

## Estimating prevalence of brucellosis in livestock and assessment of knowledge, attitudes and practices of respective communities in baringo county, Kenya

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### Abstract

Brucellosis is an infectious, contagious and important zoonotic disease caused by bacteria of genus *Brucella*. World Health Organization considers brucellosis the most spread zoonosis in the world. Brucellosis has been documented to be highly prevalent among the pastoral communities in Kenya. This study aimed at establishing the disease situation in Baringo County, by determining the sero-prevalence of brucellosis in cattle, sheep and goats; isolate and characterize the *Brucella* species affecting these livestock and assess the knowledge, attitudes and practices associated with brucellosis transmission in livestock in Baringo. Cattle, sheep and goats were randomly selected and tested for presence of *Brucella* antibodies using Rose Bengal Test (RBPT). Milk from cattle were also subjected to Milk Ring Test (MRT). All the samples will be further tested using c-ELISA and polymerase chain reaction. A structured questionnaire was also administered and data obtained analyzed using Instat® V3.36. 16.98% (9/53) of the livestock owners interviewed reported at least one or more management practices that can favor spread of brucellosis between/within livestock herds/flocks and subsequent infection to humans. Milk samples processed so far, 11.54% (6/52) have reacted positive on MRT, while 10.07% (15/149) bovine serum samples were positive on RBPT. 13.04% (12/92) and 8.23% (6/73) of the caprine and ovine sera samples respectively were positive for *Brucella* on RBPT. This study shows that brucellosis exists in livestock in Baringo, and most livestock owners have practices that favors brucellosis spread; therefore calling for urgent dissemination of information to the respective communities on brucellosis control/management measures in animals and subsequent reduction in human infections.

**Key words:** Baringo, Brucellosis, livestock, prevalence, zoonosis

### Résumé

La brucellose est une zoonose infectieuse, contagieuse et importante causée par des bactéries du genre *Brucella*. L'Organisation Mondiale de la Santé considère la brucellose comme étant la zoonose la plus répandue dans le monde. La brucellose a été documentée pour être très répandue parmi les communautés pastorales au Kenya. Cette étude visait à établir la

situation de la maladie dans le comté de Baringo, par la détermination de la séroprévalence de la brucellose chez les bovins, ovins et caprins; les isoler et identifier le caractériser des espèces de *Brucella* affectant ces animaux et évaluer les connaissances, les attitudes et les pratiques associés à la transmission de la brucellose chez les animaux d'élevage à Baringo. Les bovins, les moutons et les chèvres ont été choisis au hasard et testés pour la présence de *Brucella* antibodies avec Rose Bengale Test (RBPT). Le lait de bovins a également été soumis au test de « Milk Test Ring »(MRT). Tous les échantillons seront également testés en utilisant en outre c-ELISA et la réaction en chaîne de la polymérase. Un questionnaire structuré a été administré et les données obtenues ont été analysées en utilisant InStat® V3.36. 16,98% (9/53) des éleveurs interrogés ont déclaré au moins une ou plusieurs pratiques de gestion qui peuvent favorisant une propagation de la brucellose entre les / cheptel / troupeau et de l'infection à la suite de l'homme. Les échantillons de lait examinés jusqu'à présent, 11,54% (6/52) ont réagi positif au MRT, tandis que 10,07% (15/149) des échantillons de sérum bovin ont été positifs sur RBPT. 13,04% (12/92) et 8,23% (6/73) des échantillons de sérums caprins et ovins étaient respectivement positif pour *Brucella* au RBPT. Cette étude montre que la brucellose existe dans l'élevage à Baringo, et la plupart des propriétaires de bétail ont des pratiques qui favorisent la propagation de la brucellose. Ainsi, on appelle donc à la diffusion de l'information d'urgence pour les communautés respectives sur les mesures de contrôle / gestion de la brucellose chez les animaux et la réduction subséquente sur les infections humaines.

Mots clés: Baringo, la brucellose, l'élevage, la prévalence des zoonoses

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## Introduction

Brucellosis remains one of the world's most common public health and livestock production and health problems (FAO, 2004). Worldwide, more than 500,000 human cases of brucellosis are reported annually (Alturi *et al.*, 2011). This zoonotic disease is caused by various species of *Brucella* that infect many domestic animals, which act as reservoirs for human infection (Alton *et al.*, 1988). The disease in most animals species is remarkably similar, characterized by relapsing bacteremia that becomes intermittent to chronic in latter stages and which may sometimes recur for up to two years in 5-10 % (per cent) of the infected animals (Waghela, 1978).

