An integrated community interventional-evaluative model for neglected diseases in East Pokot district, Kenya

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Presentation Outline

- Project Background, Activities, Strategy and Goals
- Introduction – Why NTDs, why Leishmaniasis
- Journey to Pokot – Field (work)
For 4 years now, the NTD project has been working in East Pokot District on leishmaniasis responding to the impact of poverty, disease, illiteracy and insecurity.

The Northeastern collaboration was established in 2010 and is spearheaded by R. Wamai and M. Pollastri; the project has received support of $100,000 seed-funding from Northeastern University and in 2014 $100,000 from IZUMI Foundation.

Through this support, the project has been able to assess the epidemiology, services and community practices on in the East Pokot District, northern Kenya.
Activities to date

- **Northeastern**

- **USA**
  - ASTMH 61st Annual Meeting: Nov 12, 2012

- **Kenya (national)**
  - Expert Workshop: August 8-13, 2011
  - MOH meetings: May 2013
  - WAD participation: Apr 7, 2014
  - National feedback workshop: July 30, 2014

- **East-Pokot**
  - Field survey 1: Jan-March 2012
  - Tracing rk39+ cases: March 2013
  - Field visit with IZUMI: July 2013
  - Field survey 2: August 2013
  - Community feedback: August 2013
  - Planning meeting, Chemolingot: Aug 11, 2014

- **Ghana**
  - EFINTD Discussion Group Meeting, Kumasi, 4-7 Aug 2013
Core values:
- Community ownership, mutual partnerships, accountability, integrity, transparency, committed local leadership
- Committed leadership
- Intimate knowledge of the local context.
- Work with communities in remote and difficult to access areas

Goal:
- Successful implementation of needed NTD leishmaniasis control interventions in East Pokot

Strength
- Committed leadership
- Intimate knowledge of the local context.
- Work with communities in remote and difficult to access areas

Niche
- Pioneered mass screening for Kala-azar in the region
NTDs: Leishmaniasis – A forgotten NTD –
# Neglected Tropical Diseases

## Significance

- 1 billion people > one NTDs diseases (WHO, 2006)
- Endemic in ~ 149 countries
- 70% of affected countries developing countries
- Most NTD cause severe and permanent disabilities but rarely kill, hence they are placed at the bottom
- Huge impact in BOD, quality of life, loss of productivity and poverty
- AIDS increases the risk of NTDs

## The WHO NTDs

### Protozoan Infections
- Leishmaniasis (VL, CL and MCL)
- Human African trypanosomiasis (sleeping sickness)
- Chagas disease

### Helminth Infections
- Soil-transmitted helminth infections
  - Ascariasis-Trichuriasis-Hookworm
- Lymphatic filariasis (elephantiasis)
- Onchocerciasis (river blindness)
- Schistosomiasis
- Dracunculiasis (guinea-worm disease)
- Echinococcosis, cysticercosis and other "neglected zoonotic diseases"

### Viral Infections
- Dengue & dengue haemorrhagic fever

### Bacterial Infections
- Leprosy
- Trachoma
- Buruli ulcer

Many NTDs can be cured with drugs that cost as little as US$ 0.02–$1.50
Neglected Tropical Diseases blight the lives of more than a billion people worldwide and threaten the health and productivity of millions more. These infectious diseases strike the world's most vulnerable populations – those without access to clean water, basic sanitation, or health care – making it difficult for these communities to lift themselves out of poverty.

Source: [http://www.unitingtocombatntds.org/ntd_infographic.pdf](http://www.unitingtocombatntds.org/ntd_infographic.pdf)
Deaths and DALYs in developing countries, 2002 – (millions)

<table>
<thead>
<tr>
<th>Disease</th>
<th>DALYs</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuberculosis</td>
<td>35</td>
<td>1.7</td>
</tr>
<tr>
<td>Diarrheal Diseases</td>
<td>62</td>
<td>1.8</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>85</td>
<td>2.5</td>
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<tr>
<td>Malaria</td>
<td>47</td>
<td>1.3</td>
</tr>
<tr>
<td>Respiratory Infections</td>
<td>91</td>
<td>3.9</td>
</tr>
<tr>
<td>Neglected Diseases</td>
<td>57</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Source: Global Health Council. 2008 (July)
10 Leading Causes of Life-Years Lost to Disability and Premature Death, Global (in millions)

