Alert preferences of dairy farmers working with automatic milking systems

Lenno Rijkaart[1], **Erwin Mollenhorst[1,2,3]**, Henk Hogeveen[1,2]

[1] *Business Economics Group, Wageningen University*

[2] *Dept. of Farm Animal Health, Fac. of Veterinary Medicine, Utrecht University*

[3] *Animal Production Systems Group, Wageningen University (current address)*

WAGENINGEN UNIVERSITY
WAGENINGEN**UR**

stw

Universiteit Utrecht

Introduction

- **Dectection of clinical mastitis**
  - Critical factor in automatic milking systems
    - Sensors replace farmers' observation
    - Needs to be improved
  - Development and evaluation
    - Gold standard definition
    - Time windows
    - Performance criteria

But, what do farmers prefer?

Objective

To assess farmers' preferences for the performance characteristics of mastitis detection systems

Additionally: could certain groups of farmers be distinguished with specific preferences?

Materials and Methods

- 480 farmers approached
- 176 initially agreed
- 139 completed questionnaire

- Standard questionnaire
  - E.g., farm size, actual mastitis situation, management

- Adaptive Conjoint Analysis

Adaptive Conjoint Analysis (1)

- Tool from marketing research

- Attributes (characteristics)
- Levels

Adaptive Conjoint Analysis (2)

- Preference levels within attributes ⎤
- Attribute important ⎦ Initial utility values

- Paired questions ➔ updated utility values
  - Adaptive ➔ minimizing number of questions

- Results
  - Final utility value for each level of every attribute
    - Importance of attribute
    - Product preference

Attributes and levels

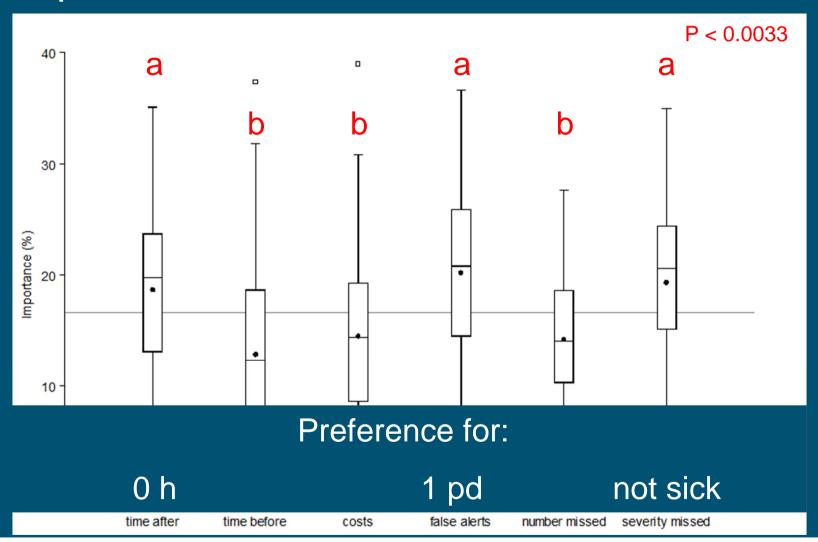| Attribute	Description (levels)
Time after	First alert is given at highest this amount of time *after* cow actually has CM (0, 24, 48 h)
Time before	First alert is given at highest this amount of time *before* cow actually has CM (0, 24, 48 h)
Costs	Variable costs of detection per year (300, 600, 1200 euros) [1]
False alerts	Number of false alerts per day (1, 3, 5, 10) [1]
Number missed	Number of missed cows per year (2, 4, 6) [1]
Severity missed	Health status most severely affected missed cow (not sick (only flakes in milk), sick, severely sick)

[1] Based on farm size of 65 cows

WAGENINGEN UNIVERSITY
WAGENINGEN UR

stw

Universiteit Utrecht

Importance of attributes

Results

- Large variation in farmer's preferences
- Not possible to distinguish groups

- Some significant relationships found
  - Single variables explained max. 10% of variance
  - Multi-variable models max. 17% (time before)
  - Example: Importance of number of false alerts
    - 12% of variance explained
    - 'Reactive' and less time in/around stable ➜ higher importance
    - But, no relation with importance of other attributes except for 'character' and 'time before'

Conclusions

- **Preferred detection system:**
  - Low number of false alerts
  - Alerting in good time
  - Emphasis on more severe cases

- **Advise:**
  - For the industry: make detection systems adaptable

  - For evaluation studies:
    - Focus on high levels of specificity (e.g. 99%)
    - Keep time windows small (not more than 24 h)

WAGENINGEN UNIVERSITY
WAGENINGEN UR

STW

Universiteit Utrecht

Acknowledgements

Farmers

Lely Industries N.V.

Aart de Groot (UU)

Jan v.d. Broek (UU)

Hans Vernooij (UU)