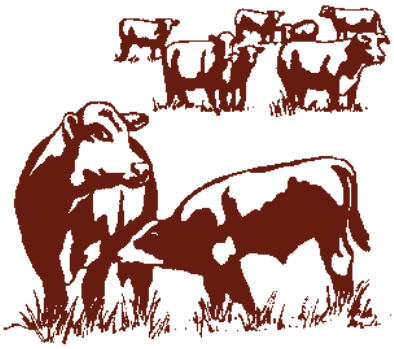
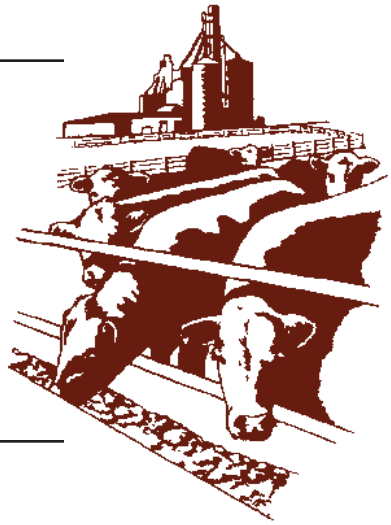


Beef Cattle Handbook



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Management Factors to Improve Health in Newborn Calves

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Introduction

For most beef cow herds, the single most important means of increasing income is increasing the number of calves weaned and sold, relative to the number of cows in the operation, or by definition, increasing reproductive efficiency. While certain production and carcass traits can be most directly influenced by genetic selection, reproductive performance is overwhelmingly influenced by management. Increasing the profitability of a ranch operation therefore relies very heavily on adjusting management practices to improve reproductive efficiency, especially one aspect—calf survival.

The aims of this paper are to highlight the factors that commonly affect calf health and survival, identify the management practices that influence them, and evaluate how effectively we institute these practices at present. There is considerable information available about management factors that improve calf survival, but much of it is not being employed.

Causes Of Calf Loss

Several large scale studies have surveyed the causes of reproductive inefficiency and calf loss. Similar trends are consistently found. The two overwhelmingly important causes of decreased reproductive performance are cows that fail to become pregnant, and calves that die within the first two to three weeks after birth. This paper will focus on the loss of neonatal calves.

The most recent (92 - 93) large scale survey of cow-calf production the Cow/Calf Health and Productivity Audit (CHAPA) was conducted by the USDA, Animal and Plant Health Inspection Service, Veterinary Services as part of the National Animal Health Monitoring System. The 18 states surveyed represented 71 percent of the national beef cow inventory, with at least 50percent of calves being born from January to June, and having five or more cows or heifers. Results of this study will be highlighted to illustrate some of the management areas that cow-calf producers need to consider more carefully in order to reduce calf losses.

Why are calves are lost? Most studies show average mortality estimates from birth to weaning of 8 - 10 percent of all calves delivered. The majority of calf loss occurs at or near birth. More than 50 percent of the losses occur within 24 hours of birth, about 70 percent occur by three days of age and about

75 percent occur within the first week. The CHAPA survey showed similar results with an overall death loss of 4.7 percent by 24 hours of age and 7.2 percent by three weeks for calves born in the first six months of 1993. Thus, the period of highest calf loss is within the first several days after delivery, and the vast majority of losses occur during the neonatal period (first three to four weeks of life).

Dystocia is the single most commonly identified direct cause of the early losses (Fig 1). Attributing calf deaths to other specific causes is difficult because many factors often interrelate to contribute to calf death. Such factors include environmental conditions, maternal nutrition, mothering and bonding, age of the dam, calf vigor, calf body heat production, colostral quality, maternal immunoglobulin transfer to the calf, and infectious disease.

