to use at the individual cow level, because a positive test was 24% more likely to come from cows affected by hyperketonemia than normal cows. On the other hand, if one considers using San++ results in a herd health monitoring program, a threshold value of ≥ 0.15 mmol/L would be more appropriate, given its higher sensitivity. When using this threshold, the herd apparent prevalence of hyperketonemia is generally higher than true prevalence, but if the apparent prevalence is monitored over time using a control chart, it can be tracked to determine if the process becomes out of control.

Preliminary Evaluation of Two Methods for Estimating Lameness Prevalence on Western US Dairies

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Introduction

Lameness is an important problem in dairy herds because it decreases production and reproductive performance, increases culling, and has a negative impact on animal welfare and longevity. The Dairy F.A.R.M. (Farmers Assuring Responsible Management) program includes animal welfare assessment and requires a lameness prevalence of less than 10%, with lameness defined as a score of 3 or above in a 5-point locomotion scoring system. Previous studies of lameness in the United States estimate prevalence greater than 20%, suggesting a need for reduction of lameness in dairy cattle. Monitoring farm lameness prevalence and detecting lameness in individual cows will be important for dairy producers and veterinarians in their efforts to reduce lameness. If monitoring is to be increased, an efficient strategy for assessing lameness that is compatible with current dairy management is necessary. Furthermore, this method must be validated as an accurate estimate of the prevalence of lameness in a herd. Two strategies have recently been suggested to estimate lameness prevalence, one by strategic sampling of cows as they exit the milking parlor and one by observing back position as cows stand in lockups.

However, these studies were based on farms with less than 275 cows, most housed in one group, whereas half of the US dairy herd is on farms with greater than 500 cows that are housed in multiple, heterogeneous pens. The purpose of this study was to test these methods on dairies with multiple pens of cows.

Materials and Methods

All cows were locomotion-scored on a 5-point scale in which a score of 1 was not lame and a score of 5 was non-weight-bearing on one leg. Cows scoring ≥ 3 were defined as lame. On farm 1, locomotion score and parlor exit order were recorded for 886 cows in six pens (62-144 cows per pen) as they exited the milking parlor single file. Herd and pen-level lameness prevalence was calculated for all cows scored. In addition, lameness prevalence was calculated from a sample of cows in the middle of the parlor exit order using a published calculation to determine sample size. On farm 2, back position (arched or not arched, where arched was considered lame) was recorded for 200 cows in three pens locked at the feed bunk. Cows were individually released from headlocks and locomotion-scored. Lameness prevalence was calculated by locomotion score and by presence of arched back for the herd and for each pen. Sensitivity and specificity were calculated for the presence of arched back as a test for locomotion score ≥ 3 in individual cows, and kappa statistic was calculated for agreement between locomotion score and presence of arched back. All data were analyzed using Microsoft Excel.

Results

On farm 1, the lameness prevalence of all cows scored was 33%, and ranged by pen from 8.5% to 44%. Estimated lameness prevalence based on a sub-sample from the middle of each pen was 34% for all pen samples

combined, and ranged from 6% to 51% by pen. On farm 2, the lameness prevalence of all cows scored was 16%, and ranged by pen from 9% to 20%. Estimated lameness prevalence based on arched-back position was 10.5% for the herd and ranged by pen from 4.5% to 17%. Presence of an arched back while standing in the lock-up predicted lameness in individual cows with 44% sensitivity and 95% specificity. Agreement beyond chance for the two methods was considered "moderate" (Kappa=0.41).

Significance

The sampling strategy using milking parlor exit order was effective at estimating herd prevalence when samples from all pens were combined. Pen level variation requires sampling all pens. The presence of an arched-back position in cows in lock-ups predicts lameness in those cows, but these preliminary data suggest that this lameness assessment strategy underestimates herd prevalence. However, lameness assessment using arched-back position has promise for wide adoption, as it could easily be incorporated into routine herd management procedures. Further work is needed to refine and validate the arched-back method.

Is Thermography a Possible New Method to Evaluate Body Temperature in Fresh Cows?

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Introduction

The period comprising one month postpartum represents the highest risk of disease occurrence in dairy cows. In freestall systems in general, cows are housed in post-fresh pens after calving where intense health surveillance has been recognized as a major determinant of cow performance during the subsequent lactation. Rectal body temperature (RT) and appetite are the most important indicators of health status, but their assessment is sometimes neglected due to time constraints, yielding poor compliance with health surveillance protocols. Thermography has largely shown the capability to accurately and quickly evaluate body temperature in other species such as humans, and widespread usage of this technology has made affordable and manageable thermographic units more available.

With the advantage of a rapid measurement, the objective of the study is to evaluate whether thermography can be comparable to RT as a diagnostic test to identify cows over an established RT threshold.

Materials and Methods

In a commercial dairy farm, rectal and thermographic temperature was evaluated daily in cows after calving (0-7 days postpartum) for eight days. One to five days of temperature data were obtained for each cow during that period. During each daily evaluation, a hand-held thermographic unit (E50, Flir) was used to obtain an instantaneous measure of the maximum temperature registered in the orbital area in both eyes. One rectal temperature was afterward recorded using a GLA 525 thermometer. Electronic health and demographic records were also retrieved from the farm software (DC305). Repeated measures analysis and receiver operating curves (ROC) will be used to evaluate the characteristics of thermography as a test to evaluate body temperature in comparison to RT.

Results

Preliminary results yield an overall sensitivity and specificity (95% CI) of 70.7% (59.5, 80.0) and 89.5% (85.4, 92.5) respectively, after adjusting for the atmospheric temperature during the day of the visit and for a threshold RT cut-point of 103°F (39.4°C). Results from the repeated measures analysis and ROC graphs will be reported.

Significance

Quick determination of body temperature and simultaneous evaluation of appetite are health indicators that could be facilitated with the use of thermography.