SEROPREVALENCE AND DISTRIBUTION OF DENGUE AND CHIKUNGUNYA VIRUSES IN COMMUNITIES WITH DIFFERENT MALARIA ENDEMICITY

Debora C. Kajeguka, Robert Kaaya, Rogathe Ndossi, Arnold Ndaro, Jaffu Chilongola, Reginald Kavishe, Karin Linda, Michael Alifranges and Franklin Mosha

Background

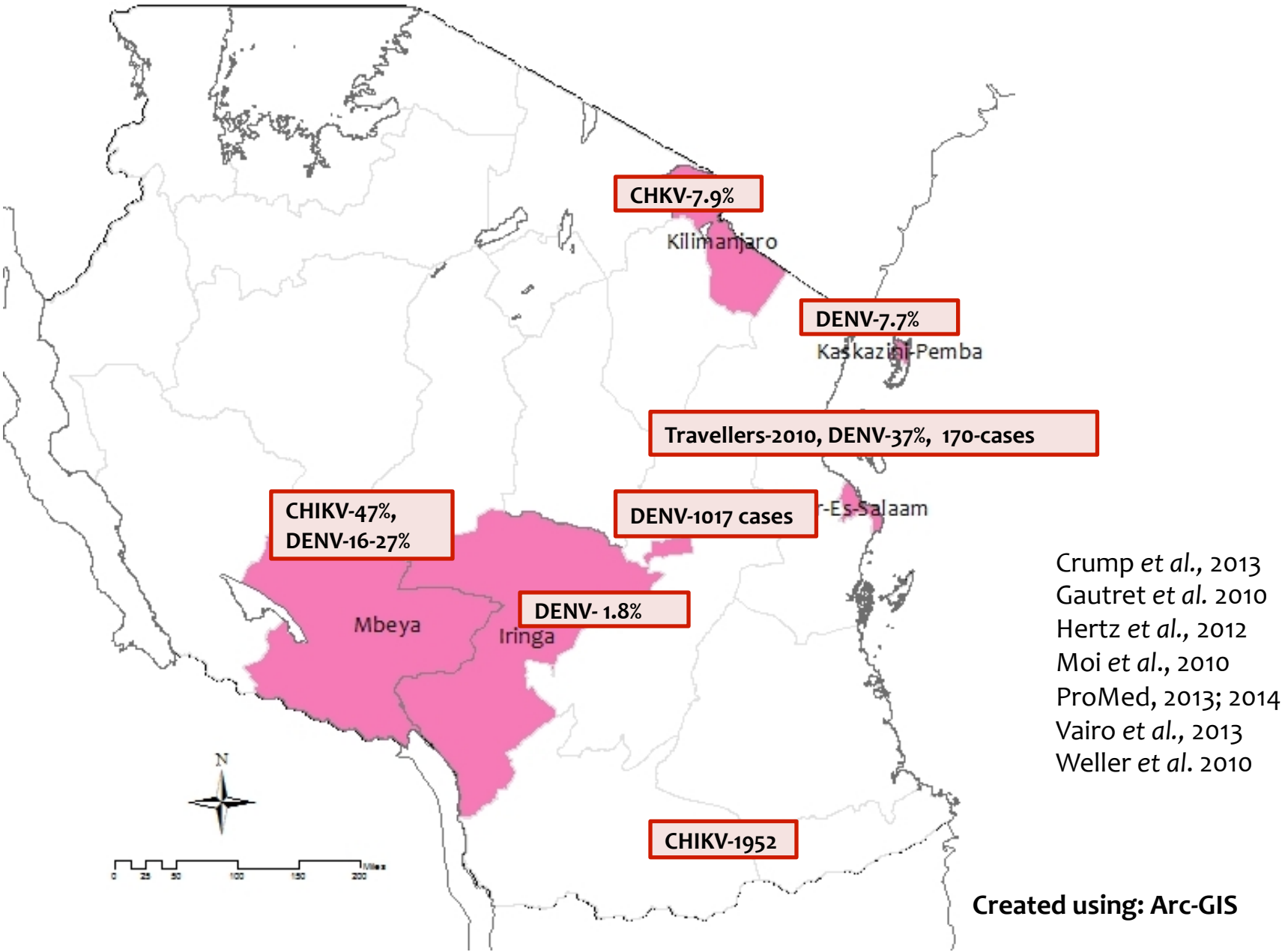
- In sub Saharan Africa where malaria is endemic most febrile cases are ascribed as malaria

