

GEVITY

Supporting Clinical Diagnosis of Febrile Disease in Tanzania: Building Bridges by Design

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Informatics for a healthier world



Acknowledgements



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Grand Challenges Canada is funded by the Government of Canada and is dedicated to supporting Bold Ideas with Big Impact in global health.



Project supported by:

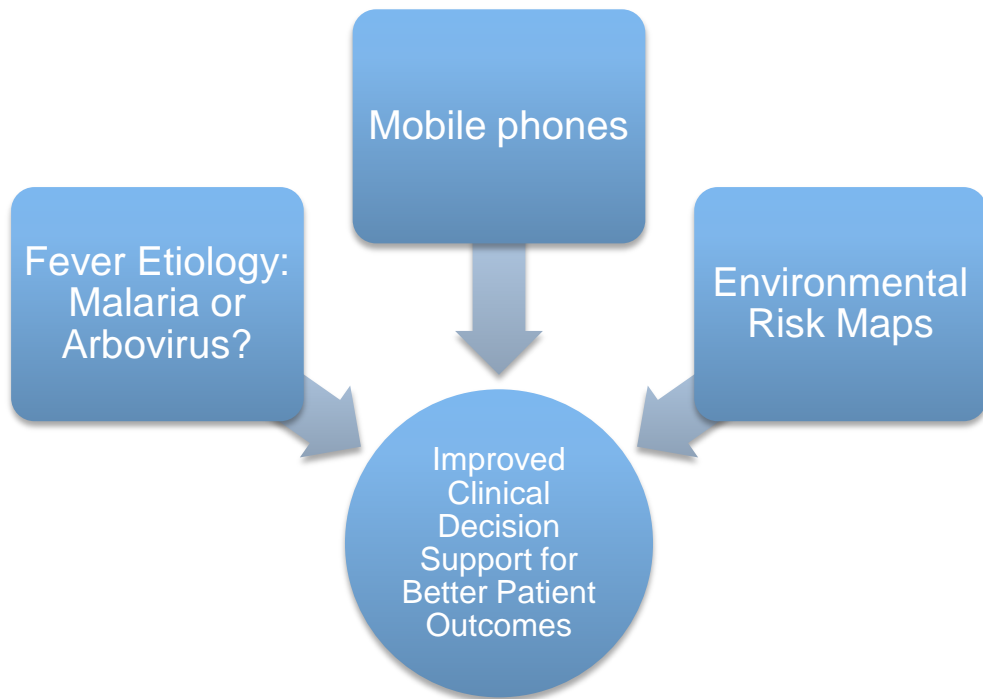
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Project Team



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- Professor Franklin Moshia, Professor and Director of Research and Consultancies, KCMUC
- Dr. William Kisinza, Centre Director, Amani Research Centre – NIMR
- Filemon Tenu, PhD Candidate, KCMUC

Summary



Our Bold Idea:
Start conversation
with broader
eHealth community
to refine solution

