ESTIMATING PREVALENCE OF BRUCELLOSIS IN LIVESTOCK AND ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES OF RESPECTIVE COMMUNITIES IN BARINGO COUNTY

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INTRODUCTION

- Livestock play crucial role in most of the sub-Saharan Africa- Food, income, prestige etc.
- Main challenges are pasture and water scarcity, diseases; including E.C.F, anthrax, brucellosis etc.
- Most diseases are poorly controlled in most African countries, including Kenya.

Literature Review

Brucellosis in animals

- Brucellosis is a zoonosis caused by bacteria of genus *Brucella*.
- It is characterized mainly by reproductive failures and wastages in domestic animals.
- There are nine spp. of *Brucella.*
- Most of these *Brucella* have preferred hosts, although cross infections do occur.

Brucellosis in Animals cont'

- In domestic animals, the most common and important *Brucella* are: *B. abortus*, *B. suis* and *B. melitensis* as well as *B. canis* in canids.
- Brucellosis in bovines and small ruminants *(B. abortus* and *B. melitensis)* appear to be the most widely spread especially among the pastoralists in Kenya, (McDermott and Arimi, 2002)

Brucellosis in Animals cont'd

Transmission

- Domestic ruminants become infected by ingesting the organisms.
- Inhalation, conjunctival routes and intra-uterine semen deposition during A.I can lead to its transmission.
- Dumping of contaminated materials enhances spread in the environment posing a risk to both animals and humans.

Brucellosis in Animals cont'd

Epidemiology

- In Africa, the epidemiology of the disease in humans and livestock is not well understood (McDermott and Arimi, 2002).
- Prevalence of bovine brucellosis in Sub-Saharan Africa is between 0.2-25.7 % (Mangen et *al.,* 2002).
- Prevalence in Kenya is 2% -15% (Kang'ethe, 2001, Mugambi, 2001, Arimi, 2005 etc).
- Highest prevalence among the pastoral and agro-pastoral communities.

Brucellosis in Humans

- People become infected by ingestion and contact with contaminated animal products/infected animal tissues, breast milk, tissue/organ transplant.
- It is also an occupational disease = Vets, farmers, lab personnel etc.
- *B. melitensis*, *B. suis*, *B. abortus* and *B. canis* affect humans in descending order of pathogenicity.

Brucellosis in humans cont'd

- It is characterized by undulating fever and generalized aches.
- It thus resembles malaria and has often been wrongly treated as such (Alturi, 2011).
- Globally, there are about 500,000 human cases annually(Alturi, 2011).

Justification

- Brucellosis is a disease of great socio-economic and public health importance.
- Requires one health approach.
- Continuous surveillance by sero-diagnosis is therefore of paramount importance.
- Need to assess the level of the disease among the livestock populations from time to time, partic-ularly in animals whose daily contact with humans puts them at risk of contracting the disease.

Justification cont'd

- Analysis of the level of knowledge, management practices and attitudes of the local communities; will help in designing an outreach educational program.
- This will aid in controlling the disease among the animal and human populations.
- Treatment not justifiable.
- Molecular typing- for future developments (Vaccine production).
- Relevant authorities will plan way forward- policy control.

Objectives

Overall Objective

To estimate prevalence of brucellosis in livestock (cattle, sheep & goats) in Baringo County, Kenya and assess the knowledge, attitudes and practices of the respective communities.

