Cow/Calf Session III

Moderator: **Mark F. Spire**

Calving Season Management

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Introduction

Optimizing calf crop weaned is a major goal of most producers. To accomplish this goal, a primary area of focus for management is reducing losses during the calving season. The objective of this paper is to discuss the economics of disease and losses and the prevention of losses through effective personnel training and records management.

Identification and Economics of Calf Losses

Few studies have been done to associate disease conditions with costs. In Colorado, as part of a pilot program of the National Animal Health Monitoring System (NAHMS), obtaining both incidence and costs of disease conditions in cow/calf operations were primary objectives (Salman *et al.* 1991, a,b). Data were collected from a total of 86 randomly selected herds, 39 herds in 1986-87 and 47 herds in 1987-88.

The details of these studies are presented in JAVMA 198:962-973, 1991.

Disease conditions were categorized into five different classes according to the native disease codes of the states involved in the NAHMS beef pilot program. These categories were: 1) enteric, 2) miscellaneous, 3) reproduction, 4) respiratory, and 5) sudden death. Incidence by disease class is presented in Table 1. The three diseases with the highest incidence is presented in Table 2. Approximately 95% of diarrhea of unknown causes and 34% of pneumonias occurred in nursing calves. These three individual classes combined account for an average of approximately 44% of all new cases of disease within these herds.

Results in annual costs of disease incidence are presented in Table 3. Total costs of disease on a per cow basis are quite variable, but costs were fairly consistent over the two years. Noteworthy is the observation that 65.8% and 66.8% of the disease incidence costs per cow were accounted for by death loss in both rounds 2 and 3, respec-

Table 1. Annual Incidence by Disease Class in National Animal Health Monitoring System (NAHMS) Cow Herds from 1986-1988.[1]

	Annual Incidence/100 Cows	
Disease Class	Mean	Range
Enteric	14.6	0.1-95.2
Miscellaneous	12.0	0.2-59.1
Reproduction	11.1	0.3-57.1
Respiratory	8.8	0.1-105.6
Sudden Death	3.3	0.2-25.0
Total	48.2	1.1-179.7

[1]*Adapted from Salman et al. 1991a.*

Table 2. The 3 High Annual Disease Incidences for Disease Conditions in National Animal Health Monitoring System (NAHMS) Cow Herds from 1986-1988[1]

	Annual Incidence/100 Cows	
Disease	Mean	Range
Diarrhea (unknown)	11.9	0-91.7
Pneumonia	5.0	0-105.6
Dystocia	4.1	0-28.6

[1]*Adapted from Salman et al. 1991a*

tively. Few would argue against the majority of death loss occurring in calves on these cow-calf operations.

Table 3. Annual costs of disease incidence on a per cow basis in National Animal Health Monitoring System (NAHMS) cow-calf during rounds 2 and 3, from 1986 to 1988

	Mean incidence cost per cow[1]	
Type of cost	Round 2	Round 3
Drugs used	$ 1.25	$ 1.20
Producers Labor	2.23	1.65
Veterinary Services	1.89	2.17
Death Loss	21.55	27.37
Culling Losses	3.73	7.19
Misc. Costs	2.10	1.40
Total Cost	$ 32.75	$ 40.97
Range	2.12 to 84.50	6.14 to 148.90

[1]*Adapted from Salman et al. 1991b.*

Table 4 has comparative mortality losses from a fifteen year study in Miles City, Montana, and unpublished data from s subset of 73 of the 86 NAHMS herds in Colorado. Disease groupings were assigned to allow comparisons between the two studies.

Table 4. Calf loss information from Miles City, Montana[1] and Colorado National Animal Health Monitoring System NAHMS project[2]

	Montana Miles City (a)	Colorado NAHMS (b)
Total Calves	13,296	24,396
% Lost	6.7	4.5
% Prem/Abort/Still	0.2	3.5
%Dystocia	49.1	30.0
% Inf Diseases	13.5	25.7
% Exposure	5.0	12.2
% Starvation	2.8	0.5
% Defects	9.7	0.5
% Accidents	5.3	7.0
% Miscellaneous	1.0	0.7

[1]*Adapted from Patterson et al., Theriogenology, 1987.*
[2]*Unpublished*

Because of the method of accumulating data within NAHMS, no association between calving and time of death was made. In the Montana study, calf losses were 57.4% (day 0), 79.2% (by day 10), and 88.9% by day 41 after calving. Only 11.1% occurred after day 41. First calving cows accounted for 40.9% of all losses while second calvers accounted for 18.5% for a total of 59.4%. The average for each parity group greater than second calvers was only a 4.1% calf loss. From Table 4, the largest contributor in both studies to calf loss was dystocia. The linkage between dystocia and calf losses from other diseases is fairly well established. In the Montana study, they concluded 50% or more of losses due to dystocia were "preventable".

