Comparison of animal welfare indices in dairy herds based on different sources of data

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Abstract

The present study seeks to evaluate the potential of a more cost-efficient animal welfare assessment by investigating the association between animal welfare indices (AWI) based on different data sources, namely register data (AWI 1, ie routine registrations, such as treatment, reproduction and abattoir data) and resource data (AWI 2, ie barn design and equipment) validated against animal-based data (AWI 3, ie direct animal observations). AWIs were created based on data from 73 Danish dairy herds. Indices for each information source were created by a weighted linear aggregation of herd level incidence and prevalence of the given indicators. Indicator weights were assigned by expert opinion for each of the AWIs. Linear dependency between the high cost AWI 3 and the two low cost AWI 1 and AWI 2 was investigated. Additionally, different time-periods of 90, 180 and 365 days prior to the actual on-farm collection of AWI 3 measures were evaluated in order to find the most predictive time-period of AWI 1. Predictive key indicators for on-farm animal welfare were investigated in uni- and multivariable analyses. Significant associations were found between the AWI 1 based on incidences 180 days prior to the farm visit and the AWI 3. Predictive key indicators were milk yield, abattoir and mortality data. Predictive models for 180 and 365 days prior to the on-farm assessment consisted of abattoir indicators, while the model 90 days prior included mortality and milk yield. The limited associations between indices and the predictive key indicators and models suggest that these cost-effective welfare assessments are not suitable to stand alone and cannot replace the actual animal welfare assessed by on-farm collection of animal-based measures.

Keywords: aggregation model, animal-based measures, animal welfare, dairy cattle, register data, resource-based measures

Introduction

The assessment and quantification of animal welfare has been of major concern over previous decades with differing approaches showing different emphasis on measures belonging to different data sources. The animal-based measures are believed to assess animal welfare in the most valid way (Keeling 2009) as these output measures are directly reflecting the animal’s response to the input or so-called resource-based measures. Although, resource-based measures are more cost effective due to being easily obtainable and less time-consuming than animal-based measures, studies indicate that animal welfare measured by animal-based measures may vary within the same or similar housing systems and overall management regimes that are alike (Whay et al 2003; Rousing et al 2007). This challenges the direct comparison of welfare assessment outcomes in different herds and the prospect of reducing the number of animal-based measures in assessment protocols (Mulleder et al 2007). To date, the most comprehensive welfare assessment protocol was given by the Welfare Quality® (WQ) assessment protocol in 2009 (Welfare Quality® 2009a,b,c). However, a major drawback for implementation of the WQ protocol is costs due to the major time consumption of data collection. Furthermore, in order to validate the objective nature of the included measures, welfare assessors need to perform ongoing calibration, all adding to the total cost of these animal-based assessment protocols. The estimated time consumption for a full WQ assessment is 7–8 h for a 200 head dairy herd (Welfare Quality® 2009a).

For practical and economic reasons there is a need for a more cost-efficient approach than the WQ. In order to allocate resources in a more beneficial manner, screening tools for animal welfare could be of interest. This could be achieved by using predictive welfare indicators as found in existing databases, ie existing routine registrations made by farmers, inseminators, veterinarians, dairy programmes, laboratories etc, hereafter termed secondary animal-based measures, as register data are already available, however, originally collected and used for other purposes. According to EFSA (2012) this database approach could also facilitate an objective approach for the quantitative risk assessment of