EFFECTS OF DYSTOCIA AND CONFINED CALVING ON CALF-MORBIDITY RATE FROM BIRTH TO WEANING

M. W. Sanderson and D. A. Dargatz

Summary

An analysis was performed on data from a national survey of US beef cow-calf producers to quantify the effects of management factors on calf-morbidity risk from birth to weaning. The analysis included 2,490 herds from 23 states. A high calf-morbidity herd was defined as one with greater than 10% morbidity. The rate of dystocia in the herd was categorized into five levels. All dystocia levels were associated significantly with increased risk of being a high calf-morbidity herd. Having greater than 70% of cows and heifers calve in confinement also was associated with increased risk of being a high calf-morbidity herd. Approximately 40% of herds experienced high morbidity from the effect of dystocia and approximately 10% from the effect of confined calving. This analysis indicates that dystocia and confined calving are important factors in determining a herd’s calf-morbidity rate from birth to weaning.

(Key Words: Beef, Cow-Calf, Calf Morbidity, Calving, Dystocia.)

Introduction

Examination of individual-animal risk factors for morbidity and mortality from birth to 45 days of age has found increased morbidity among calves born to 2-year-old heifers, and calves experiencing dystocia. A 35 lb reduction in weaning weight also has been shown among calves experiencing morbidity between birth and 45 days of age. Of all disease categories, diarrhea of unknown cause, predominately in calves, has the highest costs associated with treatment and labor. Over 75% of annual miscellaneous costs of disease may be due to lost weight gain. Clearly, calf morbidity is an important issue to the beef industry, resulting in reduced weight gains and expense and labor associated with treatment. The purpose of this study was to quantify the effect of herd management variables on herd risk for high calf morbidity.

Experimental Procedures

Data Source. Questionnaire data were collected from 2,490 beef, cow-calf operations between December 30, 1996, and February 3, 1997. Operations were selected from 23 states by the USDA: National Agricultural Statistics Service (NASS).

Producers were asked to estimate the number of calves experiencing morbidity from respiratory disease, diarrhea or "scours", bovine keratoconjunctivitis or "pinkeye", and infectious pododermatitis or "footrot" from birth to 3 weeks of age and

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1The authors thank the NASS enumerators and state and federal statisticians for their roles in selecting and contacting this sample of beef producers and collecting the data for this analysis. In addition, none of this would have been possible without the cooperation of all the beef producers who participated in the survey.

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from 3 weeks of age to weaning. Producers also were asked to estimate or use records to
determine the number of dystocias in heifers and
cows during 1996. Calvings were reported as
"no assistance given", "easy pulls", "hard pulls",
or "cesarean sections". Producers also provided
estimates of the percent of cows and heifers
calving in confined vs. extensive facilities, as well
as an estimate of calving density. Confin ed
calving was defined as cows calving in pens,
sheds, or lots without access to grazing.

**Data Analysis.** A single morbidity rate
was calculated for each herd by adding the
estimates in each morbidity category and divid-
ing by the total number of live-born calves in the
herd. This calf morbidity value was used to
categorize herds as high vs. low morbidity.
High-morbidity herds were defined as having
>= 10% morbidity.

Herd dystocia rate was calculated by sum-
ming the estimates for easy pulls, hard pulls, and
cesarean sections and dividing by the number of
calves born alive or dead. The combined dys-
tocia rate for cows and heifers was categorized
into five levels: no dystocia (reference group),
>0 to 5% dystocia, >5% to 10% dystocia,
>10% to 20% dystocia, and >20% dystocia.
Data on whether or not cows were observed
regularly during calving season also was collected.

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4 California, Colorado, Montana, New Mex-
ico, Oregon, Wyoming, Kansas, Nebraska, North
Dakota, South Dakota, Oklahoma Texas, Arkans-
as, Illinois, Iowa, Missouri, Alabama, Florida,
Georgia, Kentucky, Mississippi, Tennessee, and
Virginia.