Prevention of Calf Losses

Personnel training is the key to minimizing losses and cannot be overemphasized. This is an on-going process and needs to be individualized for each ranch or operation. The major differences among operations are 1) ownership structure, 2) managerial skill level, 3) labor force, and 4) motivational level for input. The key individual of focus in training has to be the manager of the operation regardless of the type of operation. The areas of emphasis in training are nutritional management of the cow herd, disease prevention programs relative to calf losses, physical facility design, calving shed management including obstetrical management and post-calving care of the dam and calf. This training needs to be provided in such a way that the interrelationships of all of these areas is appreciated.

Nutritional Management of the Cow Herd. This should include proper nutritional management of both replacement heifers and cow herd. Emphasis of this training would be placed on the interrelationship between pre-calving dam nutrition, calving assistance level, colostral production, and resistance to disease in calves after birth. Most states have the information available on these interrelationships. In Colorado, Dr. K. G. Odde and his associates have looked at pre-calving nutritional management relative to colostral production and calf serum immunoglobulin. In general, these studies indicate that:

1. Cow age has little to do with colostral immunoglobulin concentrations.
2. Calves from 2-year-old heifers have reduced calf serum immunoglobulins concentrations.
3. Restricted dam nutrition markedly decreases volume of colostrum, increases concentration of colostrum, decreases calf vigor, and reduces ability of calf to stay warm.
4. Body Condition Scores of 5 or 6 for heifers result in highest calf serum immunoglobulin concentrations.
5. Dystocia lowers calf serum immunoglobulin concentration.

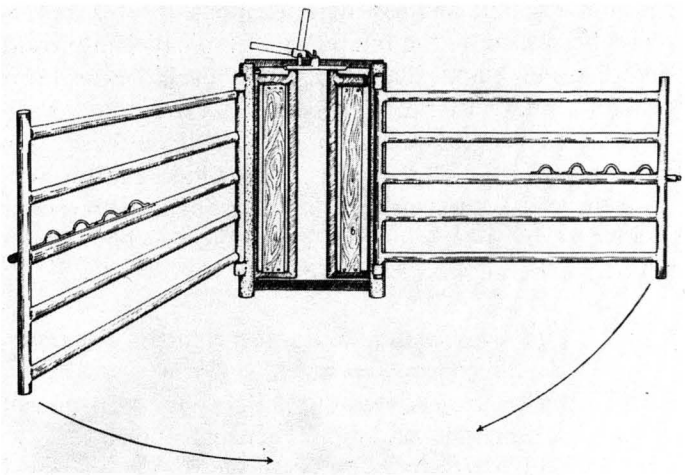
Disease prevention programs. If calf diarrhea has been a continuing problem in the operation history, consideration of dam vaccination pre-calving may be worthwhile and economical. Personnel training needs to address

not only the advantages, but the limitations of vaccination programs. Particular emphasis needs to be given on how to use these as an adjunct to management and not as a replacement for poor management.

Physical facility design. The design of the physical facilities should allow easy entry of animals and minimize the stress of handling and restraint during assistance. In addition, this should be a clean area that can be cleaned readily between animals. For the calf, dam, and attendant providing assistance, protection from the elements is most desirable. Being dry and warm will go a long way in encouraging the use of proper techniques in dystocia management. Preference on most operations, unless on very small herd size, is to have a separate delivery area and post-delivery stalls.

The delivery area should have a straight-sided head catch with side gates that are hinged on each side of the head catch to swing freely to either side with sufficient room to the sides and rear to allow assistance with the needed personnel or fetal extractor (Figure 1). A cement floor is recommended for cleaning purposes with access to both hot and cold water preferred. This may seem like a luxury, but may make the difference in optimizing calf survival.

Figure 1. Illustration of good head catch and swinging gates for restraint in the calf delivery area.



The post-delivery area should provide the ability to isolate the dam and calf to enhance pairing and bonding and observe the cow and calf for post-delivery problems. This area should have good drainage to allow cleaning and drying between animals as much as possible. In some areas, having a side of the post-delivery area exposed to the sun or at least accessible to the sun will enhance drying and decrease contamination buildup. Liming of these stalls between calves has also proven beneficial.

Calving shed management. Minimizing losses in the calving shed requires a thorough understanding of the procedures by all of the calving crew. On most operations this is a very effective area where personnel training will have a large impact. Most large operations have a labor turnover and small operations sometimes don't see enough problems to feel comfortable handling them. This training starts with the establishment of guidelines of both the observation of calving animals and for intervention in the calving process. This should include a thorough discussion of the stages of labor and their relationship to calf losses. These guidelines need to be established to fit within the economic restraints of the individual ranch and biological efficiency of the cow herd. Full-time cow/calf operations usually can provide almost full-time observation of their heifers but may fall short of adequate in mature cows. Some of the guidelines we recommend are:

1. Minimum observation of every three hours.
2. Once a cow/heifer is in stage II of calving to observe more closely until calf is delivered.
3. Intervention if:
   a) Heifer in stage I over 8 hours; mature cow 4 hours.
   b) Heifer in stage II and trying for over 30 min-1 hour and making no progress.
   c) Heifer/cow has ceased to try for over a 15-20 min. period.

