for nursing beef calves. Surveys indicate that approximately 20% of US cow-calf operations recognize nursing calf BRD to be a problem, leading to the possibility that important risk factors could be identified by comparing affected herds to appropriately matched unaffected herds. The objective of this study was to determine herd-level risk factors for nursing calf BRD through a matched case-control study of cow-calf operations in 3 US states.

Materials and Methods

Cow-calf operations in Nebraska, North Dakota, and South Dakota were enrolled during 2012 to 2014. Herds were eligible for enrollment if they had an average weaning age of at least 120 days and had at least 30 cows calving. Case herds were defined as operations treating 5% or more of nursing calves for BRD; control herds were defined as treating no more than 0.5% of calves, and were matched to case herds by referring veterinary practice and year of enrollment. Telephone interviews of producers were used to collect information about herd management. Conditional logistic regression was used to evaluate herd-level risk factors for calf BRD while accounting for the matched case-control study design. All statistical testing assumed a 2-sided alternative hypothesis, and $P<0.10$ was considered statistically significant.

Results

Thirty case herds and 54 matched control herds were enrolled. Twenty-nine of the herds were located in Nebraska, 23 in North Dakota, and 32 in South Dakota. There was no significant difference between case and control herds in the percent of herd composed of first-calf heifers, length of calving season, percent of calves surviving 48 hours after birth that lived until weaning, or average age or weight of calves at weaning. In the multivariable analysis, 3 variables were significantly associated with calf BRD: herd size, the use of intensive grazing, and synchronizing cows and heifers after calving. Compared to herds with fewer than 150 cows, the odds of having >5% incidence of calf BRD were 7.9 times higher for herds with 150 to 499 cows, and 12 times higher for herds with 500 cows or more. Compared to herds that did not use intensive grazing, the odds of having >5% incidence of calf BRD were 3.3 times higher for herds that used intensive grazing. Compared to herds that did not use a synchronization program after calving, the odds of having >5% incidence of calf BRD were 4.5 times higher for herds that used a synchronization program.

Significance

To our knowledge, this is the first reported case-control study to evaluate herd-level risk factors for nursing calf BRD in US cow-calf operations. These results provide data to support informed decision making by veterinarians who want to decrease rates of nursing calf BRD in herds where the condition is a problem. Future research will be needed to confirm which management manipulations effectively mitigate nursing calf BRD.

Diagnostic accuracy of clinical illness for bovine respiratory disease diagnosis in feedlot beef calves: a systematic review of the literature and Bayesian meta-analysis

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Introduction

Bovine respiratory disease (BRD) diagnosis in feedlots is based on clinical inspection (CI) done once or twice daily by pen-riders or pen-walkers. A diagnosis of BRD is typically established when an animal has visual signs of BRD and a rectal temperature above a threshold (ranging from 103.1 to 104 °F) (39.5 to 40 °C). This diagnostic approach is known to have less than ideal sensitivity (SeCI) and specificity (SpCI). However, accurate estimates of SeCI and SpCI are not available, in part due to the absence of a reference test for antemortem diagnosis of BRD. The objective was to determine the diagnostic accuracy of CI for BRD diagnosis in post-weaned beef calves. The presence of lung lesions at slaughter (LU) was used as an imperfect reference test to determine SeCI and SpCI.

Materials and Methods

A systematic review of the literature was done to identify research articles comparing CI detected during the post-weaned phase in beef calves with LU. A hierarchical Bayesian latent-class meta-analysis that accounted for within- and between-study variability was used to calculate SeCI and SpCI. This meta-analysis also predicted SeCI and SpCI for future studies. Conditional independence between CI and LU was assumed, as these 2 tests are not based on similar biological principles.

Results

Seven studies were identified for inclusion in the meta-analysis. Estimated pooled SeCI and SpCI were 0.27 (95% Bayesian credible interval: 0.1 to -0.65) and 0.92 (0.72 to 0.98), respectively, whereas estimated pooled SeLU and SpLU were 0.91 (0.82 to 0.99) and 0.67 (0.64 to 0.79). Predicted SeCI and SpCI for future studies were 0.27 (0.01 to 0.96) and 0.92 (0.14 to 1.00), respectively, indicating considerable heterogeneity among studies.

Significance

Clinical inspection had poor sensitivity but high specificity for BRD diagnosis in feedlot. Substantial heterogeneity among studies highlighted the urgent need to better define a BRD case.

Comparing estimates of treatment effect of antibiotics for BRD from randomized controlled trials with a network meta-analysis

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Introduction

Bovine respiratory disease is the most economically important disease of feedlot cattle in North America. Choice of antibiotic is a critical factor for producers and veterinarians. We previously published a mixed-treatment comparison meta-analysis that combined evidence from published trials and published estimates of comparative efficacy for 12 antibiotics registered for use in the US. Some of the comparative efficacy estimates were based only on indirect evidence. Since the original review was published, new randomized controlled trials that provide direct evidence of comparative efficacy have been published. Here, we compare the estimates from the original model with the estimates from the studies. Such information will enable us to determine if indirect comparisons from meta-analysis are informative.

Materials and Methods

The original search from the prior review was repeated, and found that 5 of the new studies met the criteria for inclusion in the updated review. Four of these studies provided new data on direct comparisons of active drugs. We compared the results of those trials with the results from the prior model.

Results

The results from 1 study (performed in 2002) that compared ceftiofur pinna and enrofloxacin were inconsistent with the network and were excluded from the analysis. Three new direct comparison studies examined gamithromycin compared with tulathromycin, florfenicol, and tilmicosin. For the comparison of gamithromycin (referent) with tulathromycin, the original model predicted a risk ratio (RR) of re-treatment of 0.54 (95% credible interval=0.27 to 0.87) based only on indirect data. The subsequent randomized controlled trial revealed that the observed RR of re-treatment was 0.59 (95% confidence interval=0.45 to 0.78). The results of other comparisons were also similar. For the gamithromycin (referent) to florfenicol comparison, the observed randomized trial RR using indirect evidence was 1.17 (95% confidence interval=0.83 to 1.64) and the indirect estimate of RR from the prior model was 0.84 (95% credibility interval=0.48 to