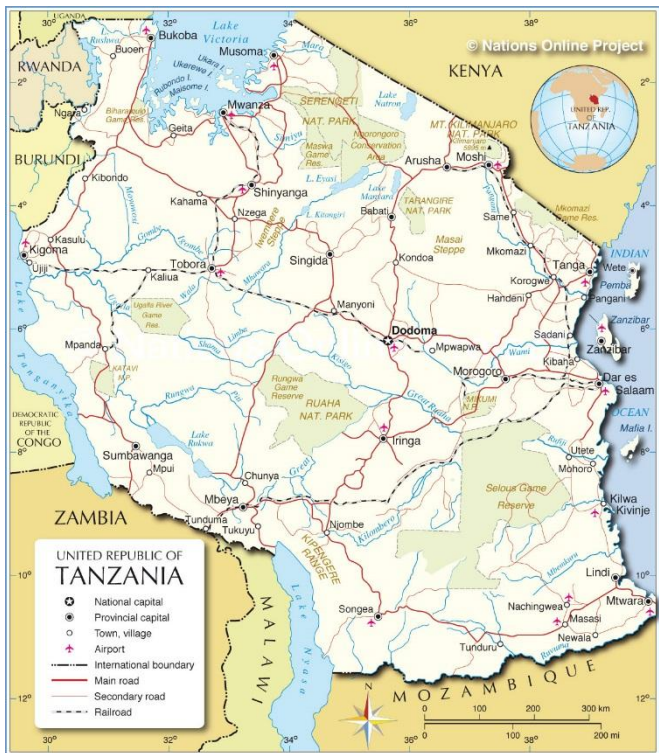
Public Health Issue

Creating Environmental Risk Maps for a
Clinical Decision Support Tool

Technical Architecture

Next Steps and Challenges

Malaria – A Public Health Threat



- Population (2014): 51.0 million¹
- Population at risk of malaria (2012): Mainland: 100%²
Zanzibar: 100%²
- Estimated annual malaria deaths/100,000 population (2012): 44³

1 US Census Bureau, International Data Base 2013

2 WHO, *World Malaria Report 2014*

3 WHO, *World Health Statistics 2015*

Diagnosis of Fevers

- Malaria and arboviruses share:
 - similar clinical presentations
 - vector-borne but different species and habitats
- Need to provide appropriate support to clinicians to maximize use of scarce resources and improve outcomes



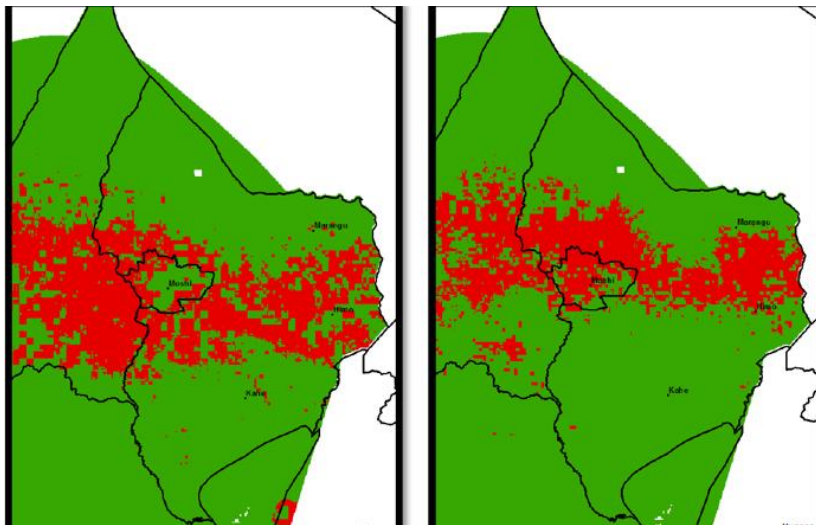
Anopheles



Aedes



Innovation: Environmental Risk Maps



Anopheles arabiensis (left) and *Aedes* spp (right)



Suitable Habitat

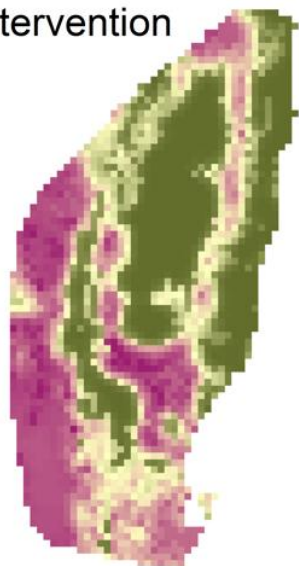


Unsuitable Habitat

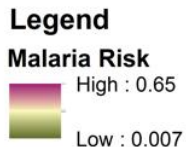
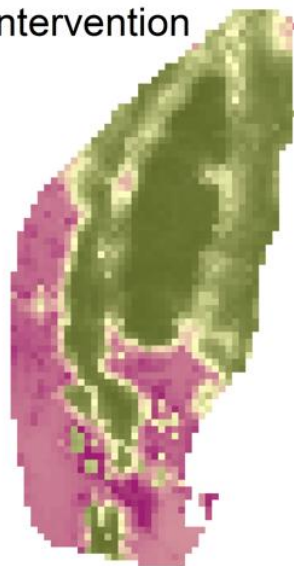
- Intensity of transmission depends on factors related to the parasite, the vector, the human host, and the environment

