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## Factors affecting the results of CMT in a Tunisian dairy herd

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Variations of CMT scores were studied on a sample of 31 dairy cows from a herd of 182 Holstein-Friesian cows milked three equally spaced times a day by an automatic machine. Scores were determined three times a week and during 60 days in the midday milking. Scores were determined for the whole mammary system and for each quarter on every cow. Associations of udder cleft, udder balance, teat placement, front teat distance, side teat distance, teat length, teat implantation, end teat diameter, rank of lactation, DIM, and disinfecting before milking with infection status were detected using logistic regression. Up to 35% of cows were infected, of which 4.5% were severely infected. The rate of infection varied only between rear and front quarters. The CMT scores varied with the rank ( $p < 0.01$ ) and stage of lactation ( $p < 0.05$ ). Older cows showed higher infection rates than first lactation cows and middle of lactations were associated with lower infection rates than other lactation phases. The odds of infection increased with teat length ( $p < 0.01$ ) and foot angle ( $p < 0.01$ ) and decreased with teat end diameter ( $p < 0.01$ ) side teat distance ( $p < 0.05$ ), and udder to knee distance ( $p < 0.05$ ). Older cows producing at the end of lactation with pendulous udders and long and thick teats are more likely to get infected with mastitis than other cows.

**Key Words:** Dairy cows, CMT, infection, logistic regression

Mastitis constitutes a major cause of losses to the dairy industry by increasing involuntary culling and deteriorating chemical and bacteriological qualities of milk (Strandberg and Shook, 1989). Mastitis occurs in different forms in herds (Obey, 1999). Detection of mastitis at early stages may reduce costs. CMT is an effective and quick means to identify infected animals. Milk production level, rank of lactation, days in milk, and udder traits were found to affect rates of infection (Rupp and Boichard, 2000). The objective of this study was to link variations of CMT scores to udder traits, rank of lactation, days in milk, and management.

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### Summary

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### Introduction

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## Material and methods

A sample of 31 cows were randomly chosen from a herd of 182 Holstein-Friesian cows milked three equally spaced times a day by an automatic machine. The sample was chosen to represent first (15 cows) and later lactations and various days in milk (<60, 60-200, and > 200 days). CMT scores were determined three times a week and during 60 days at the midday milking. Scores on a scale of 0 to 4 were determined for the mammary system and for each quarter on every cow. A cow that has a score greater than 1 was considered infected and was assigned a code of 1 and 0 otherwise. The probability of being infected was then linked to udder cleft, udder balance, teat placement, front teat distance, side teat distance, teat length, teat implantation, end teat diameter, rank of lactation, DIM, and disinfecting. The search for explanatory variables associated with infection status was done with the stepwise selection technique in SAS (1989) for logistic regression.

## Results

### Infection status of sampled cows

Up to 35% of cows were infected of which 4.5% were severely infected (Figure 1). Around 17% of the quarters were infected. Few cows had all quarters infected (<1%). Left and right quarters were similarly infected while posterior quarters were more susceptible to mastitis infection than anterior ones (23% vs 11%). Multiparous cows (79%) seemed to catch infection more than primiparous cows (21%) and those in the end of lactation (7.4%) were more likely to get infected than those in the beginning (6.5) and in the in middle of lactation (3.1%). Disinfecting the udder before milking seemed to reduce infection incidence by the 7<sup>th</sup> week of the experimental period (Figure 2).

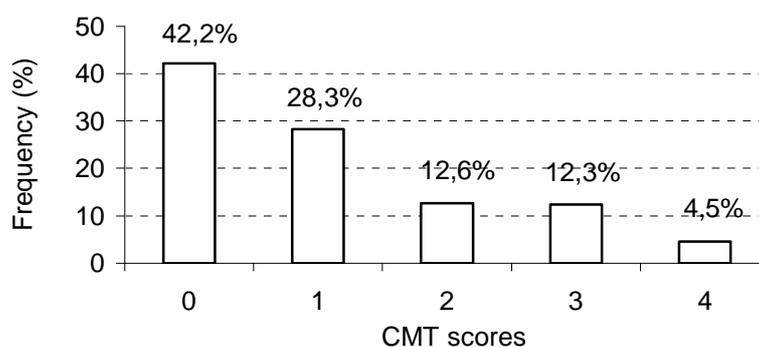


Figure 1. Distribution of CMT scores of sampled cows.

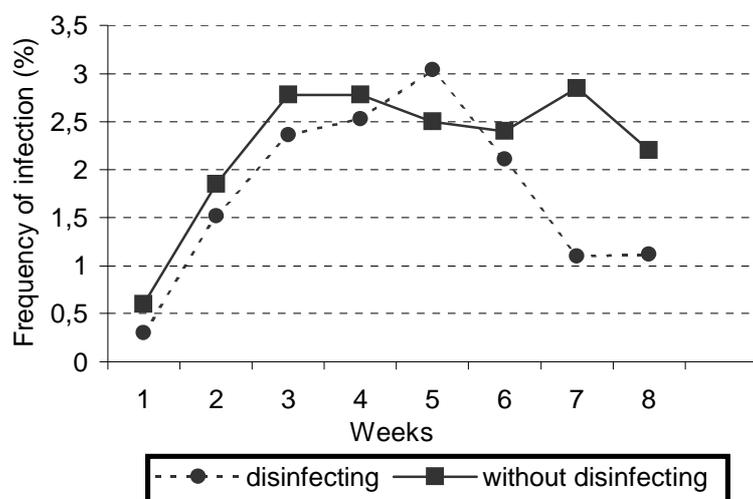


Figure 2. Evolution of mastitis infection rate with and without disinfecting the udder.

Factors levels associated with the incidence of infection by mastitis at the 5% significance level are given in Table 1. Most of teat measures and udder conformation traits seemed to affect infection rates of sampled cows. Long teats with large end diameter and an unsatisfactory implantation increased the odds of infection of milking cows (Table 1). A balanced udder with optimal fore and rear attachments and rear, side, and front teat distances decreased the probability of infection by pathogens. Furthermore, older cows at the end of lactation are more likely to get infected than first lactation cows during the whole lactation.

#### Associations of somatic cell scores with studied factors of variation

Table 1. Factor levels and variables associated with mastitis occurrence ( $p < 0.05$ )

Factor	Parameter estimate ( $\beta$ )	Standard error	Standardised estimate	Odds Ratio
Primiparous	-0,97	0,19	-0,267	0,38
Beginning of lactation	0,33	0,15	0,086	1,39
Left rear quarter	-1,01	0,14	-0,244	0,37
Right rear quarter	-1,02	0,15	-0,245	0,36
Front teat distance $\leq 3$	-1,73	0,28	-0,2980	0,18
4 $\leq$ Front teat distance $\leq 6$	-2,36	0,30	-0,524	0,09
1 $\leq$ side teat distance $< 5$	1,59	0,28	0,439	4,92
Udder to knee distance $< 4$	1,07	0,22	0,255	2,92
4 $\leq$ udder to knee distance $\leq 6$	-0,29	0,13	-0,081	0,74
Teat length $> 55$	0,39	0,13	-0,108	1,48
Teat end diameter $< 20$	-0,71	0,16	-0,192	0,49

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## **Conclusion**

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An udder with optimal conformation is easier to milking by an automatic machine. Putting more emphasis on udder conformation when selecting replacement cows and disinfecting the mammary system before milking would substantially reduce risks of mastitis infection in Tunisian dairy herds.

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