



East Coast fever Vaccination Adoption by Kenyan Cattle Owners

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Summary Statistics

1. Introduction

East Coast fever (ECF) is an important cattle disease in many Eastern, Central and Southern African countries. ECF is caused by the parasitic protozoan *Theileria parva* and transmitted by the tick vector species *Ripicephalus appendiculatus*. The disease is characterized by high fever and abnormally swollen lymph nodes that leads to the loss of animals if not controlled. Over 1 million cattle deaths per year is attributed to ECF. The economic losses due to the disease are manifested in loss of milk production, animal death, loss of animal productivity, treatment costs, etc.

Livestock owners apply acaricides to control for tick by dipping and spraying as frequently as twice per week per herd during tick spread seasons, but it is costly and has limited effectiveness due to tick resistance and tick carrying wildlife. Poor infrastructure in remote areas hinder dipping and spraying facilities.

Recently, an Infection and Treatment Method (ITM) of vaccination against ECF is available to pastoralists. While previous research findings show the effectiveness of immunization by the ITM in reducing cattle mortality, these studies do not identify the factors that determine household ITM adoption in this region.

2. Objective

The objective of this research is to identify the factors that affect the probability of ECF vaccination adoption by rural livestock owners in Southwestern Kenya and discuss implications for livestock health policy.

3. Data

469 households in Southwestern Kenya were surveyed in late 2011 and early 2012. The Southwestern Kenyan region is suitable for *R. appendiculatus* due to favorable climate, vegetation and host availability. About 39 percent of the households in the survey have vaccinated their cattle at least once in the past year. Households that vaccinated for ECF report reduction in number of acaricide treatments by 50 percent.

4. Methodology

Household adoption decision is a binary outcome that can be estimated by a probit regression analysis. The dependent variable is the probability that a household vaccinates for ECF by the ITM.

Independent variables include: Sources of Vaccination information, types of veterinary services households frequently use, monthly household income levels (not from livestock and crop production) in Kenyan Shillings, milk production in liters per day, and number of acaricide treatments per month

Variable	Obs	Mean	Std. Dev.	Min	Max
Vaccinate for ECF	469	0.390	0.49	0	1
Number of Cattle	457	107.335	137.03	0	1507
Fraction of Crossbreed	456	0.408	0.44	0	1
Milk reduction	446	0.813	1.22	0	20
Vaccine Information from NGO's	469	0.179	0.38	0	1
Vaccine Information from Farmers	469	0.173	0.38	0	1
Cattle Vet Services from Community workers	469	0.151	0.36	0	1
Cattle Vet Services from Medicine Stores	469	0.079	0.27	0	1
Household Size	451	15.115	10.81	0	77
Number of School Age Children	457	5.282	4.71	0	41
Household Savings Account	461	0.690	0.46	0	1

5. Preliminary Results

Variable	Estimate	Std. Err.	Margin Effects %
Number of Cattle	0.001	0.00*	0.04
Vaccine Info from NGO's	0.651	0.21***	24.00
Vaccine Info from Farmers	0.563	0.22***	20.72
Cattle Vet Services from Community workers	-0.428	0.24**	-15.76
Cattle Vet Services from Medicine Stores	-0.816	0.36**	-30.02
10<Household Income<20K	0.293	0.250	10.83
20K<Household Income<40K	0.274	0.310	10.07
40K<Household Income<80K	0.953	0.30***	36.58
80K<Household Income	0.039	0.350	1.36
Fraction of Crossbreed	0.907	0.20***	33.34
Milk reduction	0.482	0.12***	17.73
Household Size	0.03	0.02*	1.10
Number of School Age Children	-0.022	0.040	-0.80
Household Savings Account	-0.19	0.200	-7.01
Constant	-1.746	0.39***	-----
Number of observations	352		
Pseudo R2	0.234		

*10%, **5%, ***1%

6. Discussion

- Herd size, fraction of Cross-breed cattle, household income, perceived reduction in milk production due to ECF, source of vaccination information and veterinary services are statistically significant factors affecting the adoption of ECF vaccination.
- A unit increase in number of cattle, household size and fraction of cross-breed cattle increase the probability of vaccination by 0.04, 1 and 33 percentage points respectively
- Fraction of cross-breed cattle has large marginal impact on vaccination adoption; this may reflect the prevalence of ECF infection in non-indigenous cattle
- Lower income levels are negatively correlated with vaccination adoption which may suggest that poor households are less likely to spend their meager resources on vaccination
- The likelihood of adopting vaccination is positively and increasingly associated with income levels except for the highest income level. This may suggest that households that do not depend on cattle for income are less likely to adopt vaccination.
- Vaccination information disseminated by NGO's and fellow farmers increase vaccination adoption probabilities
- Number of school age children and whether a household holds a savings account are both negatively correlated with vaccination adoption decision. More children in school may mean more resources spent away from farm investments (e.g. vaccination). Household savings accounts may serve as buffer during bad economic times and thus may suggest less dependence on cattle. This may explain the negative correlation between savings accounts and adoption decision.

7. Implications

Regional strategic planning efforts to control ECF through the ITM should take in to account the impact of various economic, demographic and livestock related variables.

