

Benefits of Differential Somatic Cell Count as an Indicator of Mastitis

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Aim

To compare cost-effectiveness and other benefits of different selection strategies—considering only somatic cell count (SCC) or SCC and differential somatic cell count (DSCC)—for interventions for subclinical intramammary infections (IMI).

Methods

We used a detailed simulation model of a dairy cattle herd with 200 cows to simulate the occurrence and transmission of IMI and intervention measures for clinical and subclinical IMI.

Intervention measure for clinical IMI

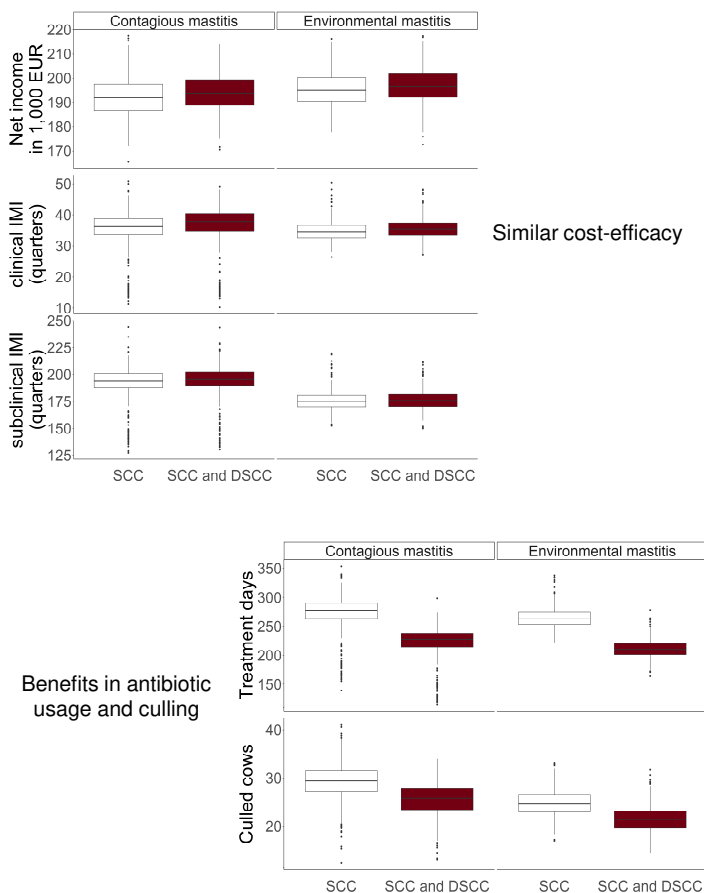
- 3-day intramammary treatment

Intervention measures for subclinical IMI

- 3-day intramammary treatment for quarters with subclinical IMI (confirmed by bacterial culture)
- Treated quarters are re-tested after one month and cows are culled if still test positive.

Results

The box plots show simulation results (annual mean values) for two herds. In one herd, most cases were caused by *Staphylococcus aureus* (contagious mastitis). In the other herd, most cases were caused by *Streptococcus uberis* (environmental mastitis).



How are cows selected for testing for subclinical IMI?

- Cows with a low SCC, followed by two high SCC (>200,000 cells/ml)
- or
- Cows with a low SCC, followed by two high SCC and a high DSCC (≥ 62) during that time.

Differential Somatic Cell Count

While the SCC counts the number of cells of different cell types, the DSCC indicates the percentage of polymorphonuclear neutrophils and lymphocytes combined. The proportion of macrophages can be calculated by 100-DSCC.

DSCC was modelled based on another study, using

- SCC
- DIM
- Parity
- Time since new infection

Conclusions

Using DSCC in addition to SCC can improve indication of subclinical IMI, resulting in

- No economic losses
- No changes in incidence
- Less antibiotics and less culling.

The Model

A stochastic mechanistic population model with daily time steps and weekly culling programmed in R (<https://doi.org/10.1016/j.jtbi.2018.04.022>).

