

Comparing Estimates of the Impact of Bovine Viral Diarrhea Virus (BVDV) Infection on the Weaning Weights of Beef Calves reported in Primary Research with Economic Models of BVDV in Beef Cattle

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Introduction

The objective of this project was to compare estimates of the impact of bovine viral diarrhea virus (BVDV) infection on the weaning weights of beef calves reported in primary research to the estimates used in economic models of BVDV in beef cattle. Models can help clarify the impact of infectious disease on production and financial outcomes; however the usefulness of economic models depends on the validity of the assumptions of lost production attributable to infection. In dairy herds, the major source of income is milk therefore BVDV transmission models often include calves only as a source for continued herd infection and economic models frequently only consider the impact of infection on milk production. In beef herds, the sale of calves is a primary income source and estimates of the impacts on BVDV infection on calf weight at weaning are of greater importance in economic impact models on BVDV infection in the beef cattle industry than the dairy cattle industry.

Materials and Methods

The project began in May 2007 to identify literature describing production impacts of BVDV infection in North American beef herds. Searches were made in leading agricultural and economic search engines. Further websites of the land-grant university extension websites in the 10 leading cattle producing states was conducted to find case reports of BVDV outbreaks. A Google search was also used to find BVDV articles on sites visited by cattle farmers and ranchers. Screening for relevant material considered the title and abstract only. For any article to pass through the relevance screening it had to answer yes to three questions; 1) Does the article discuss BVD in a cow-calf herd? 2) Does the article discuss the economics of production or loss of production in calves as a result of BVD? 3) Is this article a primary source of literature or is a model representation of a cow-calf herd? Studies eliminated from consideration included studies where BVDV infection was artificially induced and beef feedlot studies. From the remaining studies we extracted the weaning weights for PI and non-PI

calves when available. For models we extracted similar estimates when reported. To compare the estimate of BVDV from primary research sources with estimates from models, we calculated the total number of pounds weaned from primary studies with the available data:

- crude total weight of PI herd = (average weight of PI calves* number of PI calves weaned) + (average weight of non-PI calves* number of non-PI calves weaned)
- crude total weight of non-PI herd = (average weight of the non-PI calves * (number of PI weaned + number of non-PI calves weaned))

• % difference = [1-(weight of PI herd ÷ weight of non-PI herd)] x 100.

Results

Eight primary studies described consequences of BVDV infection in calves in North American beef herds, and three provided sufficient production parameters data to estimate the outcomes of interest. Several studies indicated production data were recorded but not reported. Many models only considered mortality or morbidity in calves in the economic impact assessment. Using our crude approach to measuring the impact of BVDV infection on total number of pounds weaned, studies would have seen a 1.5% - 2.5% decrease in total pounds weaned associated with BVDV infection. This estimate did not take into account any potential impact of transient infection on the weaning weight on non-PI animals in PI positive herds. One model used an estimate of 0.5% as an estimate of the decrease in weaning weight due to BVDV infection.

Significance

There was a surprising small amount of data describing the impact of BVDV on production parameters in beef herds. This fact was acknowledged by the majority of studies that reported models, and often models used conservative estimates. There is a need for primary studies that can provide primary information about the impact of BVDV on production; this information may provide better motivation for producers to control BVDV.