Drawing from the results of a variety of studies, we can conclude the following important points:

1. Dystocia is the number one contributor to calf death.
2. Dystocia can affect calves severely enough to cause mortality directly, or can contribute to other problems and indirectly increase calf death.
3. Heifers have a higher incidence of dystocia than mature cows, and calves from heifer-dams have increased death loss.
4. Environmental conditions such as cold, wind, and moisture increase calf death.
5. Calves affected by dystocia or other maternal health problems such as deficient or excessive body condition, adapt poorly to life outside the uterus and succumb to environmental problems more easily.
6. Poor maternal nutrition reduces calf vigor, calf body heat production, and calf immunoglobulin absorption.
7. Infectious disease problems increase in calves with dystocia, calves that initially adapt poorly to life outside the uterus, and calves with poor maternal immunoglobulin absorption.
8. Infectious disease is the most important cause of death in calves greater than three days old.

Influence Of Management

As mentioned earlier, reproductive performance is most directly affected by management. The single most important cause of dystocia is disproportion between calf size and pelvic size (i.e. the calf is too large for the pelvic size of the dam). Therefore, the occurrence of dystocia can be dramatically reduced by management that ensures an adequately sized maternal pelvis and a reasonably sized calf. Selection of heifers for breeding should include an assessment of overall size and pelvic dimensions. Selection of bulls for breeding, especially to replacement heifers, should include a heavy emphasis on calving ease through use of birth weight EPDs. Dams, especially replacement heifers, should have appropriate prepartum nutrition to ensure adequate growth and body condition maintenance.

While management can decrease the incidence of dystocia, the problem cannot be entirely eliminated. The adverse influence of difficult delivery on calf survival can be significantly reduced by prompt and appropriate intervention at the time of calving. This requires close observation for signs of prolonged delivery, accurate assessment of the problem, and prompt and appropriate intervention to deliver the calf.

Just as dystocia cannot be completely eliminated by management, neither can the occurrence of calves with poor vigor be totally prevented. Even in the best of circumstances, some calves will not respond to birth optimally, and will be identified as weak, compromised, or poor-doing calves. Such calves will carry a higher risk of subsequent disease and death. Their chances of survival can be substantially improved if problems are detected early and they are properly cared for. Supportive care procedures for these calves include warming and drying, providing shelter, administration of high quality colostrum, encouraging maternal attention and bonding, and supplemental feeding in some cases. Because the risk of these problems is higher in calves with difficult delivery, they can be anticipated before they occur and a regimen of supportive care can be routinely employed. Thus, all calves affected by dystocia can be promptly dried and warmed, fed colostrum milked from the dam, placed in a warmed and sheltered environment, and penned with the dam for a period of time, even if the delivery problem did not seem severe and the calf did not initially appear to be badly affected. In summary, management to improve newborn calf health should:

1. Aim to decrease the incidence of dystocia.
2. Minimize the impact of dystocia on the calf.
3. Promptly identify and provide care to weak newborn calves whether or not dystocia has affected the calf.

Evaluation Of Current Management

Once we know the factors that contribute to calf losses, we should be able to develop a management plan to solve the problems that negatively influence reproductive efficiency. In a general sense, this exercise is not particularly difficult. Numerous management procedures have been evaluated that can effectively combat the problems described above. Realistically, however, each ranch has its own idiosyncrasies and no single management plan can be instituted to work equally well on all operations. Each rancher needs to evaluate carefully to see which problems are typical of their herd, to develop a plan of management to solve these problems, and to calculate the economic impact of these management changes. If the plan is to be effective, it must conform to the individual circumstances of the ranch.

Perhaps the most important first step in establishing management changes is to evaluate the current status of the herd. Specifically, we need to identify what the current management practices are and where current problems lie. We need to identify how closely the problems of an operation match those outlined above, then we can predict the effect of proposed management changes and finally, evaluate the real outcome. To this end, it is very important to have well established records of performance and to have accurate animal identification and tracking of performance. In this regard, findings from the Cow/Calf Health and Productivity Audit (CHAPA) study are very sobering; 28 percent of operations had no records at all, and approximately two-thirds of all operations maintain only handwritten records. Only 60 percent of operators individually identified cows, and even fewer (53 percent) individually identified baby calves.

