

Calving Intervention on U.S. Dairy Operations, 2007

Calving difficulty—or dystocia—costs the U.S. beef and dairy cattle industries more than \$400 million annually.¹ Besides the potential outcome of losing both the calf and the dam, dystocia has detrimental effects that can undermine animals' health and reduce productivity. Calves that survive a dystocia are more susceptible to disease and slower to grow, and dams that experience a dystocia might be culled earlier, produce less milk, and rebreed later than cows that calve unassisted.^{2,3}

Many factors contribute to calving difficulty. For heifers, an important factor is the relationship of the calf size to the heifer size. In cows, dystocias are often related to multiple fetuses or malposition of the fetus.

Appropriate sire selection and nutritional programs can help reduce dystocias related to maternal/fetal size disproportion. Other causes of dystocia, such as multiple fetuses, abnormal calf position, and uterine torsion, are unpredictable and necessitate appropriate intervention to increase the likelihood of a successful outcome.

This information sheet provides baseline information about calving interventions on U.S. dairy operations collected during the Dairy 2007 study, conducted by the National Animal Health Monitoring System (NAHMS). NAHMS administered the study of health and management practices in 17 of the Nation's major dairy States,* which represented 79.5 percent of U.S. dairy operations and 82.5 percent of U.S. dairy cows. The operations were divided into 3 herd-size categories based on the number of milk cows present: small (fewer than 100 cows), medium (100 to 499 cows), and large (500 or more cows).

Calving assistance on U.S. dairies

A lower percentage of heifers (69.0 percent) than cows (79.4 percent) calved unassisted during the 12 months preceding the NAHMS study interview (table 1). A higher percentage of heifers than cows experienced severe dystocia (6.8 percent of heifers and 3.5 percent of cows) or mild dystocia (11.8 percent of heifers and 7.3 percent of cows).

*States/Regions:

- **West:** California, Idaho, New Mexico, Texas, and Washington
- **East:** Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Vermont, Virginia, and Wisconsin

Table 1. Percentage of Heifers and Cows That Calved During the Previous 12 Months, by Calving Difficulty:

| Calving Difficulty | Percent Heifers ¹ | Percent Cows ² |
|---|------------------------------|---------------------------|
| Severe dystocia (surgical or mechanical extraction) | 6.8 | 3.5 |
| Mild dystocia | 11.8 | 7.3 |
| No dystocia, but assistance provided anyway | 12.4 | 9.8 |
| No assistance | 69.0 | 79.4 |
| Total | 100.0 | 100.0 |

¹As a percentage of dairy cow replacements entering the milking herd in 2006.

²As a percentage of cows on the operation at the time of VS Initial Visit interview.

Guidelines and training

Although proper management can reduce the frequency of dystocias due to maternal/fetal disproportion, dystocias will still occur and must be handled properly and in a timely manner to produce the best outcome.

Guidelines, such as those developed by Colorado State University, are available to help producers and employees know when and how to assist with calving problems.^{4,5} Intervening too early or too late in the calving process can cause injury or death to the dam, the calf, or both. Usually, recommendations for intervention are slightly different for heifers and cows.

About 60 percent of operations had guidelines (e.g., standard operating procedures) on when to intervene during calving for heifers and cows. There were no differences in the percentage of operations with calving guidelines by herd size or region. For operations with guidelines for both heifers and cows, about one-half of the operations used different guidelines for heifers and cows.

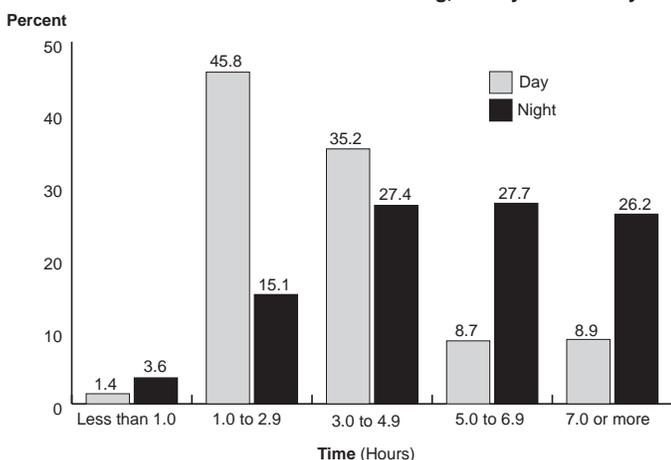
More than 90 percent of operations provided training in calving intervention for owners/employees of the operation. Most operations (90.4 percent) used on-the-job training in calving intervention. About one-quarter of operations provided training through discussion and/or lecture. Some operations used more than one method to train owners/employees in calving intervention.

