



Presentation Abstract

Presentation: 048 - Bio-economic simulation modeling: How to control Paratuberculosis on dairy farms?

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Author(s): **Carsten Kirkeby**¹, Kaare Græsbøll¹, Søren S. Nielsen², Lasse E. Christiansen³, Nils Toft¹, Erik Rattenborg⁴, Tariq Halasa¹, ¹National Veterinary Institute, Frederiksberg C, Denmark; ²Department of Large Animal Sciences, University of Copenhagen, Frederiksberg C, Denmark; ³DTU Compute, Kgs. Lyngby, Denmark; ⁴SEGES, Aarhus, Denmark. Contact: ckirkeby@gmail.com

Abstract:

Purpose:

Paratuberculosis is a widespread chronic infection causing decreased milk production, decreased farming profitability and reduced animal welfare in cattle. Infection is caused by *Mycobacterium avium* ssp. *paratuberculosis* (MAP). Current data suggest that the prevalence in dairy herds without control is much lower than suggested by previous models. Furthermore, data from Danish dairy herds suggest that test-and-culling may be an efficient strategy. Therefore the aim of this study was to build a simulation model that was calibrated to the current situation in order to evaluate strategies for disease control. Such a framework should also include important mechanisms such as an age-dependent sensitivity of ELISA tests and mechanistic modelling of MAP shed in manure on the farm.

Methods:

We developed a new bio-economic simulation model including these mechanisms and calibrated the model to a dataset of herds without any control actions against spread of MAP. Likewise, we modelled control actions mechanistically, adjusted to the effects estimated from real data. We also allowed build-up of MAP shed in manure in five farm compartments to mechanistically simulate disease transmission.

Results:

We found that the three most commonly implemented controls actions only had a

weak impact on the prevalence on their own, although they were actually able to reduce the prevalence. The most efficient control action for reducing the prevalence was a test-and-cull strategy, which was able to eradicate MAP from the herd based on simulations in a herd with an average initial prevalence.

Conclusions:

This control action was also found as the most profitable strategy, because it did not cause extra expenses and resulted in high marginal revenue.

Relevance:

The results are valuable for farmers who want to optimize their control strategy for MAP and maximize profit.