There are certainly some individuals who maintain excellent handwritten records. Generally this type of record keeping is better suited for making individual animal decisions (e.g. culling an unproductive cow) than for evaluating herd level management (e.g. overall productivity, predicted outcome of a management change). There is an important difference between maintaining records and analyzing records. Analysis is the step needed to assess current status or to predict the future

effect of a change. For small herds, record analysis may be relatively straightforward and hand written records may be readily incorporated in the process. For larger herds, computer record keeping and analysis greatly simplifies the process. Operators should critically evaluate whether their record keeping system lends itself to analysis, and whether their records are effectively utilized in making management decisions. Relative to the questions surrounding newborn calf health, an operator should ideally be able to calculate the incidence of dystocia, undersized heifers, calf health problems, etc. In order to assess the current impact of these factors, subsequent production of affected individuals, compared with herdmates or desired outcomes, can be evaluated. Then the benefits of a management change that would be expected to change the outcome can be predicted. Such data manipulations are very difficult, and unlikely to be performed, using hand written information alone, except with small numbers of animals.

Recognizing the overall high impact of dystocia on calf production, we need to look hard at those management features that can decrease dystocia occurrence. Results from the CHAPA study illustrate that heifers have much higher dystocia rates than mature cows (Fig 2). Only 2.5 percent of mature cows required calving assistance. In contrast, over 20 percent of heifers required assistance, with 8.3 percent of heifers experiencing an easy pull delivery and 11 percent experiencing a hard pull. Cesarean section delivery was required in 1.2 percent of heifers. As expected, the impact of this dystocia rate is high. Mortality of calves within the first 24 hours of birth was 10.7 percent for calves from heifer dams, about three times higher than for calves from cows. Mortality of calves by three weeks after birth was 13.9 percent from heifer dams compared with 5.9 percent from mature cows.

Looking at the management procedures that can be useful in decreasing dystocia occurrence, the most direct and effective management tool is the use of calving ease sires. Matching modest birth weight with appropriate heifer size can dramatically decrease dystocia and associated calf losses. Only three percent of operations used pelvic measurement as a means of selecting replacement heifers. Only 7.9 percent of operations weigh the heifers, which is the simplest tool for evaluating growth and appropriate size for breeding (Fig 3). Breeding heifers earlier than the mature cows allows more intensive management of heifer deliveries during the calving season and provides additional time for the heifers to return to their next breeding after delivery, but if breeding early, it is very important to watch growth. Only 12.7 percent of operations breed the heifers two weeks or more before the adult cow herd. Despite the proven importance of body condition as an indicator of adequate energy nutrition for growing heifers, body condition scoring of replacement heifers was practiced on only 4.6 percent of operations. Furthermore, the heifers were fed separate from the cow herd to allow appropriate dietary modifications in only 31.8 percent of the operations surveyed.

Even with the occurrence of dystocia, calf survival can be enhanced by appropriate calving management procedures. Prompt delivery assistance is extremely beneficial, and intervention is recommended if the delivery exceeds 60 - 90 minutes, or earlier if steady progress is not observed. In the CHAPA study, the average number of hours animals were allowed to labor before assistance was provided was 2.9 hours for heifers and 2.6 hours for cows. Approximately half of the operations allowed one to two hours before assistance, 32 percent of the operations allowed three to four hours of labor, and 13 percent of operations allowed five or more hours before assistance was provided to calving heifers. These shortcomings likely reflect a lack of observation of the pregnant cattle more than anything else (Fig 4). The average number of times that cattle were observed within a 24 hour period was 2.9 times for heifers and 1.9 times for cows. Only 16.4 percent of operations observed heifers five or more times per day for possible delivery problems. About 22 percent of operations observed heifers three to four times, and 57 percent of operations observed them one to two times per day. Almost five percent of operations observed heifers less frequently than daily during the calving season.

Although it has been well established that nutrition can have far reaching effects on calf survival, the percent of operations calculating a winter feed schedule based on animal requirements and feed quality was only 48.7 percent and only eight percent utilized a laboratory forage analysis to make nutritional decisions. Research has shown that reaching a target, yearling breeding weight of 65 percent of mature weight will help reduce later calving difficulty while assuring optimum conception rates. A calving weight of 85-90 percent of mature weight needs to be the next nutritional target. The heifers' body condition at calving, level of protein and energy fed immediately pre-calving will impact calf vigor, level of passive immunity achieved and, thus contribute greatly to calf survivability. Without measuring nutrient value of harvested forages, the primary component of a nutrition program, the producer is severely disadvantaged for developing a cost efficient feeding program to meet animal growth requirements.