Innovation: Environmental Risk Model

Pre-intervention



Post-intervention



- Environmental risk models provide local estimates of risk
- Used as part of the diagnostic algorithm to help inform fever diagnosis

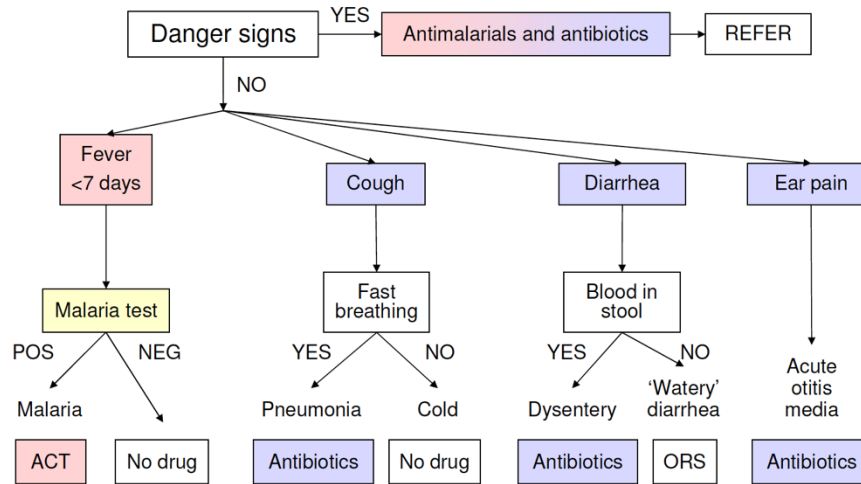
Risk Maps – Muleba District

Objective: To improve diagnosis of the underlying cause of febrile illness and accurately treat patients