- Reports on Malaria decline hence other tropical infectious disease has been on the rise

- Arbovirus
  - Including arbovirus (DENV, CHIKV etc)
  - Most prevalent vector borne infections (46.6%)
  - *Aedes aegypti* to less extent *Aedes albopictus*

Bhatt *et al.*, 2013 ,Mmbando *et al.*, 2010; Ishengoma *et al.*, 2013, Mease *et al.*, 2011, WHO: 2014

Arbovirus in Tanzania



Crump *et al.*, 2013
Gautret *et al.* 2010
Hertz *et al.*, 2012
Moi *et al.*, 2010
ProMed, 2013; 2014
Vairo *et al.*, 2013
Weller *et al.* 2010

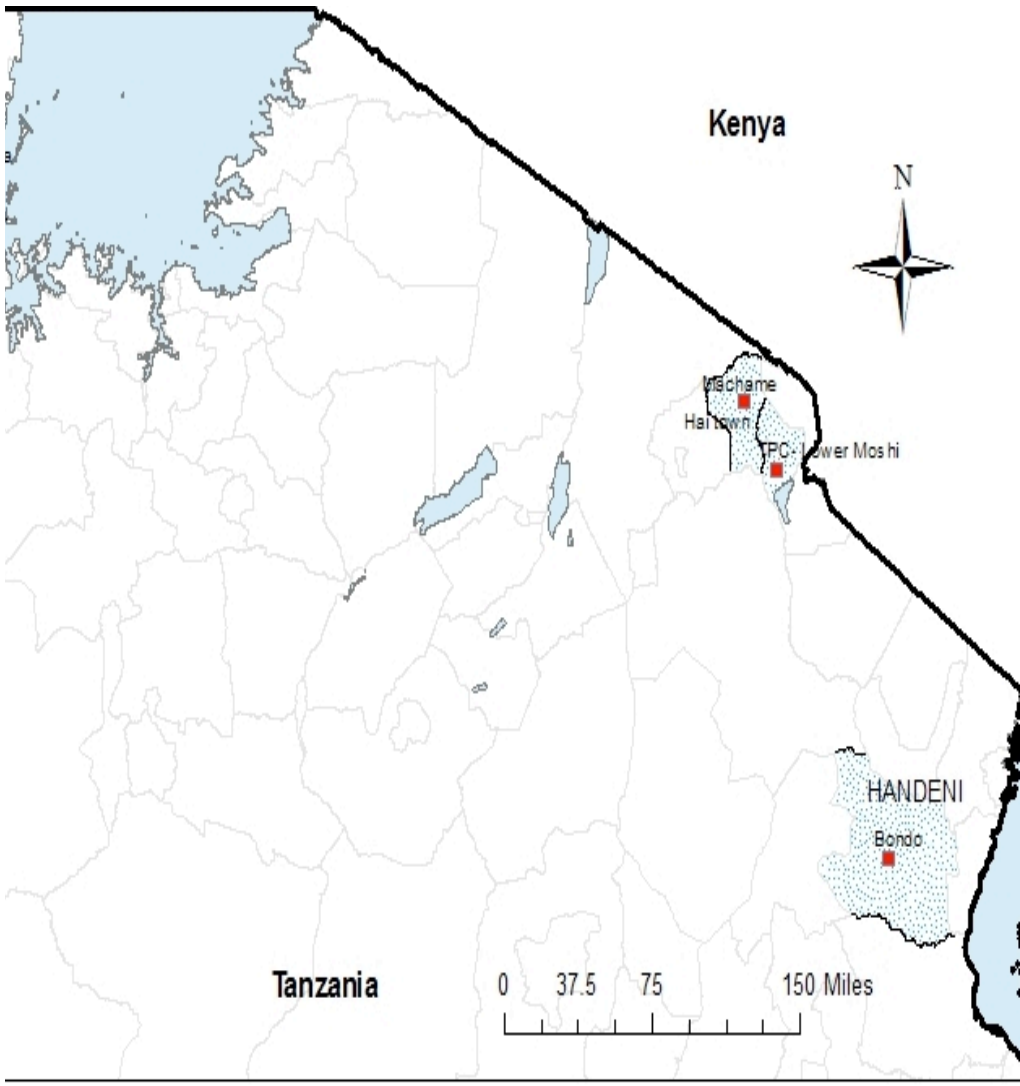
Created using: Arc-GIS

Background-continues

- Over 50% of the world's population- at risk of DENV
- Approx. 400 million individuals worldwide suffer from dengue infections every year
- Chikungunya fever has been reported from several countries around the world
  - Sporadic cases occur, but large outbreaks are infrequent
- Case fatality rate is
- Limitation in the health system
  - Inevitably results in underestimation of the true burden of arboviral diseases

Methodology

- Cross sectional study
- 780 participants of all ages
  - 450 Bondo ,Tanga
  - 208 Hai, Kilimanjaro
  - 122 Lower Moshi
- Serum samples for :-
  - Anti-Dengue (DENV, both IgM & IgG) using Capture ELISA
  - Anti-Chikungunya (CHKV, only IgM) using Indirect ELISA



