clinical Data: Dog Bites

Human dog bites 2011-2012

* - Villages with more than one health facility. (Muhinda, Muanza, Marumba).
Access/Availability

- **Humans**
  - District/regional hospitals for PEP
  - Travel time/costs
  - 14 day treatment
  - Costs

- **Dogs**
  - Vast majority not vaccinated
    - <1%
  - 72% first year mortality
  - 0.6 litters whelped per fertile year
  - 5.5 average number of pups
Vaccination Rates: Dogs
Future Directions

• Integrate survey data with clinic data on bites for Kasulu district
  – Spatial statistics
• Develop composite scores of knowledge & perception
• Influence future students interested in global community & behavioral health to create educational materials concerning rabies in Kibondo & Kaslulu Districts
• More advanced models to pinpoint needs for both districts while taking into account differences in district
Strengths & Limitations

- **Strengths**
  - First perception and awareness study done in rural Tanzania

- **Limitations**
  - Inability to create questionnaire or personally collect data
  - Cross-sectional study design
  - Lack of good surveillance
    - Even in hospital and clinic data
Practical Implications

• Inform local health officials about the lack of awareness of rabies
  – Create & target educational materials on what rabies is, how it is transferred and how it can be prevented
  – Need for surveillance of rabies
  – Animal vaccination programs
  – Treatment availability & access

• Kibondo & Kasulu
  – Distinguish malaria from rabies (Kibondo)
  – Education geared towards females
Asante Sana!!
Additional Information

• Symptoms of Rabies
  – Kasulu
    • 52% don’t know
    • 30% fever, salvation & tears, bark like a dog
  – Kibondo
    • 51% mental stress
    • 30% salvation and tears
    • 3% don’t know

• Risky Environment
  – Kasulu & Kibondo
    • 32% keeping pets
    • 20% living near the bush or forest
    • 22% don’t know
Respondents

- **Sample Data**
  - **Kasulu District**
    - n=548
    - Average age 33±14 years
    - 49% female
    - 69% agricultural workers
    - 38% ≥4 children
  - **Kibondo District**
    - n=178
    - Average age 36±14 years
    - 60% female
    - 83% agricultural workers
    - 48% ≥4 children

- **2012 Census Data**
  - **Kasulu District**
    - n=425,794
    - 51% female
    - 7.6 average household size
  - **Kibondo District**
    - n=261,331
    - 52% female
    - 4.9 average household size