Observation of animals close to calving

Ideally, heifers and cows close to calving would be observed at all times, but this is not practical or even possible for many operations. Generally, however, no more than 3 hours should pass between observation periods.⁵

Cows and heifers close to calving were observed more frequently during the day than at night (figure 1). About one-half of operations (47.2 percent) allowed less than 3 hours, on average, to pass between observations during the day, with 17.6 percent of operations allowing 5 hours or more between observation periods. During the night, 18.7 percent of operations allowed less than 3 hours to pass between observations, and 53.9 percent of operations let 5 hours or more pass between observation periods.

Figure 1. Percentage of Operations by Average Time Between Observation Periods of Cattle Close to Calving, and by Time of Day



Although the normal calving process is classified into three stages, the process is continuous and proceeds gradually from one stage to the next. Recognizing these stages and knowing when it is appropriate to intervene are critical in achieving a positive outcome for both dam and calf.

Stage 1 Labor. Stage 1 is characterized by cervical dilation and uterine contractions, which usually are not evident as abdominal contractions. Because of discomfort from the uterine contractions, heifers and cows in stage 1 labor are often off feed and appear restless. Stage 1 usually lasts 2 to 6 hours but may last longer in heifers.

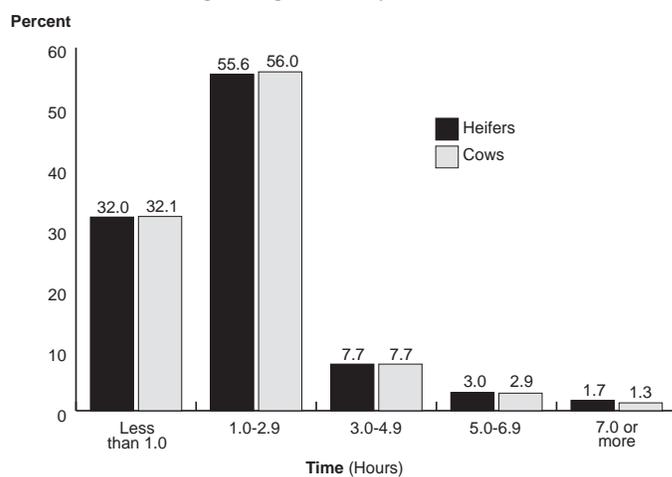
The majority of operations (63.1 percent for heifers and 61.9 percent for cows) would examine or assist an animal within 5 hours if she showed signs of stage 1 labor without subsequent straining. More than one-quarter of operations (27.0 percent for heifers and 27.7 percent for cows) would wait 7 hours or more to examine or assist an animal that exhibits signs of stage 1 labor without subsequent straining.

Stage 2 labor. During stage 2, which includes the appearance of the amniotic sac (or water bag) in the vulva, uterine contractions continue and abdominal

contractions become evident. Stage 2 ends in the delivery of the fetus(es) and usually takes less than 2 hours for mature cows but up to 4 hours for heifers. Once straining is observed, the animal should be assessed if she is not making good progress in delivery within 2 to 3 hours for heifers and 1 hour for cows.

More than 85 percent of operations wait less than 3 hours to assist heifers or cows that are observed to be straining but are not progressing in delivery of the calf (figure 2).

Figure 2. Percentage of Operations by Length of Time Producers Would Wait to Examine or Assist a Heifer or Cow that has Begun to Strain but is not Progressing in Delivery of the Calf



About 95 percent of operations reported that they examine or assist heifers and cows within 3 hours of the water bag appearing at the vulva. Almost one-half of operations would assist heifers and cows within 1 hour of the water bag appearing.

Stage 3 labor. The fetal membranes (placenta) are expelled in stage 3. If the membranes have not passed within 12 hours of calving, treatment might be needed to facilitate passage.