Created using: Arc-GIS

RESULTS

Figure1: Dengue and Chikungunya Seroprevalence

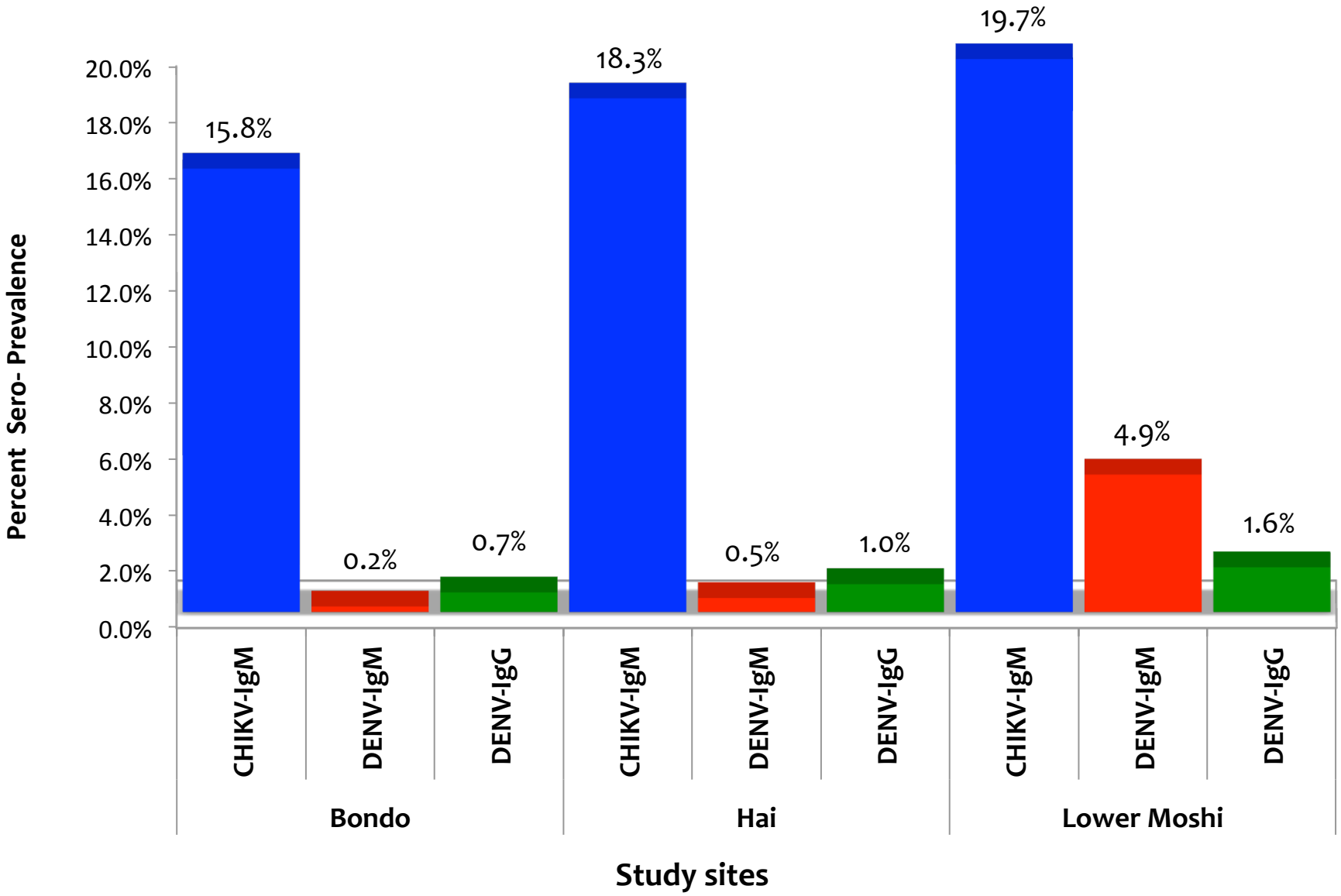


Table1: Dengue and Chikungunya Seroprevalence

Antibody	Study sites	N	n(%)
Anti-Dengue-IgM/IgG	Bondo-Tanga	450	4 (0.9)
	Hai-Kilimanjaro	208	3 (1.4)
	Lower Moshi	122	7 (5.7)
	TOTAL	780	14 (1.8)
Anti-Chikungunya-IgM	Bondo-Tanga	450	71 (15.8)
	Hai-Kilimanjaro	208	38 (18.3)
	Lower Moshi	122	24 (19.7)
	TOTAL	780	133 (17.1)

Table 2: Demographic and Clinical data on DENV-IgM/IgG seropositivity

	All n	DENV-IgM/G+ n (%)	*P*-value
Gender			
Female	468	10 (71.4)	0.3
Male	312	4 (28.6)	
Age category			
2-14 years	358	3 (21.4)	0.06
≥15 years	422	11 (78.6)	
Fever			
Yes	250	6 (50.0)	0.2
No	471	6 (50.0)	
Headache			
Yes	308	8 (66.7)	0.09
No	413	4 (33.3)	
Joint Pain			
Yes	262	7 (58.3)	0.1
No	459	5 (41.7)	
Nausea/Vomiting			
Yes	52	2 (16.7)	0.2
No	669	10 (83.3)	

Chi-square test, DENV=Dengue virus, IgM/G=Immunoglobulin M/G, +=Positive

Table 3: Demographic and Clinical data on CHIKV-IgM seropositivity

	All n	CHIKV IgM+ n (%)	*P*-value
Gender			
Female	468	77 (57.9)	0.5
Male	312	56 (42.1)	
Age category			
2-14 years	358	66 (49.6)	0.3
≥15 years	422	67 (50.4)	
Fever			
Yes	250	40 (36.4)	0.6
No	471	70 (63.6)	
Headache			
Yes	308	75 (68.2)	< 0.01
No	413	35 (31.8)	
Joint Pain			
Yes	262	57 (51.8)	< 0.01
No	459	53 (48.2)	
Nausea/Vomiting			
