There's an app for that: Monitoring bovine respiratory disease in dairy calves

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Introduction

Bovine respiratory disease (BRD) accounts for 22% of pre-weaned dairy calf deaths. Dairy calf feeders frequently inaccurately diagnose or track the incidence of BRD in pre-weaned calves. During the evaluation of BRD prevalence on 100 dairies in California, the research team identified the need for a mobile application to automate the prevalence estimation process to benchmark a herd’s BRD status. Additionally, the need for a self-reporting feature to share information and history was identified. Without accurate records on BRD prevalence, calf caretakers cannot effectively evaluate changes in management.

Objectives

• Estimate the sample size required to survey a herd of pre-weaned dairy calves for BRD
• Develop a user-friendly mobile application interface to aid calf caretakers, dairy producers, veterinarians, and consultants in accurate diagnosis of BRD using the CA BRD Scoring System
• Provide a platform to benchmark BRD prevalence in calf herds
• Encourage adoption of improved BRD control measures by maintaining history of BRD status to evaluate management changes
• Make tool widely accessible by integrating multiple languages.

The mobile application is currently available free of charge in English and Spanish on the iOS App Store and Google Play. Chinese and Arabic versions will be available soon.

BRD Scoring

Users can enter user details (name and sex), and calf details including herd identification number, birthdate, breed, and sex.

Prevalence Estimation

The app automates the prevalence estimation random sample based on a user-specified bound (width of the confidence interval), assumed prevalence and total number of pre-weaned calves on site. The app identifies a random sample of calves to score and indicates the hutch number to start scoring (in this case, hutch number 4). If a calf is present, select “yes” to advance to the scoring page. If the hutch is empty, the app will recalculate the hutch number.

To determine a BRD score, users select “normal” or “abnormal” for each sign by selecting pictures in an option (eye and nasal discharge and ear droop or head tilt). The severity within each sign is given equal weight—any “example of abnormal” results in a numerical score. As each selection is made, the score will update.

All fields are optional. User can stop scoring at any time or assign a score to every sign. The exception: if the cumulative score is 4, the user will be prompted to enter a rectal temperature. A score of 5 or greater indicates BRD.

The background color of the numerical score will display yellow if no scores are selected or temperature is required, green if the calf is negative for BRD (< 5), and will change to red if the calf is positive for BRD (score ≥ 5). The text of each sign will display green (normal), red (abnormal), or white (no value selected).

When the user selects “Done,” they are prompted to confirm that no other signs are observed, if any have been skipped. Notification of positive or negative BRD score follows.

After the designated sample number of calves is evaluated, the app generates a report indicating the estimate and 95% confidence limits for prevalence of BRD in the calf herd. The report includes descriptive analyses, several data depictions in histogram format and identification numbers of cases and non-cases are reported (if entered). The report can be self-emailed or shared with a consultant. Previous reports can be found under Reports.

History

Users can review the history of BRD status results with the ability to review the data collected for each calf at each sampling session, and for consultants, by herd and scoring date.