One Health Units and Brucellosis in Kenya

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Kenya

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Presentation Outline

- Introduction
- One Health Concept
- Drive for OH in Kenya
- Brucellosis in Kenya
- Brucellosis project

Introduction

Kenya- Geographic Attributes

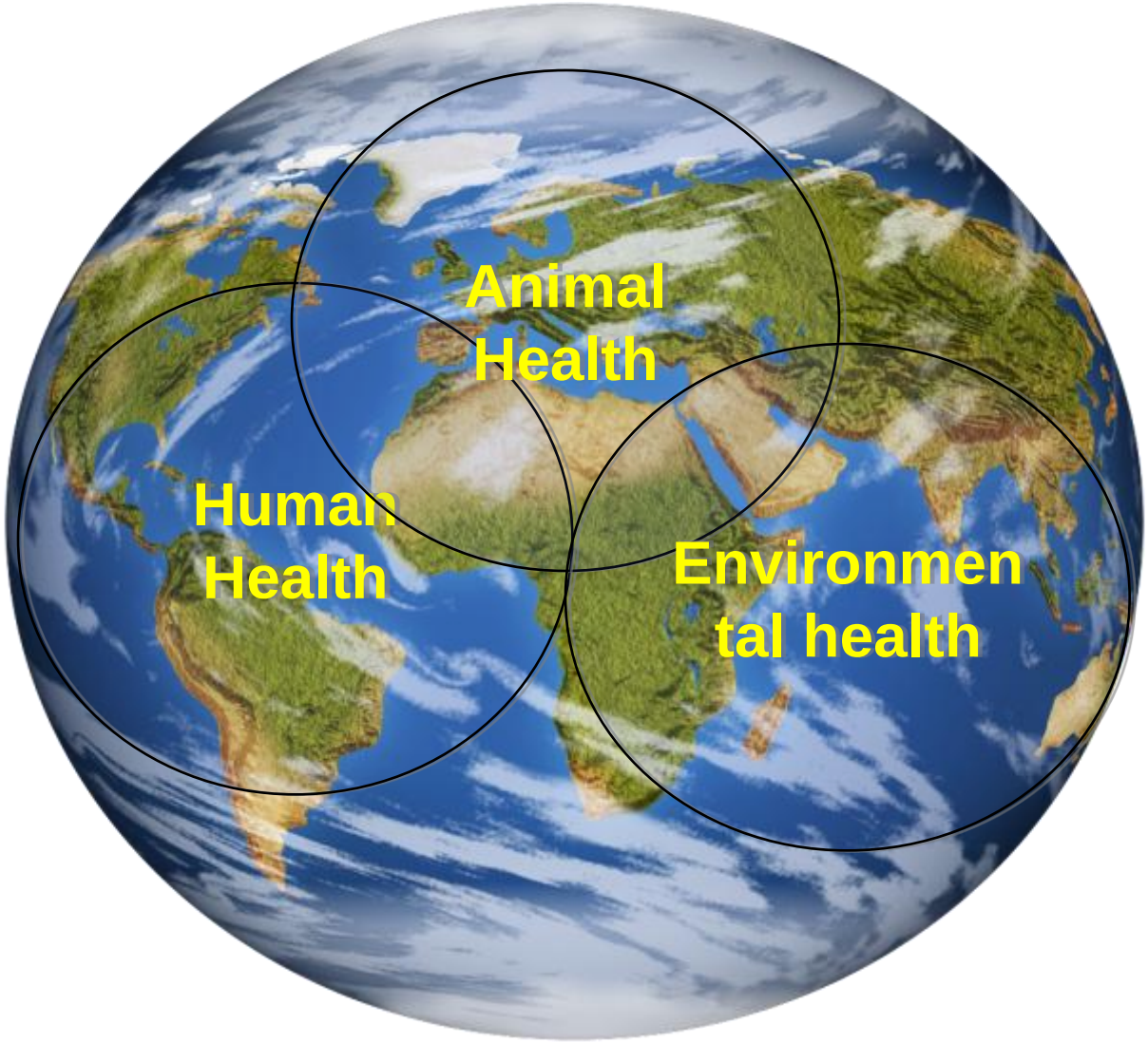
- Total landmass 582,650 km^2 .
- 80% of the landmass is ASAL that supports domestic animals and game.
- 30% of Kenyan population live in ASALs and derive virtually all their livelihood from animal resource.