- Lower Respiratory Infections: 91.4
- HIV/AIDS: 84.5
- Unipolar depression: 67.3
- Diarrheal diseases: 62
- Ischemic heart disease: 58.6
- Neglected tropical diseases: 56.6
- Cerebrovascular diseases: 49.2
- Malaria: 46.5
- Road traffic accidents: 38.7
- Tuberculosis: 34.7

Figure 3. DALYs: Number by disease and for the 21 regions in 2010 (in thousands).

http://www.plosntd.org/article/info:doi/10.1371/journal.pntd.0002865
Neglect in the Research

- <1% NIH spending on research in NTDs in SSA

- Development of new therapeutic products:
  - 1975–1999: only 1.1%
  - 2000–2011: only 4% (37 of 850)
    - 1% (or 4, three for malaria, one for diarrheal disease) of 336 new chemical entities approved

- Registered clinical trials
  - 1% (2016) of 148,445 (in Dec 31, 2011)
Framework of Risk Factors for NTDs

Household and environmental factors
- Vector contact (e.g., termite mounds and Acacia trees near house for VL)
- Crowding
- Contact with animals
- Sleeping area (above ground vs. ground) (e.g., for VL)

Behavioral Factors
- Occupation
- Daily activity
- Sleeping habit
- Use of a mosquito net & duration of use
- Knowledge of transmission and symptoms

Nutritional and co-infection factors
- Stunted
- Underweight
- Wasted
- Co-morbidities (e.g., malaria for VL)

NTDs

Source: Adapted from Kolaczinski, 2008
Major Challenges for NTD’s

- No vaccines available
- Poor diagnostics
- Few and ineffective drugs
- Limited financial resources
Public-health strategies for the prevention and control of neglected tropical diseases

Transmission control

3. Improved vector control
4. Appropriate veterinary public health measures
5. Provision of safe water, sanitation & hygiene

1. Intensified case management, surgery and chronic care

- African trypanosomiasis
- Buruli ulcer
- Chagas Disease
- Dengue
- Echinococciosis
- Leishmaniasis
- Leprosy
- Lymphatic filariasis
- Rabies
- Schistosomiasis
- Trachoma
- Yaws

2. Expansion of preventive chemotherapy interventions

- Soil-transmitted helminthiases
- Schistosomiasis
- Lymphatic filariasis
- Onchocerciasis
- Trachoma
- Foodborne trematode infections
- Cysticercosis

Dracunculiasis eradication
Leishmaniasis (Kala-azar)

- World's 2\textsuperscript{nd} largest parasitic killer after \textit{malaria}
- \textbf{Two forms}: \textit{cutaneous} (CL) and \textit{visceral} (VL)
- Transmitted through the bite of an infected female \textit{phlebotomine sand fly}, in hot and humid climates
  - Sand flies typically go unnoticed–as they make no noise, are quite small, and their bites are often not felt nor seen.

\textit{Up to 90\% fatality rate within 2 years if left untreated, killing much more quickly than AIDS}
Key Population Features

GLOBAL: 1.3 millions cases occur each year (300,000 VL; 1 million CL) with 20,000-30,000 deaths annually, and 310 million people are at risk of infection.

- Affected populations are the poorest and most isolated
- Diagnostic procedures and case management are expensive, difficult to implement in resource-limited field settings and require expertise
- The diseases cannot benefit from preventive treatment
- Treatment often results in post-kala-azar dermal leishmaniasis (PKDL)
- There is no vaccine

**Solutions lie in:**
1. Control and
2. Innovative and Intensified Disease Management

Source: WHO
**Recommended Treatment regimens for VL, ranked by preference in Eastern Africa**

*Visceral leishmaniasis caused by L. donovani in East Africa (Ethiopia, Eritrea, Kenya, Somalia, Sudan and Uganda) and Yemen*