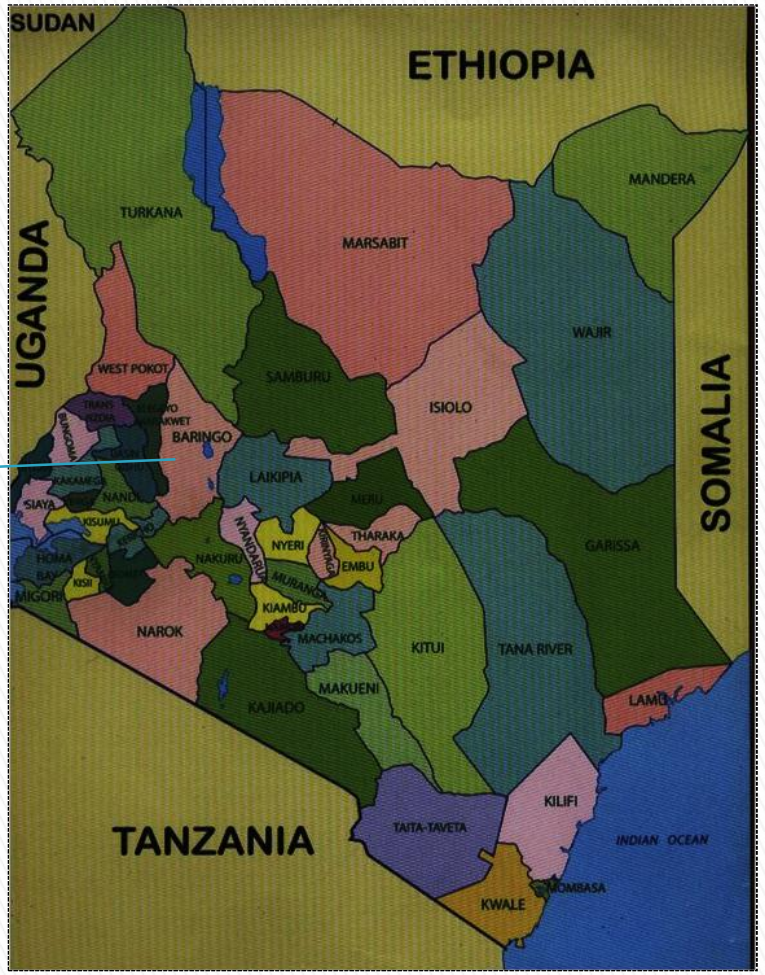
Specific objectives:

- To estimate the sero-prevalence of brucellosis in cattle, sheep and goat herds/flocks in Baringo.
- To isolate and characterize the *Brucella* species infecting cattle, sheep and goats in Baringo.
- To assess the knowledge, attitudes and practices of the local community associated with brucellosis in cattle, sheep and goats in Baringo, Kenya.

MATERIALS AND METHODS.

Study area

- Baringo is located in the southern part of Rift valley and borders Nakuru to the south, Turkana to the north, Samburu and Laikipia to the east and Elgeyo-Marakwet to the west, and covers an area of 8,655km^2.



Source= IEBC, 2013

Study population

- Baringo has a population of 555,561 people (110,649 households) mainly comprising the Tugen community.
- Estimated 107,000 cattle; 297,000 goats; 103,000 sheep and 301 pigs.
- 80-90% of these livestock in the smallholder farming sector, usually in small herd sizes of less than 15 animals per herd (KNBS, 2009).

Selection of herds

- There are six sub-counties in Baringo County.
- Four districts in the county will be selected (2 pastoral and 2 agro-pastoral).
- Divisions will be sampled randomly from the these districts.
- A tentative list of the approximate number of herds/flocks in the selected divisions obtained from the local veterinary and agricultural offices.

Herd selection cont'd

- Herds/flocks to be recruited will then be randomly selected from each selected division.
- In each selected herd/flock, animals will be sampled by systematic random method.

Sample size–Martin *et al.*, 1987.

Sample size, n = $\frac{Z^2 \alpha P q}{L^2}$

Where;

Z=the value of $Z\alpha$ required for confidence=95% (1.96),

P = the prevalent estimate,

q =1-p,

L = the precision error.

Sample size cont'd.

- Taking the confidence interval to be 95%,
  - Precision error of 5%,
  - Estimate p=13.7% in cattle (Arimi, 2005),
  - Estimate P= 8.1% and 8.4% in sheep and goats respectively (Mugambi, 2001),
  - Sample size will be:
    - 189 cattle
    - 120 sheep
    - 124 goats

    Total= 433

Assessment of factors associated with brucellosis.

- A óKAPôsurvey will be conducted.
- A structured and pre-tested questionnaire will be administered in a face-to-face interview to assess the **knowledge, attitudes** and **practices** of the community to brucellosis.

Assessment of associated factors cont'd

- Among other variables to consider will be:
  - Herd factors-
    - Size, herd structure, grazing system etc.
    - Abortion history, RAB, disease management etc.
  - Human factors
    - History of human brucellosis, Knowledge
  - Management factors
    - Animal movement
    - Disposal of aborted material, RAB, milking practices, etc.

Sero-prevalence study.

Serum

- About 10 ml of blood will be collected aseptically from the jugular vein or the coccygeal (tail vein), of individual animal in sterile vacutainers without anticoagulant.

Milk

- About 10 ml of milk will be collected in sterile universal glass bottle either directly from the udder in cases of individual cows or from the milk tank or milk containers in the case of bulk raw milk.

sero-prevalence study (Cont')

LAB PROCEDURE:

- Samples will be tested using Rose Bengal test (RBT) and competitive ELISA.