Human Livestock Demographics

- Human population
  - 39 Million (Kenya Bureau of Standards, 2009)
- Average annual population growth rate 2.6%
- Population density 71 people per sq km
- Livestock populations
  - Cattle 18 million
  - Sheep 18 million
  - Goats 28 million
  - Camels 3 million
  - Poultry 30 million
  - Swine 0.3 million
  - Wildlife Biodiverse

One Health Concept

Convergence of the Human-Animal-Environment Interface



Definition of One Health

- **“the collaborative efforts of multiple disciplines working locally, nationally and globally to attain optimal health for people, animals and our environment” (AVMA, 2007)**

- Other names for One Health: One Medicine, One World One Health (OWOH), Conservation Medicine, Eco-health & VPH etc

Why One Health approach

- Majority (60%) of infectious problems of humans are shared with animals
- Emergence and re-emergence of diseases and pathogens such as HIV virus, SARS, HPAI virus, H1N1 Virus, RVF, Ebola, Lassa, Marburg
- Growing concern owing to the continued neglected diseases like brucellosis, cysticercosis, trypanosomosis, coxiellosis, anthrax, rabies

Drive for One Health in Kenya

- The global pandemic **threat** by H5N1;
  - 1st coordinated One Health activity- CP developed
- Saw the establishment of the National Avian Influenza Task force in 2005.
- Multisectoral/ Multidisciplinary body comprising over 24 agencies and bodies.
- Rift Valley Fever outbreak in 2006/07;
  - Multi-sectoral collaboration derived from the National Task Force
- Ad hoc response to zoonoses outbreaks due to lack of integrated government structure

Legal Framework for One Health in Kenya

- **Meat Control Act** administered by veterinary services for control of meat & meat products for human consumption
- **Public Health Act** administered by Ministry of Public Health analogous to Meat Control Act
- **Rabies Act** requires Veterinary Officers to notify the Medical Officer of Health of any cases of rabies in domestic animals.
- Confirmatory rabies diagnosis in humans has historically been done in the Central Veterinary Laboratories

Institutionalization of One Health in Kenya: Zoonotic Disease Unit (ZDU)

- **MOU**: Signed by MoPHS and MoLD in **Aug 2011**
- **Housing:** Office constructed on government land and officially opened by the Minister for MoLD and Minister for MoPHS – **Oct 2012**
- **Staff:** Epidemiologists deployed by government

  Support staff: Admin Assistant and Data personnel

Zoonotic Disease Unit (ZDU)

- **Mission:** To establish and maintain active collaboration at the animal, human and ecosystem interface towards better prevention and control of zoonotic diseases

- **Vision**: A country with reduced burden of zoonotic diseases and better able to respond to the epidemics of emerging infectious diseases