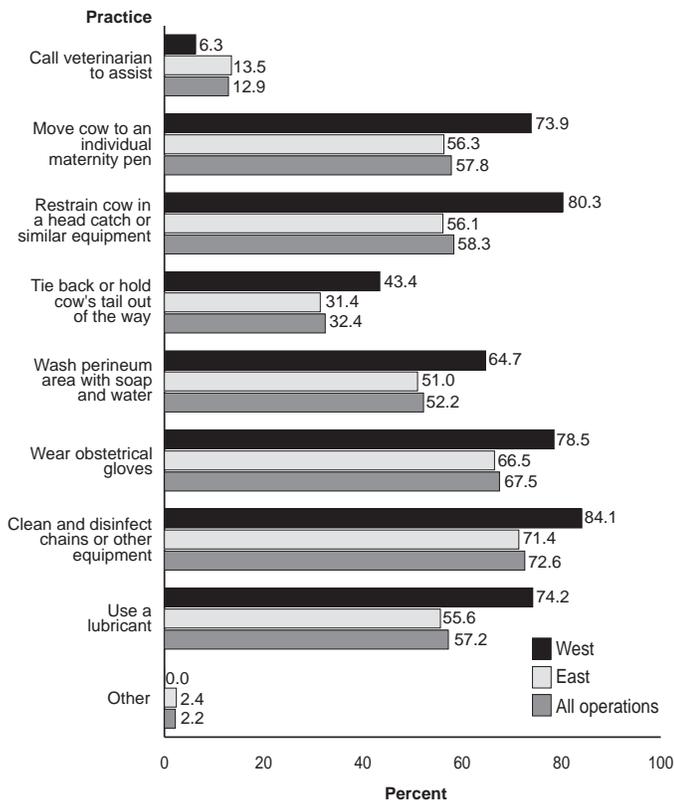
Calving interventions

The practices listed in figure 3 provide measures that can facilitate the hygienic delivery of the calf while preventing infection or injury to the dam. Their use is generally recommended during calving intervention.

More than 50 percent of operations reported that they generally implemented the recommended practices, except for calling a veterinarian to assist or tying or holding the tail out of the way (figure 3).

Use of three of the recommended calving intervention practices differed by region. A higher percentage of operations in the West region than in the East region would generally move the cow to an individual maternity pen (73.9 and 56.3 percent, respectively), restrain the cow in a head catch or similar equipment (80.3 and 56.1 percent, respectively), or use a lubricant (74.2 and 55.6 percent, respectively).

Figure 3. Percentage of Operations by Practice Generally Implemented Once a Decision is Made to Intervene in Calving, and by Region



During dystocia, additional lubricant can help in delivering a healthy calf and in protecting the dam from trauma. Mineral oil, soap, commercial obstetrical lubricant, and shortening may be helpful; water used alone is not. The recommended choice is a commercial obstetrical lubricant mixed with water and used generously.

More than 50 percent of operations that reported generally using a lubricant during calving intervention used a commercial lubricant, soap, or water with other lubricant.

Any instrument used to assist with a difficult delivery should be easy to sanitize, especially instruments that are used inside the vagina and uterus to deliver calves. Most operations (71.1 percent) used stainless-steel OB chains for pulling calves; these chains are easy to sanitize and are recommended for use. Almost one-half of operations (49.6 percent) used twine to pull calves, while 22.1 percent used rope.

The amount of pressure exerted on the calf during an assisted delivery can be enough to cause injury or death to the cow and calf. Studies have reported that two strong people can exert a force of 400 to 600 lb while delivering a calf, whereas a calf jack can exert 2,000 lb of force.⁶ If two strong people can't deliver a calf manually, then an alternative delivery method, such as a C-section for live calves or a fetotomy for dead calves, is usually recommended.

On more than one-half of operations (53.7 percent), the method most commonly used to apply traction to deliver the calf was one or two people pulling on the chains, rope, or twine. About one of five operations (22.0 percent) used a calf jack to apply traction. A higher percentage of small operations than large operations used a block and tackle (5.9 and 0.2 percent, respectively). A higher percentage of medium and large operations used a calf jack (34.3 and 37.0 percent, respectively) compared with small operations (16.1 percent).

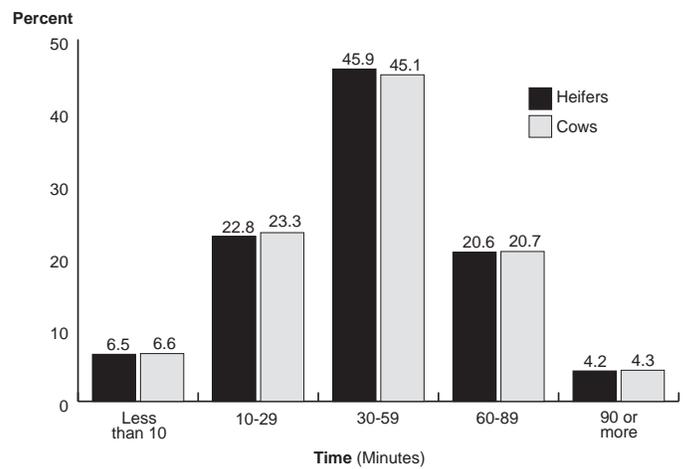
To reduce the possibility of injury to the dam during calving intervention, traction should be applied only when the dam is straining. More than three of four operations (77.3 percent) reported that traction is generally applied in conjunction with the dam straining.

Veterinary assistance

Although 12.9 percent of operations routinely call a veterinarian to assist once a decision is made to intervene during a difficult calving (figure 3), almost all operations (94.8 percent), regardless of herd size or region, sometimes seek veterinary assistance for difficult calvings.

