

Economic assessment of selective versus blanket dry-cow treatment options

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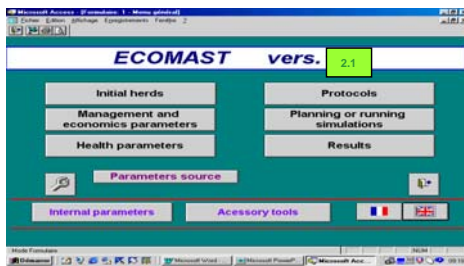
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Context and objective

Systematic antibiotic dry-cow treatment is widely implemented in French dairy herds. It has become challenged, due to reduction of prevalence of intra-mammary infections in many herds and to the availability of an inert teat sealer.

However, no grounded indications for selective implementation are currently available. A dynamic stochastic simulation model was used to assess control options and selection rules for cows left untreated, subjected to antibiotics or treated with teat sealer in a typical French 50-cow herd.



Overview on material and methods

ECOMAST model

- dynamic with daily stepping;
- individual based and mechanistic (all females in herd and all individual events are represented);
- stochastic for occurrence of events and level in effects;
- intra-mammary infections at quarter level;
- 5 types of pathogens resulting in a wide range of effects on yield, somatic cell counts (SCC), lethality and culling.

Simulation experiment

- 48 scenarios for epidemiological initial conditions, defined by levels (and type of pathogens) in (i) prevalence during lactation and at drying-off, and (ii) risk of new infections during the dry period
- 10 scenarios for type of treatment and their implementation rules. Treatment efficiencies for the here reported results were parameterized as indicated in table (high efficiencies).

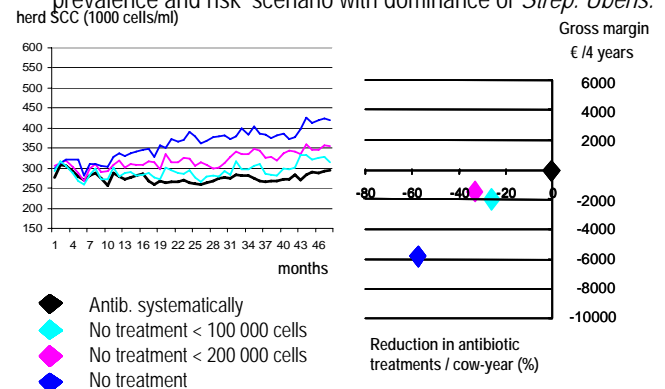
Treatment	Cure rate (%)		Prevention (%)*	
	<i>S.aureus</i>	<i>Strep.uberis</i>	<i>S.aureus</i>	<i>Strep.uberis</i>
No	35	45	0	0
Antibiotic 'A'	60	85	30	40

* % of new infections avoided when treated

- Multi-criterion utility function based on discounted gross margin over 4 years, rejection from milk collection (when herd SCC >400,000 cells/ml), change in number of antibiotic treatments, and change in incidence of clinical cases.

Examples of results

Individual outcomes are processed to provide herd-year level results (means and standard deviations for 250 replications). An example of summarization is provided here under, for a 'mean prevalence and risk' scenario with dominance of *Strep. Uberis*.



Summary recommendations can be drawn from such type of results.

For example, recommendations under a low or intermediate level of risk for new infections and *Staph. aureus* or *Strep. uberis* dominance are displayed here.

Herd SCC 1000 c./mL	Dominant aetiology	Systematic Treatment	No treatment <100	No treatment <200	No treatment
<150	<i>St. aureus</i> or <i>Str.uberis</i>	Not justified	Possible	Possible	Recommended
>350	<i>St. aureus</i> or <i>Str.uberis</i>	To be maintained	No	No	No
150 à 250	<i>St. aureus</i>	Possible	Possible	Recommended	No
250 à 350	<i>St. aureus</i>	Possible	Recommended	No	No
150 à 250	<i>Strep. uberis</i>	Possible	Recommended	No	No
250 à 350	<i>Strep. uberis</i>	To be maintained	No	No	No