1. Combination: pentavalent antimonials (20 mg Sb\(^5^+\)/kg per day intramuscularly or intravenously) plus paromomycin (15 mg [11 mg base] per kg body weight per day intramuscularly) for 17 days (A)
2. Pentavalent antimonials: 20 mg Sb\(^5^+\)/kg per day intramuscularly or intravenously for 30 days (A)
3. Liposomal amphotericin B: 3–5 mg/kg per daily dose by infusion given over 6–10 days up to a total dose of 30 mg/kg (B)
4. Amphotericin B deoxycholate: 0.75–1 mg/kg per day by infusion, daily or on alternate days, for 15–20 doses (A)
5. Miltefosine orally for 28 days at dosage as above (A)

Leishmaniasis in Kenya

- **Disease profile**
  - Endemic in 22 arid and semi-arid Districts
  - Averages 600 cases annually, VL: 5,000-24,999, CL: <1,000

- **Policy Guidelines**
  - There is a guideline for management and control of Kala-Azar prepared in 2001 and a Control Strategy 2010

- **Technical capacity**
  - Entomology Unit of the MOH requires strengthening with field and laboratory equipment and operational facilitation
  - No routine reporting of Kala-azar
The field research is extremely challenging; here fixing a tire burst, Jan 9, 2012
Prior Work on Leish

1. Health facility survey
2. KAP survey
3. Systems analysis
4. Epidemiology survey
5. Educational campaign

GIS map, 2014
Touching people in the community

- Mission Dispensary
- AIC Church
- By a river
- Market place
- Dry (sandy) river bed
- Elders meeting place
- School compound
Research and Intervention Areas
Thematic area 1

Diagnosis and treatment

- Procurement and supply of Kala-azar diagnostic kits for Leishmaniasis
- Procurement of medicine to treat minor elements where screening takes place
- Annual screening campaigns
- Referral of suspected cases for further investigations and treatment at Kimalel health centre
- Follow-up of patients
Thematic area 2

Public health education

- Public health education campaigns
- Distribution of educational materials; posters and brochures
- Raise community public health awareness through their involvement in the interventions

Training

- Training of clinicians on screening for Kala-azar using the rapid kit test (rK39)
- Training of community health workers to conduct public health education campaigns and vector control activities.
Thematic area 3

Healthy environments

- Environmental vector control (clearing of bushes, anthills and animal burrows),
- The F (face washing) and E (environment) components of the SAFE strategy and
- The Water, Sanitation and Hygiene (WASH) strategy for Trachoma and STH.

Operations Research

- Epidemiologic mapping,
- Household (KAP- knowledge attitude-practices) survey
- Facility survey
- Systems analyses.
Output of field activities to date

- **Screened for leishmaniasis:**
  - 1,324 in **2012** in 18 villages
  - 597 in **2013**, with DBS

- **KAP-knowledge and attitude survey**
  - Respondents = 446
  - Key informant interviews = 26

- **Medical screening and drugs distributed in 2013**
  - 855 patients in 11 villages

- **Education material distributed in 2013**
  - 200 posters and 350 flyers

It is not possible to know how many people were reached by the educational components.
Next Steps, Stage 4 and beyond

1. Data analysis and writing (2012-2014)
   - Outcomes:
     - Scientific publications
     - Regional and international conferences
   - Analysis of blood samples
     - Genotypes of Leishmaniasis
     - Drug resistance
     - What other diseases are co-morbid with the Leish.

2. Implementation grant (2014-2016)

3. Project site at Chemolingot District H.?
To transform the pastoral community, one Pokot at a time
The field research is extremely challenging; here fixing a tire burst, Jan 9, 2012.
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The field research team after recruitment of enumerators, Chemlingot, Jan 10, 2012
The field research is extremely challenging; here fixing a tire burst, Jan 9, 2012
The Lead Project Personnel

- Richard Wamai, Ph.D., Project leader
- Joseph Wang’ombe, Ph.D., Professor
- Mercy Mugo, Ph.D
- Hellen Nyakundi, MPH, Project administrator
- Dr. Davis Wachira, MOH DVBNTD
- Dr. Charles Mwaswai, DHMO East Pokot District
- Elijah Plilan, MOH district community health strategy focal person for East Pokot District
The Challenge of Insecurity

*Daily Nation.* KDF soldiers on patrol in Nginyang. November 6, 2014
Kewanya Termes!
Asanteni – Thanks
End the Neglect

END7 Campaign

Join the Movement @ NEU

NEU Group Email: end7northeastern@gmail.com
Facebook: https://www.facebook.com/end7northeastern