5 This analysis is based on data from the
USDA:APHIS:VS. Beef 97 survey. For com-
plete results of the survey, contact the Centers
for Epidemiology and Animal Health. Ft. Collins,
CO. (970) 490-8000.

Percentage of cows and heifers calving in
confined facilities was classified into three cate-
gories; <=20% (reference group), >20 to 70%,
and >70%.

Based on biological plausibility, all potential
explanatory variables for which data were
present for all herds were examined for association
with calf morbidity. Variables associated
with herd morbidity were included in an initial,
multiple-logistic-regression model. The propor-
tions of herd morbidity attributable to the identi-
fied management factors were calculated.

**Results and Discussion**

The estimate of mean morbidity prior to
weaning was 5.8%, and mean mortality rate
prior to weaning was 3.7%. The final odds
ratios and confidence intervals (CI) for being
classed a high calf-morbidity herd are sum-
marized in Table 1. Odds ratios quantitate the risk
of being a high calf-morbidity herd. Odds
ratios for dystocia categories increased as the
proportions of dystocia in the herds increased
(P<0.01). Odds ratios for confined calving
categories increased as the proportion of cows
and heifers calving in confined facilities
increased (P<0.01). No association was found
between calf morbidity levels and regular obser-
vation of calving, specific dystocia categories
such as dystocia in cows or hard dystocia (hard
pull or cesarean section), or percent heifers in
the herd.

In this data set, the mean dystocia rate for
cows and heifers combined was 4% vs. 16.7% for
heifers alone. Percentage of heifers in the
herd was not associated significantly with high
calf morbidity. Risk for morbidity in heifer's
calves may be accounted for in the dystocia
variable.
Table 1. Odds Ratios for Being Classified a High Calf-Morbidity Herd

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dystocia class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0%</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>&gt;0 to 5%</td>
<td>2.68***</td>
<td>1.8-3.99</td>
</tr>
<tr>
<td>&gt;5% to 10%</td>
<td>2.68***</td>
<td>1.71-4.2</td>
</tr>
<tr>
<td>&gt;10% to 20%</td>
<td>3.19***</td>
<td>1.77-5.77</td>
</tr>
<tr>
<td>&gt;20%</td>
<td>5.46***</td>
<td>2.28-13.1</td>
</tr>
<tr>
<td>Confined calving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 20%</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>&gt;20% to 70%</td>
<td>1.34</td>
<td>0.67-2.65</td>
</tr>
<tr>
<td>&gt;70%</td>
<td>1.8**</td>
<td>1.16-2.82</td>
</tr>
</tbody>
</table>

** P<0.01, *** P<0.001

Each category of dystocia was associated with increased risk of being a high morbidity herd. As dystocia rate increased from one category to the next, the associated point estimate for that odds ratio also increased. This relationship was particularly evident in herds with >20% dystocia, where the estimate of the odds ratio increased to 5.4. Failure to provide for adequate ingestion of colostrum and for maintenance of body temperature likely would increase morbidity significantly. As dystocia rate increased, the number of calves requiring additional support increased. Thus, available labor may be overwhelmed, resulting in increased risk of morbidity for individual calves.

The odds ratio for herds in which 20 to 70% of cows and heifers calved in confinement was numerically, but not significantly, greater than the ratio for herds in which less than 20% of cows and heifers calved in confinement. Herds in which >70% of cows and heifers calved in confinement were significantly more likely to be high morbidity herds (odds ratio=1.8). These estimates suggest a threshold where labor inputs are exceeded or environmental contamination reaches a level where disease transmission probability increases sufficiently to cause an outbreak.

The combined effects of dystocia and confined calving accounted for a significant proportion of high morbidity. Approximately 40% of herds experienced high calf-morbidity from effects associated with dystocia, and approximately 10% of herds experienced high calf-morbidity from effects associated with confined calving. Eliminating all dystocia would be unrealistic; nonetheless, the data reported here indicate the relative effects of dystocia and confined calving on calf morbidity.