Yes	52	6 (5.5)	0.4
No	669	104 (94.5)	

Chi-square test, CHIKV=Chikungunya virus, IgM=Immunoglobulin M, +=Positive

Discussion (1):

- Data demonstrate that there is high exposure to DENV and CHKV in areas with different malaria endemicity

- Sero-prevalence of CHKV-IgM in Bondo, Hai and Lower Moshi
  - This indicates that CHKV is prevalent in these areas
  - Presence of IgM antibodies may not necessarily indicate acute infection but suggest on-going transmission
  - This is due to the reason that IgM antibodies can be detected starting day 5 after fever onset

Discussion (2):

- Low sero-prevalence of DENV-IgM/IgG in both sites
- There is evidence that DENV is emerging
  - Dar DENV outbreak
  - No Cases before the outbreak-2010

- Established itself in epidemic transmission as it has recently been observed in recent outbreak in Dar es Salaam

- Though lower Moshi had higher seroprevalence as compared to other sites
  - Irrigation scheme
  - Vegetation

Discussion (3):

- More than 50% of the participants reported headache and joint pain, after excluding malaria positive
  - Indicating that headache and joint pain was attributed to CHIKV infection
    - PCR results
  - These results provide evidence that majority of clinical features are not due to malaria alone
  - This indicates that high number of people may be wrongly treated as malaria