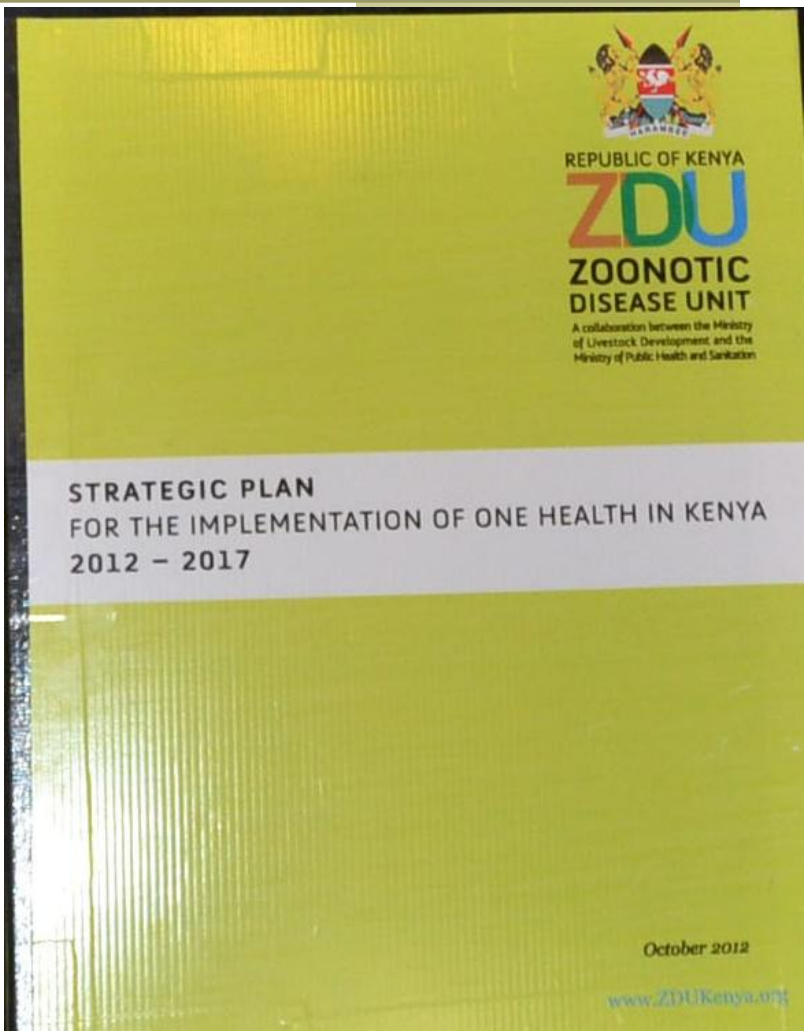
Launch of the ZDU

Hon. Minister, MOLD and Hon. Minister MoPHS officially open ZDU office

Strategic Plan for Implementing OH in Kenya (2012-17)

Objectives:

- Strengthen surveillance, prevention and control of zoonoses
- Establish structures and partnerships to promote OH
- Conduct and PromoteApplied Research



To download visit
WWW.ZDUKenya.org

Brucellosis in Kenya

- Although endemic in Africa, brucellosis data in Kenya is scarce
- Huge Public health problem owing to:
  - Weak laboratory diagnosis (human diagnosis)
  - Non standardized control in animals
  - Vaccination not widely done; if any??
  - Test and slaughter/ culling not practical

Brucellosis in Kenya…

- Brucellosis included in IDSR for monthly reporting in march 2011
  - Sentinel surveillance; yet to be established
- Enlisted as a notifiable disease in livestock (April 2011)
- Control strategy, yet to be developed

Febrile Diagnostic kit®	Polymerase chain reaction (PCR)		
	Positive	Negative	Total
Positive	22	100	122
Negative	37	225	262
Total	59	325	384
	Sensitivity=37%	Specificity=69%	Concordance= 0.03
	Predictive value positive =18%	Predictive value negative =86%	

Yields from evaluation of rapid kit used at Ijara District Hospital, 2011 (Thesis work: Stella Kiambi)

Brucellosis Study

Collaborating institutions

- Zoonotic Diseases Unit (Coordinating)
- Ministry of Livestock Development
- Ministry of Public Health and Sanitation
- CDC/KEMRI
- Training institutions (FELTP)
- Funding: Unites States Department of Defense, Defense Threat Reduction Agency (DTRA)

Multi-Sectoral, Multi-Disciplinary Brucellosis Planning Team

Study Set Up: Two phases

Phase 1

Sero-prevalence survey with following objectives:

- To determine the baseline sero-prevalence of brucellosis in humans and animals
- Identify the factors of infections with *Brucella spp in* animals and humans
- To evaluate the community knowledge attitude and practices with regard to Brucellosis

Phase 2

Incidence study with the objectives:

- To determine the incidence of human and animal brucellosis
- Determine the socio-economic impact of brucellosis in both human and livestock populations
- To determine the circulating brucella serotypes
- Validate the appropriate human diagnostic kits

Research output (sero-prevalence and incidence studies)

- Establish burden of brucellosis in humans and livestock
- Determine the incidence and factors associated of brucellosis
- Determine the socio-economic impacts of brucellosis infection
- Determine the brucella spp contributing to infections and possible transmission pathways
- Establish the appropriate diagnostic test for brucellosis