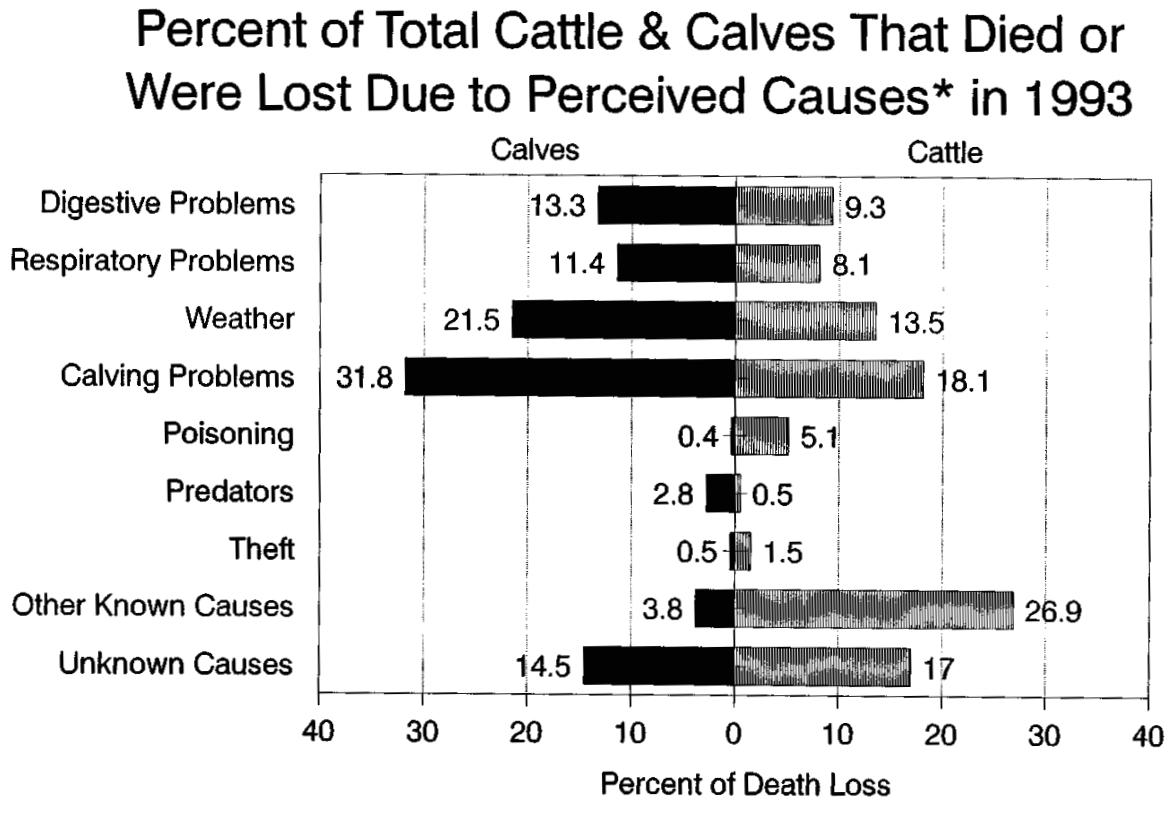
Environmental conditions can have a tremendous impact on calf survival. Adverse weather conditions can take a heavy toll on newborn calves, while increased crowding can encourage the spread of infectious problems. As a result, calving location and time of year of the calving season are particularly important management issues. During bad weather, calves may require additional shelter, but the additional or close confinement may contribute to the spread of disease. Choosing the time of year in which calving takes place would seem to be a very important management decision. This decision alone will determine what type of needs an operation will have for natural or man-made shelter, how intensively the shelter will be utilized and, in turn, how crowded the operation is likely to become during the critical neonatal period of a calf's life. With this in

mind, it is interesting to note that 52.7 percent of operations had no set calving season. The percentage of operations using certain factors for setting a calving season include the market cycle (4.9 percent), maximum age/weight at weaning (5.2 percent), forage availability (5.6 percent), tradition (11.9 percent), labor availability (2.9 percent), time of cattle movement (0.8 percent), weather (14.2 percent), and other factors (1.8 percent). It may be time for many operators to think through the pros and cons of a different calving time since 65 percent of the calves considered in the CHAPA study were born during the months of February, March and April when harsh weather conditions are very likely and native pasture feed availability is scant.