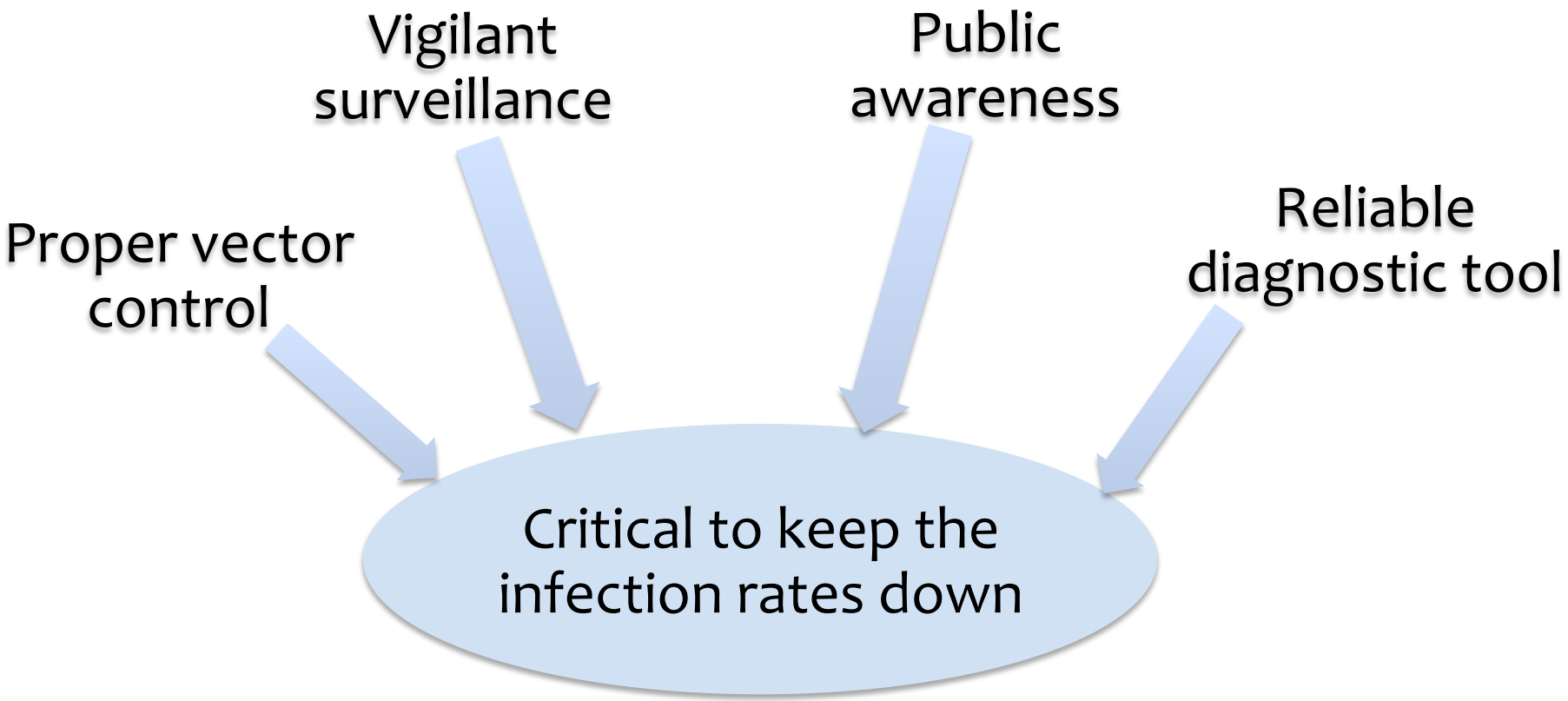
Conclusion:

- First report which shows that CHKV is prevalent
- DENV circulate in low prevalence
- This calls for surveillance in order to know the real burden country wide

Limitation:

- Cross-reactivity with antibodies specific for other flaviviruses or alphavirus was not excluded

Recommendation:



Acknowledgement

SD-AFRICA

DMO - Handeni District

DMO - Hai District

DMO – Moshi Rural

CDC – Tanzania

Study Participants

BUILDING STRONGER UNIVERSITIES
IN DEVELOPING COUNTRIES