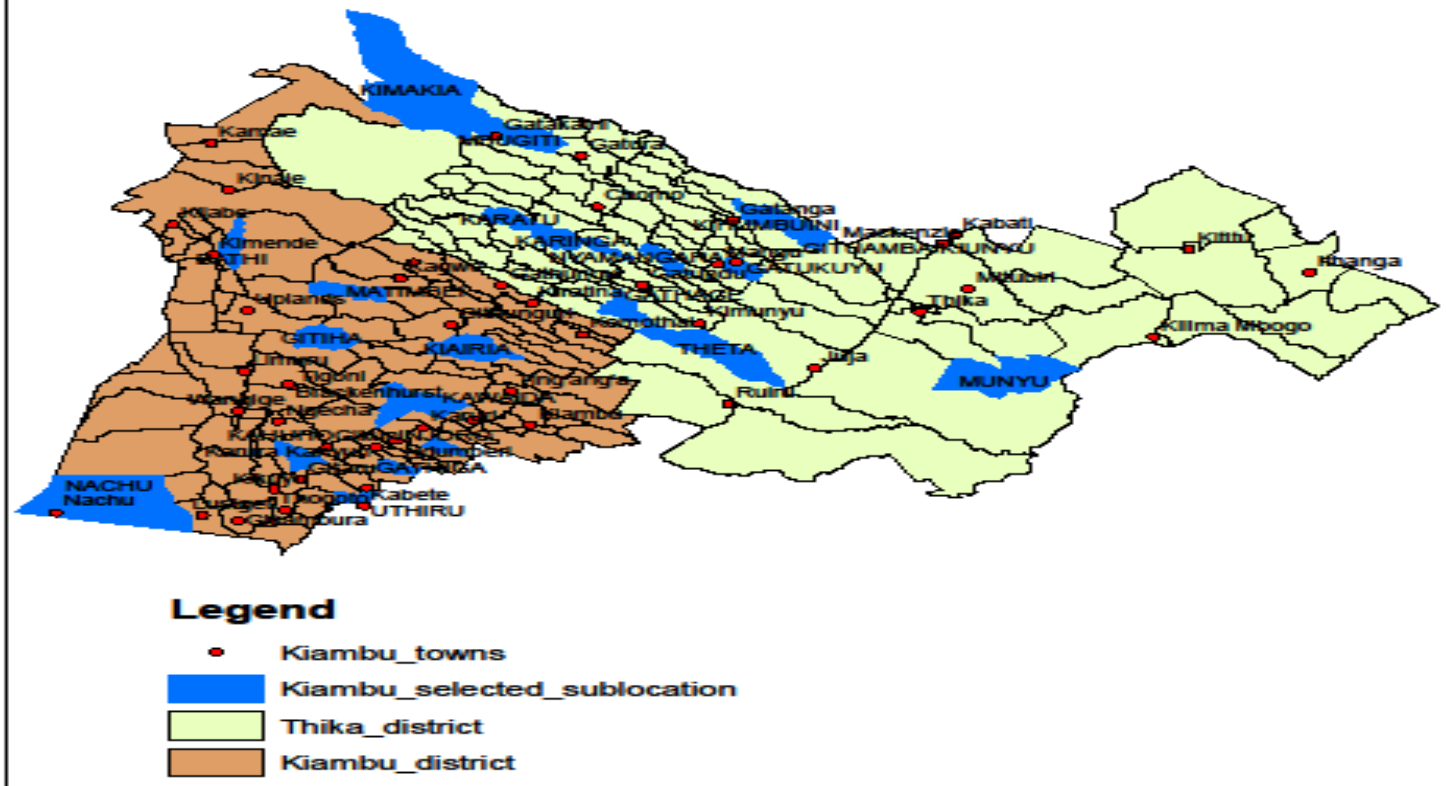
Phase 1: Pre-study Planning

- Weekly planning meetings (multi-sectoral)
- Standard Operating Procedures developed
- Survey manual developed
- Series of trainings and workshops
- Good clinical practice training carried out
- Field work (Nov-Dec 2012)

Materials and Methods

- **Study design:** Cross-sectional survey
- **Study sites:**
  - **Kiambu County**
    - Considered low risk; Peri-urban small holder system
    - Animals mainly on zero grazing
  - **Kajiado County**
    - Considered high risk county
    - Land tenure, mainly communal with little crop farming
    - Pastoralism is the main livestock keeping system
- No animal vaccination for brucellosis in these counties

