Variation factors of overall health score using Welfare Quality® protocol in French dairy herds

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Production systems and dairy cattle welfare?

40 years of epidemiological studies to identify risk factors for the multifactorial production diseases of dairy cows but for each disease separately

Example: Lameness VS Mastitis and Housing System

Need to consider all diseases together to provide relevant knowledge in dairy farming

Which advice should then be delivered to farmers?
Cross-sectional survey (evaluation of all aspects of welfare on a one-day visit)

Focus on animal-based observations (« outcome » of the interaction between the animal and its environment)

Working with aggregated welfare scores providing an overall assessment of welfare in a given farm

Welfare Quality® assessment protocol

**FEEDING**
- Lameness, integument alterations
- Coughing, nasal discharge, ocular discharge, hampered respiration, diarrhoea, vulvar discharge, milk somatic cell count, mortality, dystocia, downer cows
- Disbudding/dehorning, tail docking

**OVERALL HEALTH SCORE [0-100]**

Health scores based on disorders likely to produce pain - Great innovation of this protocol

**HOUSING**

**BEHAVIOUR**

At each step, the weight attributed to each observation or score is based on experts’ opinion

Material & Methods

Results & Discussion

General discussion & Conclusion
Objectives of the study

Using Welfare Quality® assessment protocol:

- Investigate which production systems and related herd management factors are associated with a variation of the overall health score
- Describe the distribution of the overall health score in a sample of French dairy farms

OVERALL HEALTH SCORE
Study design

1. Cross-sectional survey

2. Study sample

3. Selected strata

- Milking system: MP vs AMS
- Housing system
- Breed
- Farm location
- Herd size: « small » (23-49) vs « large » (50-120)

Diversity of French dairy systems:

N=130 herds

Random sampling to fulfill selected strata

Welfare Quality® assessment protocol

Performed in 130 herds:

5 trained investigators (1 investigator per farm)

Hypothesis: Systems associated with a variation of the overall health score

Material & Methods

Results & Discussion

General discussion & Conclusion
Data analysis

1. Description of the distribution of the overall health score in the sample

2. Identification of herd level variation factors
   a. Univariate analysis \((p \leq 0.25)\)
   b. Multivariate analysis + test for plausible interactions between variables

Variables tested:
- Analysis of variance model
- Backward procedure

Breed; Farm location; Herd size; Housing system-Milking system

Proportion of very clean cows per herd; Herd milk production adjusted on breed; .......
Results and Discussion

Moderate overall health score despite the consistence of the prevalence of most of the health disorders with previous studies.

Non-compensation between criteria scores (experts’ choice)

Overall score always closer to the minimum value of criteria scores

Weaknesses (high prevalence)

Current French regulations do not allow farmers to use local anesthesia while disbudding performed essentially by them.
Results and Discussion: Variation factors (multivariate results)

OVERALL HEALTH SCORE

PRODUCTION SYSTEMS

Housing system _ milking system

Benefit of comfort bedding...

Breed

Lower disease susceptibility of the breed less specialized in milk production...

<table>
<thead>
<tr>
<th>Category</th>
<th>Adjusted means</th>
<th>p-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straw yard_Milking parlor</td>
<td>38.4 (a)</td>
<td>0.07</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Cubicles_Milking parlor</td>
<td>29.9 (b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cubicles_Automatic parlor</td>
<td>30.1 (b)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Results and Discussion: Variation factors (multivariate results)

### OVERALL HEALTH SCORE

<table>
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<tr>
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<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;65%</td>
<td>36.1</td>
<td>0.002</td>
</tr>
<tr>
<td>≤65%</td>
<td>29.6</td>
<td></td>
</tr>
</tbody>
</table>

### RELATED HERD MANAGEMENT FACTORS

- **Proportion of very clean cows per herd (%):**
  - Benefit of herd cleanliness on herd health...

- **Herd average parity adjusted on breed:**
  - Herd average parity: indicator to detect herds with health problems?
  - Young herds face a high culling rate maybe due to a high prevalence of diseases...

### Table 1: Herd average parity adjusted on breed

<table>
<thead>
<tr>
<th>Category</th>
<th>Adjusted means</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montb: x ≤ 2.5; Holst: x ≤ 2</td>
<td>30.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.03</td>
</tr>
<tr>
<td>Montb: 2.5 &lt; x ≤ 3; Holst: 2 &lt; x ≤ 2.5</td>
<td>35.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Montb: 3 &lt; x; Holst: 2.5 &lt; x</td>
<td>32.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>
• Strengths and limits of this study:

First description at such a scale of welfare assessment in dairy cattle including health aspects

**Originality of an overall health score**: Only method allowing an overall assessment of dairy cows’ health

**Herd health assessment based on the opinion of a selected group of experts**

⚠️ Welfare Quality® protocol = Just one way of looking at the level of health

The moderate overall health score in France must be interpreted with caution
General discussion & Conclusion

• Overall health score associated with expected factors...

Confirmation of production systems and hygiene practices associated with a negative change in herd health scores
Acknowledgments

Thank you for your attention

All dairy farmers

Bretagne, Pays de la Loire, Rhône-Alpes, Auvergne