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

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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.

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.