Isolation of Brucella organisms.

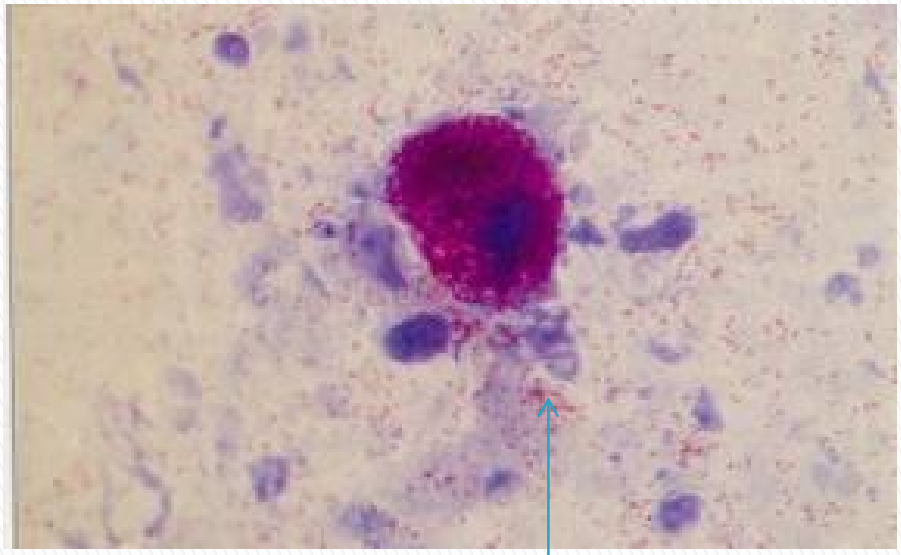
SAMPLING:

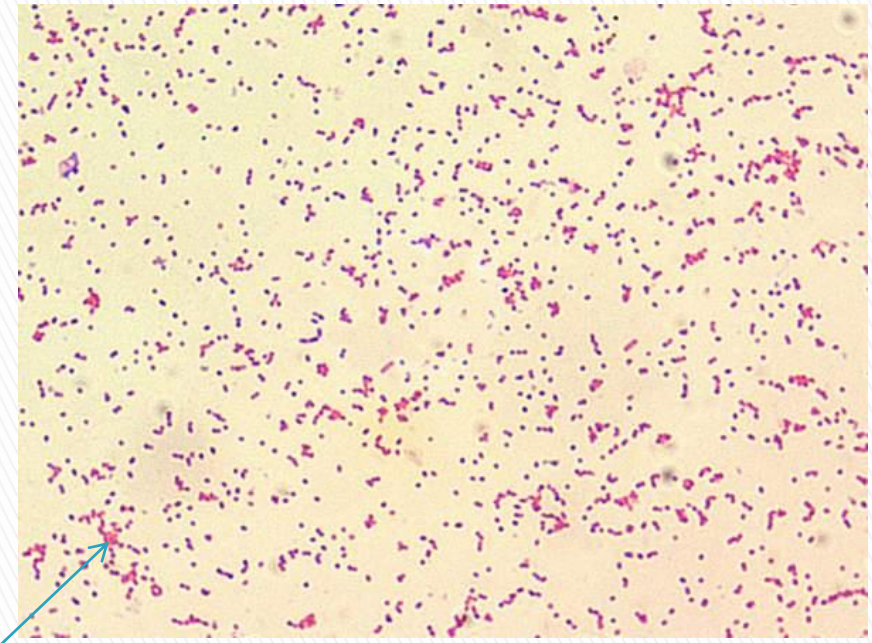
- **Milk** and **blood** as given above.
- **Other samples**: For animals showing signs of brucellosis (in the course of study), relevant samples will be taken.

Lab analysis procedure.

- Before culture is attempted, the samples will be screened for presence of Brucella organisms by direct microscopy (Gram and Modified acid fast staining).
- Culture and isolation of *Brucella* species will be attempted from positive specimens collected.
- RT- PCR will also be done to detect and characterize the *Brucella* spp.

