The interaction between *Theileria parva* and *Theileria mutans* and the association with clinical outcomes

Jennings, A.E., 1 Bronsvoort, B.M.C., 1 Woolhouse, M.E.J., 2 Toye, P., 3 Mwangi, S.T., 2 Kiara, H., 3 Conradie, I., 4 Handel, I., 1 and Coetzer, J.A.W., 4

1 The University of Edinburgh, The Roslin Institute, United Kingdom, 2 The University of Edinburgh, The School of Biological Sciences, United Kingdom, 3 The International Livestock Research Institute, Kenya, 4 The University of Pretoria, South Africa; amy.jennings.vet@gmail.com

East Coast Fever (the clinical disease associated with the tick borne parasite, *Theileria parva*) is a major restriction on cattle production in East and Southern Africa. Fatal to most European breed cattle, there is believed to be a tolerance to the disease in the indigenous short horn zebu (SHZ) cattle breed. However, indigenous breed calves also experience mortality from ECF with reported rates varying from 3 to 25%. A cohort of 548 SHZ calves was followed from birth until 1 year old. They were examined and sampled frequently, with longitudinal data available for growth, blood parameters, antibody levels, and for intestinal worm burden. Autopsies and extensive testing was carried on dead animals to establish cause of death. This data has offered an opportunity to examine the interactions between infections in a non-experimental setting. 72% of the calves were exposed to *T. parva* before they left the study, but only 35 of the 548 calves died from ECF. The aim of this work was to explore the differences between those calves that died and those that survived following exposure to *T. parva*. Each of the 35 ECF deaths was matched by proximity to 2 controls that survived but were exposed to *T. parva* during their time in the study. The most significant association with survival was being infected with *T. mutans* prior to exposure to *T. parva*. This very significantly reduced the odds of being a case. This work offers an interesting example of how pathogens can interact to change clinical outcome.