# Treatment of chronic subclinical mastitis caused by *Streptococcus uberis*: Stochastic modelling to support decisions

*Wilma Steeneveld[1], Henk Hogeveen[1,2] and Jantijn M. Swinkels[3]*
[1]*Business Economics, Wageningen University, Wageningen, the Netherlands,*
[2]*Department of Farm Animal Health, Faculty of Veterinary Medicine, Utrecht University, Utrecht, the Netherlands*
[3]*Innovet Bovine Herd Health Consultancy, The Netherlands*

## Background

Traditionally, subclinical mastitis cases were not treated with antibiotics except during the dry period. However, recently this practice is changing. By some veterinarians, treatment of some types of subclinical mastitis is regarded to be effective. Economics play an important role in the decision to treat subclinical mastitis with antibiotics (Swinkels *et al.*, 2005). Various factors play a role on the cost-effectiveness of treatment, amongst others probability of spontaneous cure, probability of the cow becoming clinically diseased, spread of infection to other cows, cure rate under treatment and physiological effects of the infection. The goal of this research is to support decisions around treatment of chronic subclinical mastitis caused by *Streptococcus uberis*.

## Results

Since the decision on antibiotic treatment of subclinical mastitis involves much uncertainty and variability, a stochastic Monte Carlo model is developed. This model simulates the dynamics of an infection for a cow known to have subclinical mastitis caused by *S. uberis*. Besides the effect of treatment on the infection status and economic damage of the cow, possible infections in other cows are also taken into account. The average economic damage (with basic input parameters) when a cow with chronic subclinical *S. uberis* mastitis (diagnosed after 2 subsequent cow somatic cell count measures above 250,000 cells/ml) is not treated is € 88.47 (Table 1). With a short (3 day) treatment, the average damage was higher, with a long (8 days) treatment, the average damage was even more higher. For the average cow, treatment is not economic efficient. Sensitivity analysis showed that this might depend on some specific cow and farm factors. Moreover, the spread of economic damage (Table 1) indicates that the risk of high damage is much higher when a cow with chronic subclinical mastitis caused by *S. uberis* is not treated.

*Table 1. Total economic damage (€/cow with chronic S. uberis) for different treatment methods. Given are the average and the spread (extremes and percentiles).*

| Treatment | Average | Minimum | Maximum | 5% | 95% |
|---|---|---|---|---|---|
| None | 88.47 | 0 | 1,149.26 | 7.52 | 416.12 |
| Short | 103.47 | 0 | 1,019.38 | 9.13 | 294.78 |
| Long | 142.85 | 0 | 1,240.14 | 8.90 | 234.33 |

## References

Swinkels,J.M., J.G.A.Rooijendijk, R.N.Zadoks, and H.Hogeveen. 2005. Use of partial budgeting to determine the economic benefits of antibiotic treatment of chronic subclinical mastitis caused by Streptococcus uberis and *Streptococcus dysgalactiae*. Journal of Dairy Research 72: 75-85.