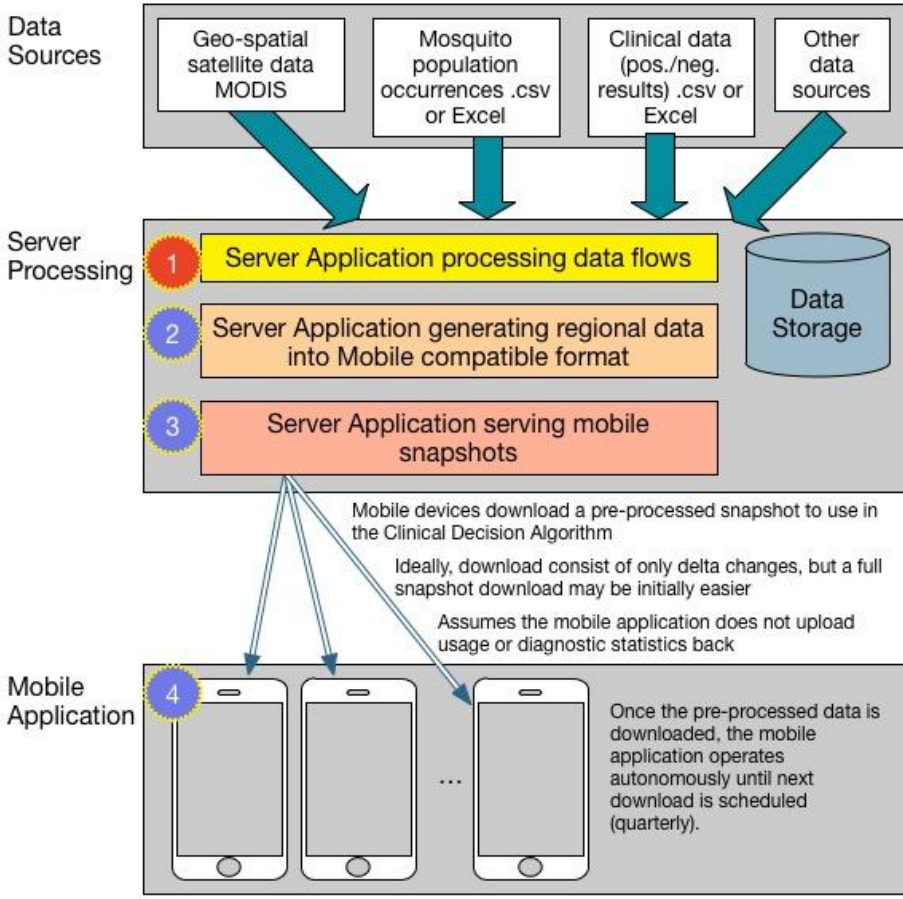
Inputs <i>Resources dedicated to or consumed by the program</i>	Activities <i>What you do to fulfill your goals and objectives</i>	Outputs <i>The direct products of the activities you do</i>	Outcomes <i>Changes, benefits, or impacts as a result of an activity</i>		
			Short-term	Intermediate	Long-term
<p>Staff</p> <ul style="list-style-type: none"> - Senior government decision makers - Geospatial experts - Clinical experts - Healthcare practitioners (HCPs) - Technical support <p>Data Sources</p> <ul style="list-style-type: none"> - Updated environmental risk maps - Clinical decision support algorithm/program <p>Equipment</p> <ul style="list-style-type: none"> - BYOD android phones <p>Other</p> <ul style="list-style-type: none"> - Funding for cloud server - Community support 	<ul style="list-style-type: none"> - Build program governance structure - Confirm program goals and objectives - Secure funding and staff for updated risk maps - Design, test, and pilot clinical decision support tool - Assess hardware and infrastructure needs - Create and deliver training program - Create and deliver public awareness campaign - Implement program - Evaluate and report on the program 	<ul style="list-style-type: none"> - # of training session provided - # HCPs trained - # app downloads - # app updates - # times report downloaded - # staff (F/T and P/T) 	<ul style="list-style-type: none"> - Increased knowledge and efficacy of HCPs at diagnosing febrile disease - Increased awareness of common causes of febrile disease in HCPs - Awareness of evidence-based practice guidelines 	<ul style="list-style-type: none"> - Reduced patient demand for anti-malarials and antibiotics - Reduced prescription of anti-malarials and antibiotics 	<ul style="list-style-type: none"> - Reductions in (malaria) drug resistance - Improved use of resources for treatment and care of patients

Clinical Decision Support

IMCI Guidelines: primary care for malaria high risk areas



- Definition of suspected malaria varies with malaria transmission intensity
- The intention is to extend and test the “Malaria Test: Neg -> No drug” portion of the algorithm by including local environmental risk malaria versus arboviruses:
 - Chikungunya
 - Malaria
 - Dengue
 - Rift Valley Fever



1. Data input backend-processing module would accept the provided data files and process them for consumption
2. Generation of the download package can either be a scheduled process or manually initiated.
3. The download module will simply validate the access token and then stream the package archive to the mobile device
4. Embedding the clinical algorithm(s) into the download package will allow updates to the mobile device logic without requiring new deployments

Clinical Decision Support



ODK Collect > Zanzibar SAM Clinical Exam

Does the child have a cough?

yes

no



ODK Collect > Zanzibar SAM Clinical Exam

Is there chest indrawing?

yes

no

ODK Collect > Zanzibar SAM Clinical Exam

This child should be referred to PHCC/hospital for treatment IMMEDIATELY

Acknowledge

Next Steps



- Confirm environmental risk models are robust and clinically valid
- Obtain funding
- Reconfigure partnership with government and mHealth projects to gain lessons learned from their education and clinical support
- Phase 1 (proof of concept) – manually generate algorithm, create UI
- Phase 2 (interactive development/delivery/maintenance)- automate processing

Challenges



- Funding requirements drives project phasing
- Field experience informing requirements for risk maps
 - Using the app to collect symptom and mRDT data to keep refining the risk maps based on habitat maps that aren't updated frequently
 - Designed from a distance
- Investment in developing a tool may be overshadowed by program implementation costs
- Need link to surveillance data

mHealth Tanzania Partnership

Health D...