Considering the likely spread of infectious disease to newborn calves when animals are confined together, it is interesting that only 15 percent of operations separate cow-calf pairs from the pregnant cow herd within one week of delivery. There are numerous interplays between the needs for close observation of delivery, shelter from harsh environmental conditions, and the undesirability of crowding. Considering the previous information about the time of calving season, it is interesting to note that 41.6 percent of calves are born in a calving pasture or calving lot, less than one percent of calves are born in an individual calving pen, and 2.9 percent are born in a covered shed. In addition to what these data tell us about infectious disease spread and exposure to harsh environmental conditions, they also provide food for thought about the operator's preparedness to promptly identify poor-doing calves and provide additional supportive care.

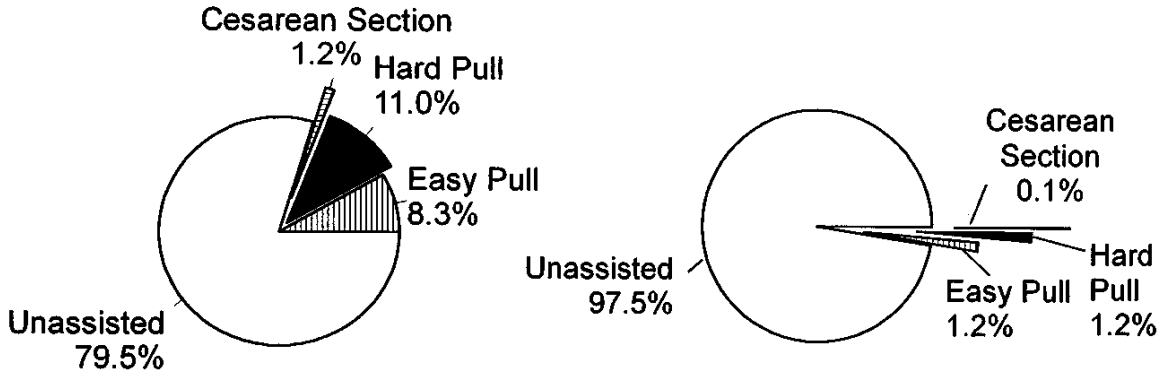
Summary

Improvements in newborn calf survival can have a very beneficial effect on reproductive efficiency, and consequently the profitability of an operation. Furthermore, calf survival is most directly influenced by certain management practices. While many interrelated factors can be involved in newborn calf survival, most studies show a very consistent pattern of factors that contribute to newborn calf survival. Management practices that decrease the rate of dystocia, that lessen the impact of dystocia on the calf, and that identify and provide care for compromised or sick calves are the most important means of improving overall calf survival. Recent survey data suggest that many management practices that could have a favorable impact on calf health are not extensively employed.