## Literature summary

Bovine brucellosis caused by *B. abortus* has been shown to be widespread in most Sub Saharan countries (McDermott and Arimi, 2002); and just like many other *Brucella* infections, it causes abortions and stillbirths; with abortions usually occurring during the second half of gestation. Some neonates are born alive but weak, and may die soon after birth. Retention secundarium and secondary metritis can occur and lactation may be decreased (Corbel, 1997). After the first abortion, subsequent pregnancies are generally normal; however, female animals may continue shedding the organism in milk and uterine discharges thereby contaminating the environment and consequently facilitating spread of the disease. Epididymitis, seminal vesiculitis, orchitis or testicular abscesses are sometimes seen in males.

Infertility occurs occasionally in both sexes (Alausa, 1979) due to metritis or orchitis/epididymitis (Blood and Radostits, 1989). Hygromas, particularly on the leg joints, are a common symptom in some tropical countries. Arthritis can develop in some long-term infections; however systemic signs do not usually occur in uncomplicated infections; with deaths being rare except in the fetuses or new-born (Blood and Radostits, 1989). Infections in non-pregnant females are usually asymptomatic (Morgan and Mackinnon, 1979) in some areas and may even be higher than abortion cases. The establishment of the disease is similar in all animals with the susceptibility being dependent on the animal species, reproductive stage, age, resistance and infecting dose of the causative agent (Blood and Radostits, 1989).

Brucellosis in Kenya has been reported to be widely spread and endemic in livestock especially among the pastoral communities, and many cases have been reported in the annual reports of the Ministry of Agriculture, Livestock and Fisheries; and elsewhere (Anon, 1947; Kagunya, 1977; Kagumba and Nandokha, 1978; Waghela, 1978; Arimi and McDermott, 2002; Kang'ethe, 2005). The prevalence of brucellosis in cattle from pastoralist herds is usually higher than from settled herds (Hussein *et al.*, 1978) with stock movement, mixing of different animal species and concentration of animals around water points considered important transmission factors (Waghela, 1976; McDermott and Arimi, 2002).

### Study description

**Methods.** This is a cross-sectional study based on samples of unpasteurized bulk raw milk and serum from randomly selected herds/households. Administration of the household questionnaire also featured the cross-sectional design to assess the knowledge, attitudes and practices of the local community associated with brucellosis in cattle, sheep and goats in Baringo, Kenya.

Milk and serum samples were collected concurrently with administration of the questionnaire. All the samples were collected in sterile containers (universal bottle for milk and plain vacutainers for blood) and stored in a cool box with cool pack at a temperature of 4°C soon after collection and transported to the laboratory where the samples were refrigerated and latter transported to Central Investigation Laboratory (CVIL), Kabete to be processed by Milk Ring test-MRT (for milk samples) and Rose Bengal Plate test-RBPT (for serum).

Species		Number sampled	Number/proportion positive
Bovine	Baringo central	81	8 (9.88%)
	Marigat	68	7 (10.29%)
Caprine	Baringo central	41	5 (12.16%)
	Marigat	51	7 (13.73%)
Ovine	Baringo central	34	2 (5.88%)
	Marigat	39	4 (10.26%)

**Data analysis.** Questionnaires data were stored in a computer spread-sheet, Microsoft office Excel® and exported to InStat® V3.36 for analysis. Descriptive statistics were also done. Chi-square test will be used to test statistical association between herd's disease status and categorical risk factors in uni-variable analyses. Odds ratio will be used to test for strength of association.

## Discussion

MRT results showed 7.14% (2 out of 28) turned positive (Baringo central) and 16.67% (4/24) in Marigat. Most of the livestock owners interviewed so far-22% (12 of 53) reported to have had at least a case of abortion in their herds/flocks in the last two years. Some farms (19%) also reported to have had a case of retained placenta in their farms.

Most farmers practice mixed farming, keeping and feeding cattle, sheep and goats together. Some farmers also use communal fields for grazing, watering and even communal males for breeding.

**Ongoing research.** Completion of laboratory work (Polymerase chain reaction and Enzyme linked Immunosorbent Assay is currently underway.

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## Expected outputs

At the end of this study the following outputs are expected; (i) estimated sero-prevalence of brucellosis in cattle, sheep and goat herds/flocks in Baringo (ii) isolated and characterized *Brucella* species infecting cattle, sheep and goats; (iii) feedback on knowledge, attitudes and practices of the local community associated with brucellosis in cattle, sheep and goats in Baringo; (iii) outstanding research findings disseminated to concerned authorities and livestock owners; (iv) at least three manuscripts published in peer-reviewed scientific journals and (v) research outputs presented at international, national and regional conferences/seminars/workshops.

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