PRELIMINARY INVESTIGATION INTO THE USE OF EXPERT OPINION TO COMPARE THE OVERALL WELFARE OF DAIRY CATTLE FARMS IN DIFFERENT FARM ASSURANCE SCHEMES

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Abstract *Animal Welfare 2003, **12**: 565-569*

This paper describes an approach to assessing the overall welfare of cows on dairy farms. Veterinary and behaviour experts were shown results for ten selected welfare parameters for 25 pairs of dairy farms paired for farm assurance status but with similar geographical location and husbandry system. From this information alone they were asked to state which farms had better welfare. Overall, there were no significant differences between the conclusions of veterinary and behaviour experts. There was a significant relationship between the proportion of experts rating a farm as poorer and the measured difference in the number of cows with lameness or rising restrictions between the paired farms. There were no significant relationships between the expert decisions and differences in milk yield, flight distance, swollen hocks, mastitis incidence, dystocia level, conception rates, prevalence of thin cows and proportion of cows with dirty udders. Clearly, experts rate lameness and discomfort as highly important indices of poor welfare in dairy cows.

Keywords: *animal welfare, dairy cattle, farm assurance, integration, welfare*

Introduction

This study is a preliminary investigation into a simple technique that uses experts to integrate more than one welfare measure result from pairs of dairy cattle farms into a single decision of "better versus worse" welfare. This opinion on overall welfare requires consideration of more than one measure in order to achieve a single judgement. Other integration techniques have been used in animal welfare assessments. For example, the TGI assessment system produces a single overall score by applying different weights to welfare resources and outcomes based on scientific knowledge and expert opinion (Bartussek 1999). Integration of several welfare measures would be useful for systems that operate at the whole-farm level. For example, some certification systems require a pass/fail result based on several different welfare aspects. This study examines the suitability of asking experts to compare results from pairs of farms in order to assess which system (or in this case farm assurance scheme) gives rise to better overall welfare.

The data used for this study were collected during a larger investigation on individual animal-based welfare measures (Main *et al* 2001). Expert opinion was used to identify which animal-based measures should be assessed for the welfare evaluation of animals on farms (Whay *et al* 2003a). The measures used in the evaluation were based on observations of physical condition and behaviour of the adult dairy cattle, plus information either from the medicinal records or reported by the farmer. A selection of these measures and their results from farm visits were used in this study to investigate this integration technique.

Materials and methods

Data collection

Data relating to 32 animal-based welfare parameters (Whay *et al* 2003b) were collected during the winter of 2000–2001 from 53 dairy cattle farms. Data from 50 farms and ten welfare measures (Table 1) were selected for this study. Information on the milk yield, conception rate and number of assisted calvings was gathered using a postal questionnaire to the farmer prior to the visit. The number of mastitis cases was taken from the records of medicine use. At each visit, 20% of the herd was observed in order to estimate the proportion of thin cows (body condition score less than 2) and cows with dirty udders and swollen hocks. The prevalence of lameness was assessed by observing all milking cows as they exited the milking parlour. Behavioural observations of flight distance and the proportion of cows showing behaviour restrictions during rising were made on 10 cows per farm.

The farms were allocated into 25 pairs according to different farm assurance status and similar geographical location, date of visit and herd size. The slides containing the results of the 25 pairs of farms were arranged into five groups, each with a different randomised order of measures presented on each slide and a randomised order of slides (and, therefore, pairs of farms).

Table 1 **Ten welfare measures used by experts to assess overall welfare.**

1.	Annual average milk yield reported by farmer
2.	Thin cows (Body Condition Score less than 2) observed during visit
3.	Conception rate to 1st service reported/estimated by farmer
4.	Annual assisted calving cases estimated by farmer
5.	Annual mastitis cases per 100 cows per year, taken from records
6.	Number of lame cows observed during visit (prevalence)
7.	Dirt on udder around teats as observed during visit
8.	Swollen hocks observed during visit
9.	Average flight distance of 10 cows observed during visit
10.	Serious or severe rising restriction observed during visit

Expert opinion

Opinion from groups of veterinary and behaviour experts was used to compare the overall welfare state of pairs of farms. Thirty veterinary experts were drawn from the delegates attending the British Cattle Veterinary Association (BCVA) summer meeting (2001). Twenty-six behaviour scientists were drawn from the Association for the Study of Animal Behaviour Spring meeting (2002) in Bristol. The experts were blind to the identity, location and farm assurance status of the farms. They were shown up to 25 slides, each containing the results of a pair of farms. Both groups of experts were asked to record which (if either) farm had the better welfare.

The importance of each of the ten measures in the decision to assign better welfare to one farm was assessed by examining the relationship between the difference in the results of each pair of farms and the proportion of experts choosing the farm with the lower measure. The influence of the difference in the ten measures on the strength of the expert's decision was analysed by linear regression.

Results

Thirty veterinary and 26 behaviour experts conducted a total of 841 comparisons of the 25 pairs of farms. The number of comparisons per pair ranged from 29 to 40 (average 33.6 comparisons per pair). The proportion of experts choosing one farm as having better welfare ranged from 0% to 100% (median 37.4%). The level of agreement among the experts varied according to the specific pair of farms. There was 60% or more agreement among experts for 21 out of 25 pairs of farms. However, there was 90% or more agreement for seven pairs of farms. The proportion of experts unable to differentiate either farm in the pair ranged from 0% to 31% (median 11.8%). For two pairs of farms, fewer than 50% experts preferred either farm.