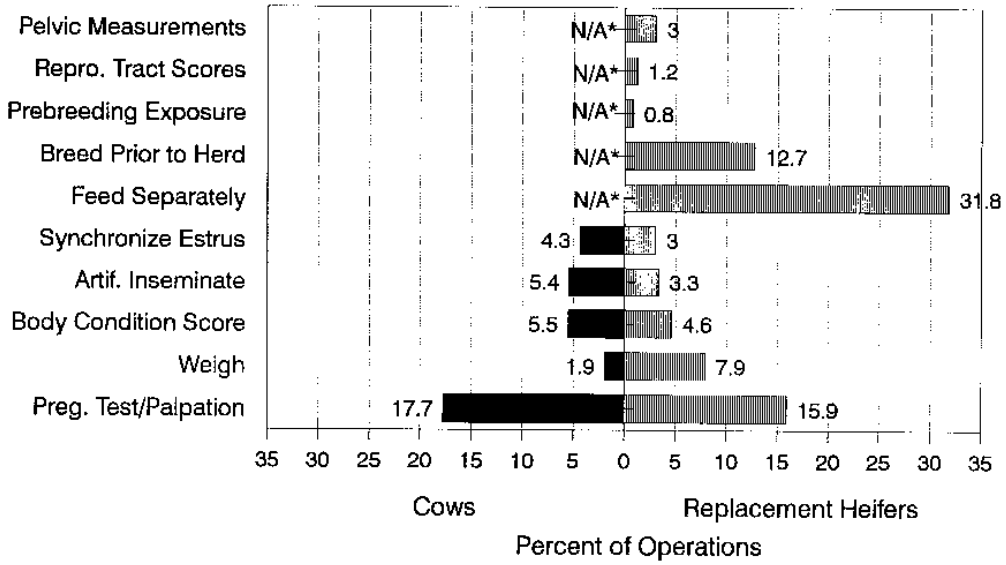
*Owner-attributed causes.

Percent of Females Requiring Assistance During Calving

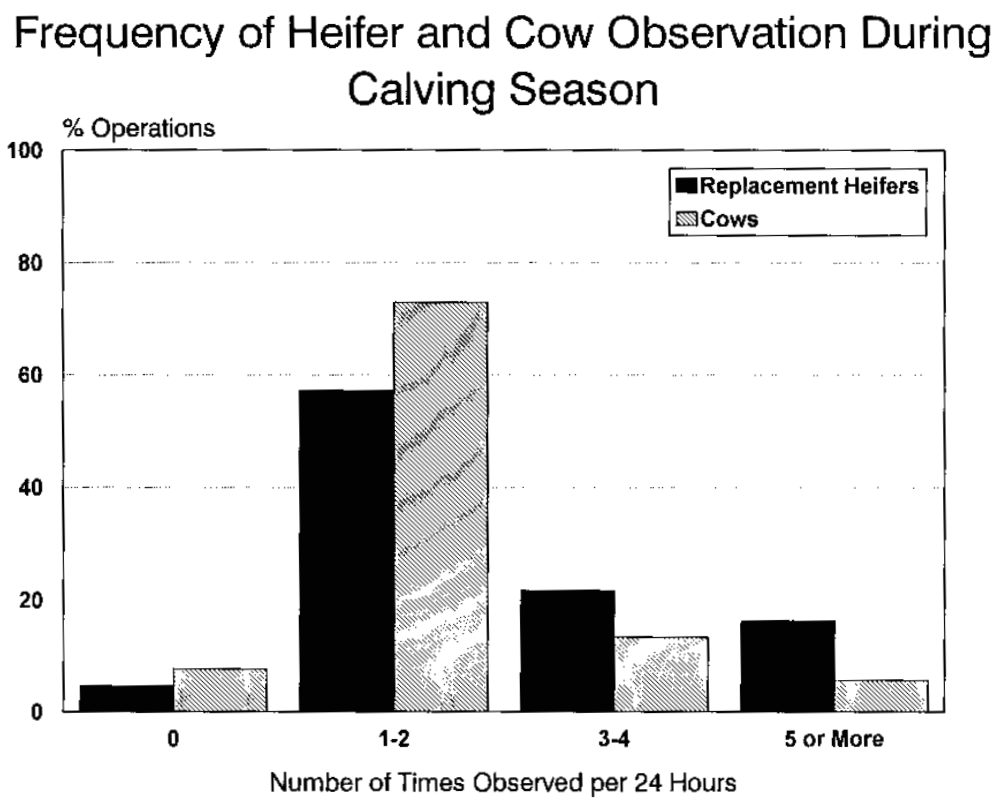


Replacement Heifers **Cows**

Percent of Operations Using Selected Management Procedures on Cows & Replacement Heifers in the Last 12 Months



*N/A = Information not available.



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