Personnel training of common obstetrical problems is essential. This includes not only presentation, position, and posture of the fetus, but also the amount of traction, direction of pull and tests for delivery. These all play a role in the understanding of the best option for optimizing calf survival. In addition, the recognition of unusual calving situations needs to be clarified. Once intervention is made the guidelines for professional assistance is made on the basis of the following suggested rules:

1. Don't know what problem they are dealing with!
2. Know the problem and the solution but know they are unable to handle it!
3. Know the problem and the solution; have tried and simply made no progress in 30 minute period! Further delays will simply put the calf in jeopardy.

If these rules are followed the survivability opportunities of the calf and dam are maximized.

Proper post-calving care is necessary, particularly on assisted deliveries. Regarding the calf, neonatal care starts with understanding the factors that will optimize passive immunity transfer. The problem is not just one of colostral intake, but a combination of colostral intake, immunoglobulin absorption, and with heifers mothering-up or bonding properly. This includes personnel training in the delivery systems, timing of delivery and volume of colostrum. Because of the influence of dystocia on immunoglo-

bulin absorption, it is a sound recommendation to advise the dam be milked and the calf fed immediately after delivery in assisted births. This recommendation on all births is probably unwarranted, but those calves that are assisted are in a high risk category for failure of passive transfer. How much colostrum should be fed? In general, we recommend milking out what the heifer is able to give freely. In beef heifers, this amounts to about 1½ quarts or liters. In older cows, we may limit outselves to approximately this volume. Excessive volumes may result in calves not trying to nurse their mothers as soon and in heifers may play a role in proper bonding.

The next point to be made is the establishment of a record system that will function adequately for that individual operation. This system does not have to be elaborate but will serve as a reminder to check on individuals before potential problems arise. In fact, a simple three ring notebook as a calving record can be quite adequate. Minimal information that has proven to be beneficial in identification of the problem are:

a) Identification of cow and calf
b) Age of mother
c) Body condition score of mother at calving
d) Calving ease
e) Date and time of birth
f) First nursing time
g) Udder condition
h) Other informaton that would be helpful: size, breed, and birthweight

Treatment protocols for the various anticipated clinical problems of both the dam and the calf need to be part of the personnel training program. We suggest strongly they be put in written form and that established procedures of evaluation of the treatment programs be worked out. This requires attention to detail in the form of health records or treatment records which need to correspond with the calving records. In this way, the relationship of calving problems and future disease problems can be established more objectively for the client. The treatment protocols need to be geared toward the managerial level of the individual operation. The keeping of records is of little value unless time is spent after they are collected in the evaluation of the information to determine the success or limitatons of the current program.

Certainly other areas of management such as sire selection and pelvic measurements that affect calf survivability may need to be addressed in the overall management scheme. These also may fit very well into aspects of personnel training.

In conclusion, effective calving season management is by necessity a year long process. We need to be proactive in working with our clients in such a way if we are to optimize productivity and profitability for our producers.

Selected References

1. Bellows, R.A., Patterson, D.J., Burfening, P.J., Phelps, D.A. Occurrence of Neonatal and Postnatal Mortality in Beef Cattle II. Factors Contributing to Death. Theriogenology 28:573-586, 1987. 2. Holland, M.D., Odde, K.G., Johnson, D.E. Effects of Dietary Protein Intake in 2 year old Beef Heifers on Gestation length, Birth weight, and Colostral and Calf Serum Immunoglobulin Levels. Colorado State University Beef Program Report 1987. 3. Odde, K.G., Abernathy, L.A., Greatheuse, G.A. Effect of Body Condition and Calving Difficulty on Calf Vigor and Calf Serum Immunoglobulin Concentration in 2 Year Old Beef Heifers. Colorado State University Beef Program Report, 1986. 4. Patterson, D.J., Bellows, R.A., Burfening, P.J., Carr, J.B. Occurence of Neonatal and Postnatal Mortality in Range Beef Cattle I. Calf Loss Incidence from Birth to Weaning, Backward and Breech Presentations and Effects of Calf Loss and Subsequent Pregnancy Rate of Dams. Theriogenology 28:557-571. 1987. 5. Salman, M.D., King, M.E., Odde, K.G., Mortimer, R.G. Annual Disease Incidence in Colorado Cow-Calf Herds Participation in the National Animal Health Monitoring System from 1986-1988. JAVMA 198:962-967. 1991a. 6. Salman, M.D., King, M.E., Odde, K.G., Mortimer, R.G. Annual Costs Associated with Disease Incidence and Prevention in Colorado Cow-Calf Herds Participating in Rounds 2 and 3 of the National Animal Health Monitoring System from 1986 to 1988. JAVMA 198;968-973, 1991b.