The decision of veterinary and behaviour experts to attribute better welfare to the farm with a lower level for each measure was significantly ($P < 0.01$) related to the actual difference between the two farms for two out of the 10 measures (Table 2). Experts assigned better welfare to a farm if that farm had a lower prevalence of lameness and a lower proportion of cows showing rising restrictions compared to the corresponding paired farm (Figure 1). There was, however, a significant correlation between the differences between pairs in lameness levels and the corresponding differences in rising restrictions and swollen hock levels (Pearson correlation $r^2 = 0.51$, $P = 0.09$).

Table 2 **The linear regression r^2 values for the relationship between the proportion of veterinary (n = 30), behaviour (n = 26) and all experts (n = 56) choosing better welfare overall for the farm with the lower level of each measure and the difference between the paired farms (*$P < 0.01$).**

Measure	Veterinary		Behaviour		All experts	
Annual average milk yield	0.011	−	0.004	−	0.009	−
Thin cows	0.016	−	0.071	−	0.031	−
Conception rate to 1st service	0.001	−	0.015	−	0.000	−
Annual assisted calving cases	0.086	−	0.115	−	0.099	−
Annual mastitis cases	0.044	−	0.007	−	0.027	−
Number of lame cows	0.326	*	0.261	*	0.314	*
Dirt on udder	0.105	−	0.092	−	0.105	−
Swollen hocks	0.125	−	0.049	−	0.097	−
Average flight distance	0.049	−	0.020	−	0.038	−
Rising restriction	0.321	*	0.265	*	0.312	*

Conclusions and animal welfare implications

This study demonstrates a relatively simple technique suitable for comparing overall welfare on two groups of farms. There was a degree of consensus between experts for seven pairs of farms where 90% of the experts agreed.

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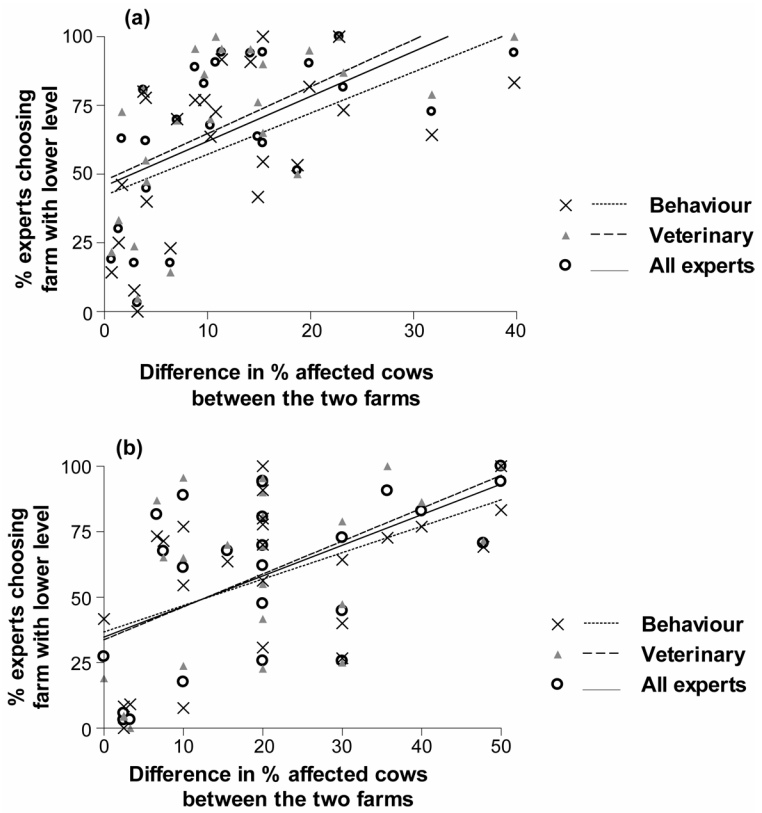

Figure 1 **Relationship between the proportion of veterinary, behaviour and all experts choosing the farm with the lower level of each measure and the actual difference in the results between the paired farms for (a) lameness and (b) cows with rising restrictions.**

Because the subjective experience of animals cannot be assessed directly, the true validity of such integration techniques cannot be assessed. Certainly selection of a greater number of measures would have increased the content validity; however, it was not thought feasible for experts to consider more measures for each farm. The welfare measures chosen did, however, include a wide range of welfare aspects such as production, fertility, nutrition, limb condition, disease and behaviour. This technique had some internal validity in that the decisions between the two types of expert groups collected on different occasions were very similar. However, the decisions of the experts appeared to be strongly influenced by only two out of the 10 measures. Furthermore, since there was a significant correlation between the difference between each pair in the lameness, swollen hocks and rising restriction results, a large number of experts could be basing their judgement simply on one aspect such as lameness levels.

Currently experts appear to consider that lameness and discomfort aspects are very important (Whay *et al* 2003). This concentration on lameness by experts may be a consequence of the relatively high profile of lameness as a welfare concern in recent scientific investigations and publications (FAWC 1997) rather than a genuine scientific reason for being of greater welfare significance than, say, assisted calving or mastitis cases.

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This emphasis on lameness may change over time as more information becomes available on other aspects such as body condition or mastitis.

Clearly, welfare affects the individual animal and it does not benefit an individual cow with mastitis if that farm has particularly low levels of lameness. However, integrating many different welfare aspects into a single result has attractions for certification and legislative decisions because these systems often operate at the whole-farm level. However, this study highlights the problem that one overall score, even when decided non-numerically, does not allow for variability across measures. Also, this technique of assessing overall welfare does not provide specific information on how to improve systems such as farm assurance schemes. This is best achieved by assessing the scheme's ability to influence specific welfare measures.

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