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## Optimal Control of Disease in Multihost System

The majority of the world's pathogens are generalist with approximately 80% of livestock diseases able to transmit between different species [1]. It is therefore essential that any control strategy takes into account the dynamics of this interaction to consider the full impact of the disease. The two species apparent competition model has been widely studied and well understood. Using the methods developed by Greenman and Hoyle [2] this model has been extended to include the interactions of distinct spatial groups. This metapopulation-type approach allows us to consider the impacts of disease spread over a much wider scale and to account for changes in spatial distribution of infected individuals due to control. An increase in ranging behaviour has been observed in the European Badger (*Meles meles*) in response to culling as a method of bovine TB (*Mycobacterium bovis*) control in England [3]. This model may be employed to provide a long term prediction of the effect of badger culling on a large scale and to optimise control strategies to reduce the impact of bovine TB from England.

### REFERENCES

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- [2] Greenman, J.V. and Hoyle, A. *Exclusion of generalist pathogens in multi-host communities* American Naturalist (2008) **172** 576-584.
- [3] ] Bourne F.J. *Bovine TB: The Scientific Evidence* Final report of the Independent Scientific Group on Cattle TB (2007)