

Central Tanzania ¹UC Davis School of Veterinary Medicine, ²Hali Project

Prevalence of and Risk Factors for Bovine Tuberculosis in South-VETERINARY MEDICINE Sophie Charlton¹, Goodluck Paul², Chris Kilonzo^{1,2}, Abel Ekiri^{1,2}, Woutrina Smith^{1,2}, Jonna Mazet^{1,2}

Introduction

- Tuberculosis causes over 65,000 deaths in Tanzania annually.
- *Mycobacterium bovis*, or bovine tuberculosis (bTB), is a significant source of infection.
- Pastoralists are at risk for bTB infection due to their contact with livestock and consumption of raw dairy products and blood.
- In areas bordering protected lands, livestock share their land and water with wildlife and people, other potential hosts of bTB.

Aims & Hypothesis

Aims:

1) Investigate prevalence and biogeographic, husbandry, and animal demographic risk factors for bTB using the BOVIGAM[™] immunoassay. 2) Help formulate recommendations for the pastoralist communities and public health organizations to decrease the risk for bTB transmission in herds.



Hypothesis:

Demographic, biogeographic & husbandry risk factors (e.g. exotic breeds, increased herd size) are associated with increased prevalence of bTB in cattle in rural Tanzania.

Methods

- Study Site: pastoralist and agropastoralist households in the Ruaha and Kilombero River Valley ecosystems of south-central Tanzania.
- 394 cattle from 41 herds were sampled between April and July 2017.
- Data on risk factors at the individual and herd level variables were collected by interview.
- For the BOVIGAM[™] immunoassay, whole blood was collected and mixed with phosphate buffered saline (negative control), bovine tuberculin purified protein derivative antigens (bovine PPD), and avian PPD antigens.
- If exposed to *M. bovis*, T-cells release IFN-γ when stimulated with bovine PPD. \bullet
- IFN-γ is measured through enzyme-linked immunosorbent assay (ELISA).
- *M. bovis* infection is indicated when bovine PPD stimulates more IFN-y than \bullet both avian PPD and the negative control.

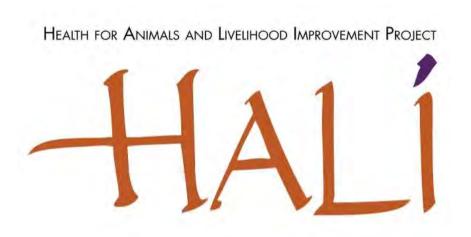


Results

Category	Ν	Positive (%)	Negative (%)	Inconclusive (%)
Overall	394	20 (5.1)	223 (56.6)	151 (38.3)
Breed				
Zebu	279	15 (5.4)	171 (61.3)	93 (33.3)
Tarime	107	5 (4.7)	47 (43.9)	55 (51.4)**
Herd Introductions*				
Recent Acquisition	168	13 (7.7)	84 (50)	71 (42.3)
No Acquisition	226	7 (3.1)	139 (61.5)	80 (35.4)
Total Cattle in Herd*				
<40	181	12 (6.6)	89 (49.2)	80 (44.2)
40-90	104	6 (5.8)	51 (49)	47 (45.2)
>100	109	2 (1.8)	83 (76.1)	24 (22)**
Total Animals in Herd*				
<50	129	9 (7)	53 (41.1)	67 (51.9)**
50-150	117	6 (5.1)	66 (56.4)	45 (38.5)
>150	148	5 (3.4)	104 (70.3)	39 (26.4)
Wild Pigs*				
Contact	108	13 (12)	33 (30.6)	62 (57.4)**
No Contact	286	7 (2.4)	190 (66.4)	89 (31.1)
Non-Human Primates*				
Contact	140	13 (9.3)	48 (34.3)	79 (56.4)**
No Contact	254	7 (2.8)	175 (68.9)	72 (28.3)
District*				
Ulanga	144	13 (9)	56 (38.9)	75 (52.1)**
Iringa	250	7 (2.8)	167 (66.8)	76 (30.4)

*Significant difference between positive and negative proportions for each factor using chi-square analyses or Fisher's exact test at P < 0.05. **Significant difference between conclusive and inconclusive proportions for each factor using chi-square

analyses or Fisher's exact test at P < 0.05.







- analysis.
- \bullet
- social problem.
- herds at the market can spread disease.



Veterinarian Goodluck Paul discusses the benefits of deworming while administering ivermectin to a goat.



The field team forms relationships and answers questions about animal care and the research during lunch.



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Discussion

High proportion of inconclusive results (151 of 394 cows) limited risk factor

Inconclusive results may be a potential effect of coinfection or cross-reaction. As results were promised to each family, high inconclusivity is a scientific &

Data suggests that BOVIGAM[™] is not an ideal test for this environment.

Recent cow acquisition increases bTB risk, as close contact and mixing of

Wild pig & primate contact might also represent overall greater wildlife interaction, meaning increased contact with other species that also carry bTB.

Ulanga showed a cluster of positive herds in one village, possibly representing increased transmission among herds when grazing.

Future Directions:

- Tuberculosis eradication is difficult here, even with a perfect test, due to the multihost nature & lack of government compensation for culling combined with the high cultural value of cows.
- Focus could instead be on prevention of bTB transmission including improved husbandry & food handling.
- Emphasis could also be on veterinary care & education occurring alongside research, as teams provide
- recommendations. A pamphlet with pictorial descriptions of bTB risk & prevention will be developed. Future studies could investigate the cause of the inconclusive BOVIGAM[™] results.

Acknowledgements