

# More testing, less antibiotics –future trends in mastitis treatment?

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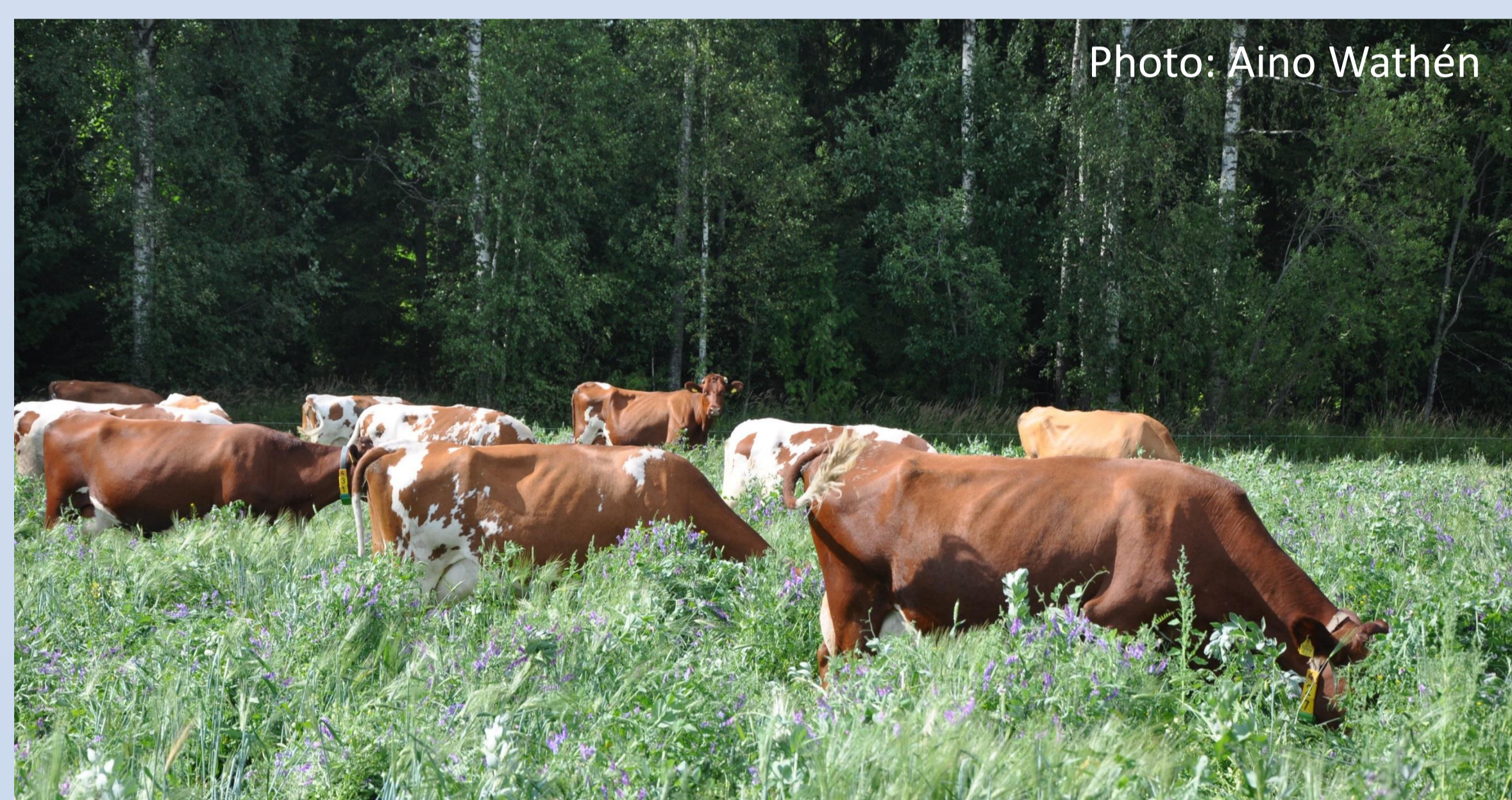
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## Background

In Finland, milk samples are tested for bacteria in most mastitis cases. Since 2010, the majority of samples have been analyzed using a semi-quantitative PCR test. The test targets the DNA of 15 bacterial species or groups of species and the staphylococcal *blaZ* gene coding for penicillin resistance.



## Methods

We analyzed bacteriological data consisting of 240,069 quarter milk samples sent to Valio Laboratory in 2010–2012. The samples were taken from 93,530 individual dairy cows on 4,725 dairy farms. The data containing records of milk samples were merged with the data from the Finnish dairy herd recording system. Descriptive statistical analyses were implemented to describe the results of PCR tests and the differences in the treatment history of cows with diverse findings from their milk samples. This study focuses on treatments associated with the findings of *Staphylococcus (S.) aureus* (n = 43,400) and coagulase-negative staphylococci (CNS) (n = 107,749) in milk samples. The differences between the treatments of penicillin-susceptible and penicillin-resistant staphylococci were examined.

## Results in figures

	Pathogen		<i>BlaZ</i> gene		CNS		<i>S. aureus</i>	
	CNS	<i>S. aureus</i>	positive	negative	<i>blaZ</i> gene positive	<i>blaZ</i> gene negative	<i>blaZ</i> gene positive	<i>blaZ</i> gene negative
Prevalence in milk samples	46% <sup>1</sup>	18% <sup>1</sup>	31% <sup>2</sup>	69% <sup>2</sup>	30% <sup>2</sup>	70% <sup>2</sup>	32% <sup>2</sup>	68% <sup>2</sup>
Share of treated cows	47% <sup>1</sup>	53% <sup>1</sup>	48% <sup>1</sup>	49% <sup>1</sup>	48% <sup>1</sup>	47% <sup>1</sup>	47% <sup>1</sup>	56% <sup>1</sup>
Share of culled cows	80% <sup>1</sup>	85% <sup>1</sup>	85% <sup>1</sup>	80% <sup>1</sup>	83% <sup>1</sup>	79% <sup>1</sup>	89% <sup>1</sup>	84% <sup>1</sup>
Mastitis as culling reason	37% <sup>1</sup>	50% <sup>1</sup>	46% <sup>1</sup>	39% <sup>1</sup>	40% <sup>1</sup>	36% <sup>1</sup>	57% <sup>1</sup>	46% <sup>1</sup>

<sup>1</sup>Chi-square test for equality of the two proportions on the same line of each column ( $p < 0.01$ ), <sup>2</sup>Chi-square goodness of fit test for the proportion of 0.5 ( $p < 0.01$ )

## Conclusions

Testing the samples of mastitic milk provides valuable information for dairy farmers' decision-making. Knowing whether mastitis is caused e.g. by CNS vs. *S. aureus* or penicillin-susceptible vs. penicillin-resistant staphylococci, helps to assess the utility of treatments. *S. aureus* mastitis is treated more frequently than CNS mastitis that is often subclinical or mild clinical. Generally, the share of treated cows is higher with penicillin-susceptible staphylococci compared to penicillin-resistant staphylococci which, in turn, cause more repeated treatments. These treatments of mastitis having inferior cure rates compared to those of mastitis caused by penicillin-susceptible staphylococci should be avoided. Dairy producers seem to follow the recommendation to cull cows with chronic *S. aureus* mastitis and cows with penicillin-resistant staphylococci. By differentiation the treatments pathogen-specifically even more precisely than at present, dairy farmers can contribute to reducing the use of antibiotics.