

# Predicting Clinical Mastitis: No Need for a Field Trial?!

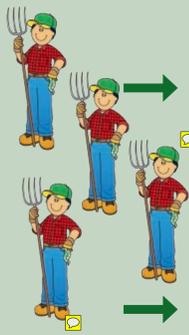
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**The aim was to develop a model that can:**

1. Predict clinical mastitis incidence on routine herd data for all dairy herds
2. Detect individual dairy herds with an elevated clinical mastitis incidence

Developing these models required 1) data on mastitis incidence based on farmers observation and 2) routinely collected data of these herds

**Field study: Registration of every Clinical Mastitis case on a monthly basis in 2013 and collecting routinely available data**



Farmers observation

Routinely collected data

N = 227 herds

**Clinical Mastitis (CM):** aspect changes in color and/or consistency and/or presence of clots

**Udder:** heat, pain and/or swelling of the udder

**Clinical Mastitis Incidence (CMI):** Number of CM cases divided by the number of cow days at risk (DAR) multiplied by 365 days and 100 cows

**Monthly registration forms**

I&R data, metabolic records on test-day level, SCC data on bulk tank milk (3 day level) and test-day level, supplies of antibiotics, results of bacteriological culture

**Model 1: Prediction of Clinical Mastitis incidence (CMI) for all herds on year level**

**Development of prediction model**

Farmers observation	<p><b>Learn data:</b> CMI based on observations of 2/3 of the data N=156 herds</p>				
Routinely collected data	<p><b>Antibiotic treatment</b> Total use in cows Intramammary Parenteral</p>	<p><b>SCC</b> Bulk tank milk Primiparea Multiparea</p>	<p><b>Demographics</b> Season Growth in herd size Herd size Purchase</p>		<p><b>True mean CMI (95% CI)</b> 31.5 (28.6-34.4)</p> <p><b>Pred mean CMI (95% CI)</b> 31.5 (29.9-33.0)</p>

**Validation of developed model**

<p><b>Validation:</b> 1/3 data N=71 herds</p>					
		=	<p><b>True mean CMI (95% CI)</b> 33.4 (29.5-37.4)</p>		
	<p><b>Prediction:</b> developed model</p>	=	<p><b>Pred mean CMI (95% CI)</b> 32.5 (30.2-34.8)</p>		

**Model 2: Detection of herds with an elevated CMI on quarterly level**

**Development of prediction model**

Farmers observation	<p><b>Learn data:</b> CMI based on observations of 2/3 of the data N=156 herds</p>				
Routinely collected data	<p>Intramammary Antibiotic treatment</p>	<p>Season</p>	<p>Primiparea with high SCC</p>		
	<p>Bulk tank milk</p>	<p>Herd size</p>	<p>Standardized milk production level</p>		

**Validation of developed model**

		=	<p><b>Very motivated farmers</b></p>		
	<p><b>Validation:</b> 1/3 data N=71 herds, 4 quarters</p>	=	<p><b>77.1% correctly classified</b></p>		
	<p><b>Model</b></p>	=	<p><b>Poor detection by farmers</b></p>		

**Discussion**

- Model 2 misclassified 23% of the observations. Studying these observations learned that it was questionable whether misclassification occurred. Because, some farmers might have under- or overestimated the amount of CM cases as indicated by the subclinical parameters.
- Although the models show potential predictive capabilities it remains important to re-validate the models every 3 to 4 years because associations between independent and dependent variables may change.

**Conclusion**

There is no need for yearly field trials to estimate and monitor the average CMI in the dairy population and to detect herds with CM problems. Both can be predicted based on routine herd data.

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