Alton *et al.*, 1988





Brucella stain- MZN

Brucella gram stain

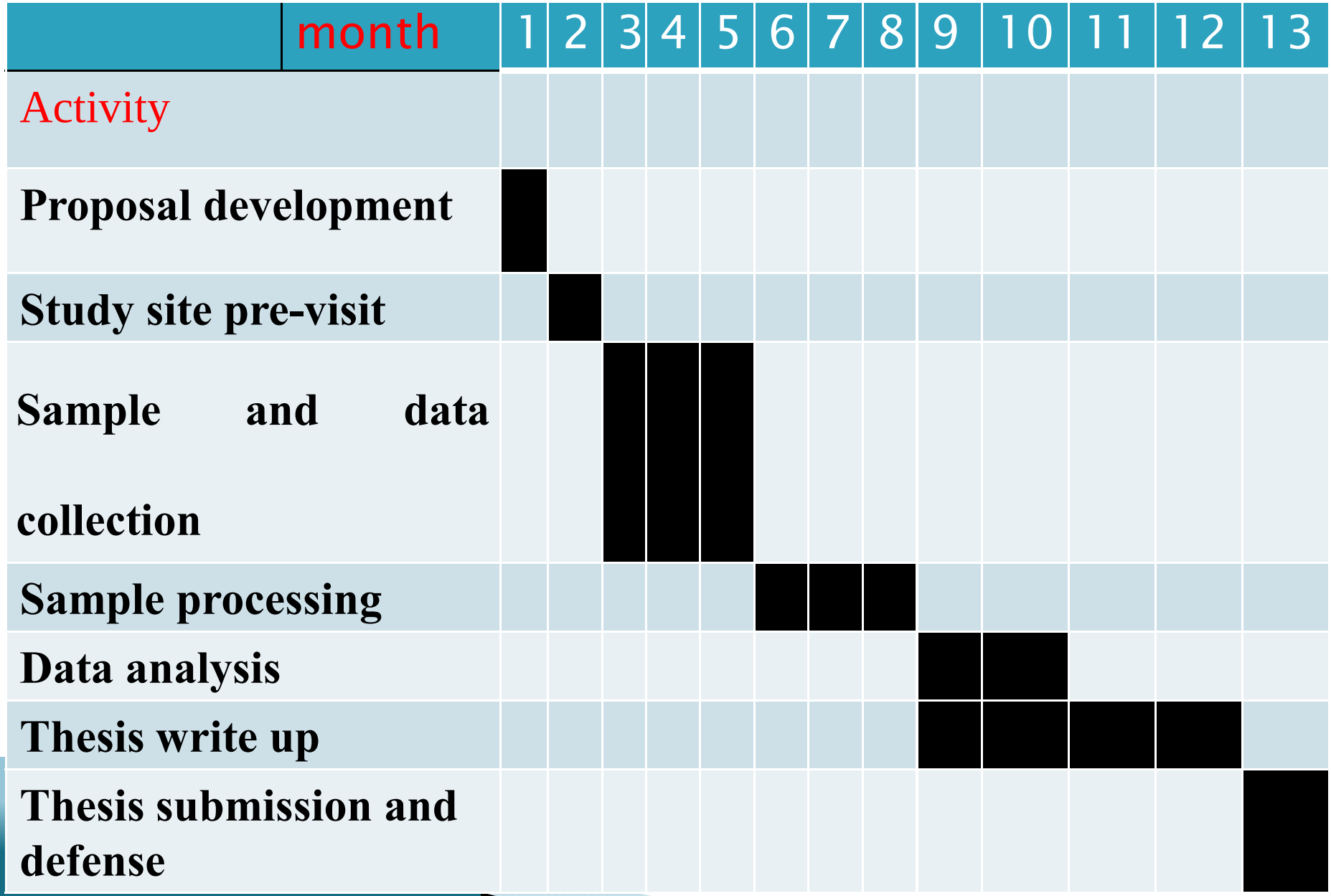
Data analysis

- Questionnaires data will be stored in a computer spread-sheet, Microsoft office Excel® and exported to Instat® V3.36 for analysis.
- Descriptive statistics
- Chi-square test- To test statistical association between herdôs disease status and categorical risk factors in uni-variable analyses.
- Odds ratio:- Test for strength of association.

Data analysis cont'd

- A binary, multiple logistic regression analysis (STATA 7.0, Statistics Data Analysis, version 7.0) to predict for D+/D-.
- Clustering effect will be controlled by use of mixed model.

Work plan (Month 1=July 2013; Month 13=July 2014



BUDGET

ITEM	APPROX COST (KSH)
Lab reagents	40,000
PCR and c-ELISA kits	195,000
Lab equipment	73,250
stationery	10,000
Transport and food	50,000
Field assistants	75,000
Miscellaneous	10,000
Sub-Total	453, 250
Contingences (10%)	45, 325
TOTAL(KSH)	498, 575

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THANK YOU...