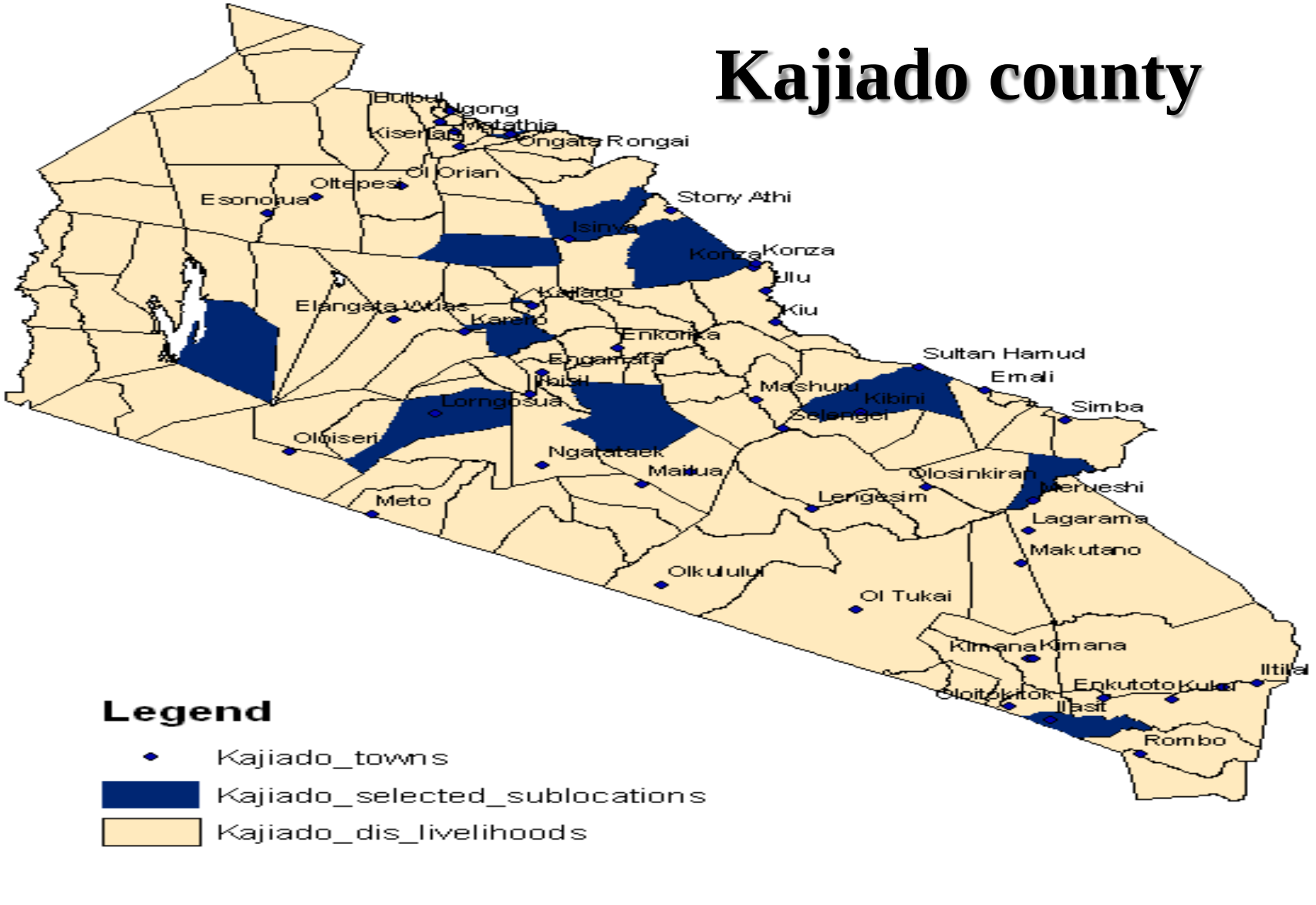
Kiambu County



Legend

- Kiambu_towns
- Kiambu_selected_sublocation
- Thika_district
- Kiambu_district

Kajiado county



Legend

- Kajiado_towns
- Kajiado_selected_sublocations
- Kajiado_dis_livelihoods

Sampling

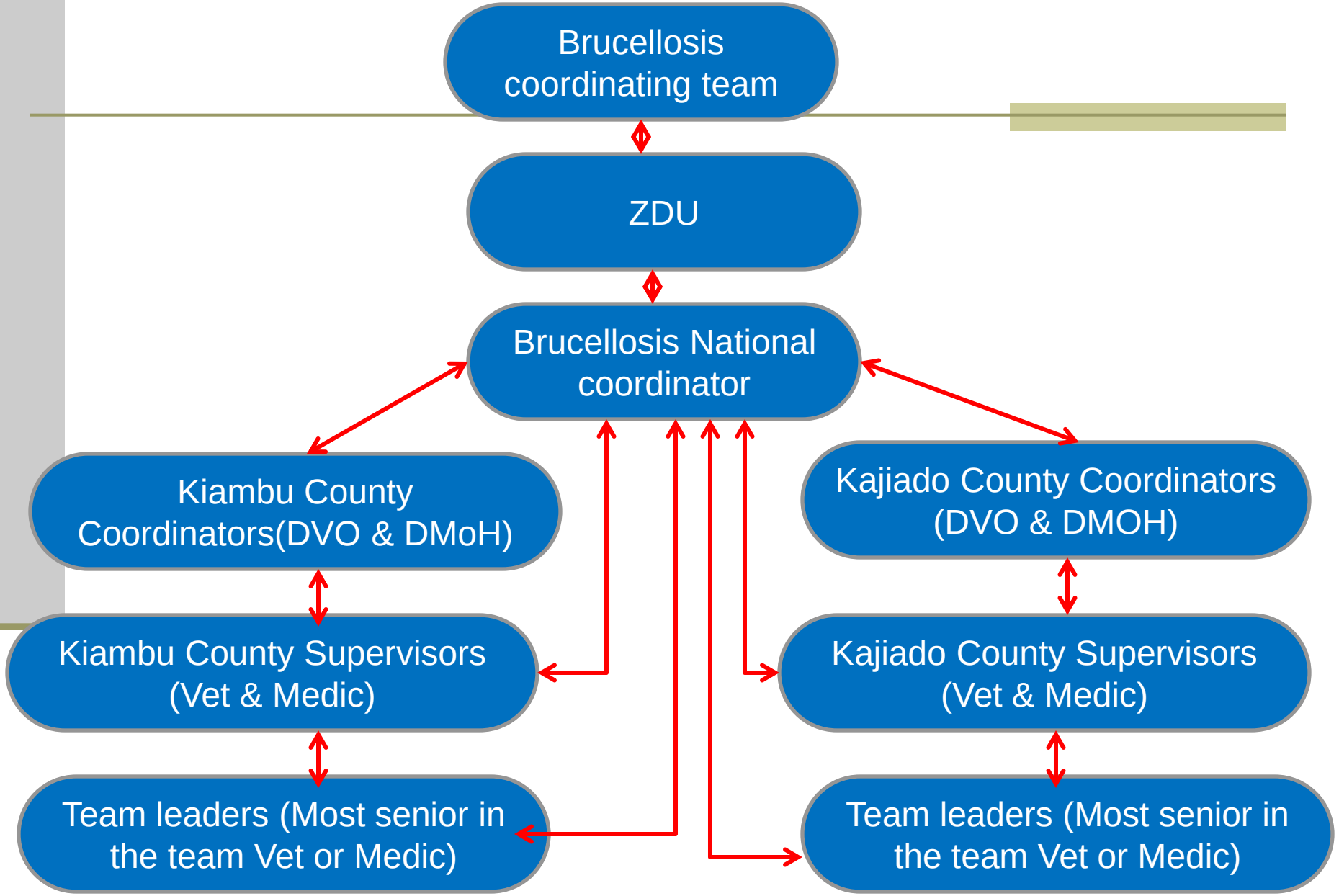
- Two stage cluster sampling by sub-location and household
- Random selection of sub-locations after stratification by livestock production system
- GPS handsets used to locate the pre-determined geo-codes
- Random selection of households
- Interviewing -Household/compound head and additionally to each consenting/assenting human before sampling

HH= Household

Methods….

- **Human specimen collection** on all enrolled HHs
  - Three humans ≥ 5 yrs of age per HH
- **Animal specimen collection** in enrolled HHs
  - Up to 15 animals of each eligible species (cattle, sheep, goats, camels)
- Data collection using a standardized questionnaire on PDAs

Study Coordination structure



Teams composition

- There were 10 teams in total, with 5 teams per county
- Each team consisted of seven staff:
  - A Health worker (nurse/ clinical officer)
  - Two veterinarians/paravets
  - A Lab technologist
  - A guide
  - Two animal handlers
- Roles for every team member were elaborated

Explaining the study

Field session: Data collection

Questionnaire administration (PDA)

Human sampling

Cattle sampling

Samples collected and shipped to appropriate labs

County	Human samples	Livestock samples	Total samples	No. of Households
Kiambu	1210	2005	3304	494
Kajiado	813	3513	4331	310
Total	**2023**	**5518**	**7635**	**804**

Laboratory

- All samples logged into a database within CVL
- Human sera - ELISA (IBL America ELISA
    - CDC Kisumu lab Kisumu
- Animal sera -by cELISA (Svanovir ELISA)
    - Central Veterinary lab in Kabete

    NB: Testing to commence soon

Phase 2: Incidence study

- To commence in 2013

Acknowledgement

- Principal Investigator-Dr. Kariuki Njenga
- CDC/KEMRI
- Department of Veterinary Services
- Department of Public Health and Sanitation
- Local administration
- Local guides
- Hospitals
- Study team
- Communities and study participants of Kiambu & Kajiado Counties
- Transport Company
- Any other person that may have assisted in the study in any way

“There is no dividing line between the medicine of different species, nor should there be.”

Virchow