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A Cow- and Herd-specific Bio-Economic Model of Intramammary Infections in Dairy Cows

Carsten Kirkeby¹, Maya Gussmann¹, Kaare Græsbøll¹, Søren Saxmose Nielsen², Nils Toft¹, Tariq Halasa¹
¹DTU National Veterinary Institute, Denmark, ²University of Copenhagen, Denmark

Methods
We developed a **mechanistic, stochastic simulation model** for a 200 cow herd with individual properties such as curves for milk and somatic cell count. **Infection is on quarter level** based on two transmission modes: **environmental and contagious pathogens**. Subclinically infected cows have increased somatic cell counts and a reduced milk yield.

Background
Intra-mammary infections (IMI) are often caused by more than one pathogen circulating on a farm, each with different prevalence, transmission and required management approach. **Farm-specific simulation models** can be useful for choosing the optimal management strategy, e.g. prevention measures, antimicrobial treatment or culling specific cows.

We created a bioeconomic model for IMI infection with multiple pathogens within dairy cattle herds. The model is versatile enough to simulate specific herds with management decisions on cow level.

Objectives
• Simulate infection with **multiple pathogens** within a herd
• Take economically sound **management decisions** such as prevention, treatment and culling for individual farms and cows.

First results:
A model output example (above) shows co-existence of three **contagious pathogens**: *S. aureus*, *S. agalactiae* and *S. uberis* (contagious strain); and two **environmental pathogens**: *S. uberis* (environmental strain) and *E. coli*. Adjusting the transmission parameters enables simulation of specific herds with different sets of **pathogens** and **strains**. The model provides the **economic result of different management strategies**, and can thus be a tool to pinpoint the optimal strategy for the specific herd and cow.