The best chance of ending up with a live calf and a healthy dam after a difficult calving requires that the method being used be reassessed if no progress is made within 15 to 20 minutes. Longer intervention times, without veterinary assistance, can lead to death of the calf and possibly of the dam. The length of time operations intervened before calling for assistance was about the same for both heifers and cows. About 30 percent of operations would call for veterinary assistance within 30 minutes of intervening in a calving (figure 4). The highest single percentage of operations would seek assistance within 30 to 59 minutes of intervening for both heifers and cows.

Figure 4. For Operations that Ever Seek Veterinary Assistance for Difficult Deliveries, Percentage of Operations by Length of Time from Beginning Intervention During Calving Until Calling for Veterinary Assistance



Assistance for compromised calves

Although calves experiencing a dystocia are more likely to be stillborn and suffer subsequent health problems, calves that are born alive can be given assistance to increase their chances of survival.

Calves that survive dystocia are likely to have low levels of oxygen in their blood, and their blood pH is frequently acidic instead of neutral. These impairments can lead to other problems, such as decreased ability to nurse, decreased absorption of IgG, and inability to regulate temperature. After a difficult calving, efforts to dry and warm the calf, stimulate muscular activity and movement, provide shelter from weather, feed warm colostrum, and supplement intranasal oxygen can substantially increase calf survival.

On 80.7 percent of operations, a calf that experienced a dystocia would receive nostril stimulation to initiate breathing. The calf would be hung upside down on 66.3 percent of operations. Hanging the calf upside down—once promoted to help remove fluid from the calf's lungs—might actually be harmful for two reasons: most of the liquid comes from the abomasum and not the lungs, making the calf more susceptible to dehydration; and hanging the calf upside down increases pressure on the chest, making it more difficult for the calf to breathe. Three of the practices that are simple to perform and don't require special equipment or materials—positioning the calf on its sternum, drying the calf manually with towels or a hair dryer, and trying to elicit a suckle response—were performed by at least one-half of operations. Few operations (1.4 percent) would provide supplemental oxygen.

Use of some of these practices varied with the size of the operation. Almost two-thirds of large operations resuscitated the calf via assisted breathing, compared with about one-third of small and medium operations. A higher percentage of small and medium operations (61.5 and 55.6 percent, respectively) than large operations (27.4 percent) dried the calf manually with towels, hair dryer, etc. Additionally, a higher percentage of small and medium operations (45.8 and 58.5 percent, respectively) provided calf coats or calf jackets compared with large operations (26.6 percent).

Conclusion

The effects of dystocia on calves are well known and are associated with increased stillbirths, morbidity, and mortality. To minimize and mitigate these negative consequences, producers should establish protocols for handling a dystocia and implementing practices to aid both dam and calf. Operations with employees should provide written calving-intervention guidelines and thorough training in calving management for employees.

References

1. Agricultural Research Service. Helping heifers calve easier. *Agricultural Research* July 2001. Accessed November 2008. <http://www.ars.usda.gov/is/AR/archive/jul01/calve0701.pdf>
2. Lombard JE, Garry FB, Tomlinson SM, Garber LP. 2007. Impacts of dystocia on health and survival of dairy calves. *J Dairy Sci* 90:1751-1760.
3. Tenhagen BA, Helmbold A, Heuwer W. 2007. Effects of various degrees of dystocia in dairy cattle on calf viability, milk production, fertility and culling. *J Vet Med A Physiol Pathol Clin Med* 54:98-102.
4. Integrated Livestock Management. Determining if the Cow/Heifer Needs Your Help. Colorado State University. Accessed November 2008.
5. Mortimer RG. Calving and Handling Calving Difficulties. Accessed November 2008. <https://beef.unl.edu/documents/herd-health/2015-Calving-and-Handling-Calving-Difficulties-December-2017.pdf>
6. Mortimer RG. Abnormal calving—pulling the calf. Material edited from the Calving Management Manual. Accessed November 2008. http://www.ansci.wisc.edu/jjp1/ansci_repro/lab/lab13_09/calving/abnormal.html

For more information, contact:

USDA:APHIS:VS:CEAH
NRR Building B, M.S. 2E7
2150 Centre Avenue
Fort Collins, CO 80526-8117
970.494.7000
E-mail: NAHMS@aphis.usda.gov
<http://www.aphis.usda.gov/naahms>

#547.0209

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Mention of companies or commercial products does not imply recommendation or endorsement by the U.S. Department of Agriculture over others not mentioned. USDA neither guarantees nor warrants the standard of any product mentioned. Product names are mentioned solely to report factually on available data and to provide specific information.