

Dairy Calf Management Practices Impact Future Production



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Gone are the days when growth and health of dairy calves are the only important outcomes expected with successful calf management programs! We now understand that these programs also impact a calf's future performance. Known as perinatal programming, management and nutritional practices during early life have three to seven times more influence on future milk production than sire selection. Our understanding in this area has increased in recent years and this will continue to be an actively studied area. Consequently, the role of certain management practices which control or impact future performance will become better understood along with a continual refinement of recommended nutritional and management practices in heifers prior to puberty. When implementing practices on farm, understanding the reasons behind these practices, why they have changed over time, and how they can impact future performance are important parts of managing heifer programs.

Colostrum intake

Feeding four quarts of high quality colostrum within six hours of life is important for healthy calves. Antibodies are not absorbed across the placenta because of the multiple tissue layers between the blood supply to the placenta and uterus. Thus, calves must absorb antibodies found in colostrum for early life immunity against diseases. Failure to absorb an adequate amount of IgG antibodies is known as failure of passive transfer. Calves which do not absorb adequate IgG antibodies have lower weight gain, increased risk for disease and death, and decreased milk production during their first lactation.

Colostrum important for more than healthy calves

Researchers estimate that feeding four versus two quarts of colostrum to large breed calves may increase milk production by 2,500 lbs. or more during the first lactation. This production response is related to nutrients and other components found in colostrum, in addition to the antibodies. Colostrum contains growth factors, hormones and other biologically active factors

which positively impact the development of the digestive tract. These components of colostrum, in turn, enhance the uptake and utilization of nutrients, especially those associated with providing energy. This positive effect continues throughout this calf's life.

Calves are born with an immature immune system

Newborns have an immature immune system which takes 6 months or more to fully mature. Essentially, their immune system has “no memory” and, as a result, does not respond well when faced with a disease challenge. Maternal antibodies from colostrum are essential to protect the newborn for at least the first 2 to 4 months of life. However, these maternal antibodies can interfere with a calf's ability to respond immunologically to traditionally administered vaccines. To avoid the influence of maternal antibodies, intranasal vaccines can be used to vaccinate young calves to reduce the risk of respiratory diseases. Intranasal vaccines elicit a local immune response within the mucosa of the calf's nose and provide for a quick immune response, thus providing disease protection for the calf. These vaccines unfortunately only provide short term protection, usually less than 30 days.

Pre-weaning growth rate impacts future milk yield

A majority of studies have shown that higher pre-weaning average daily gain positively impacts first-lactation milk yield. Scientists from Cornell University estimated that for each pound of daily gain, milk production increased by 1,540 lbs. in the first lactation or 6,000 lbs. over three lactations. They suggested that calves should double their birth weight by 56 days of life in order to achieve milk production responses from early life nutrition. In an analysis where many studies were evaluated, Gelsinger and others at Penn State University concluded that pre-weaned calves with average daily gains greater than 1.1 lbs./day have greater first-lactation milk yields. Obviously, appropriate growth post-weaning also is needed to capitalize on this improvement in milk production during the first lactation, and other management practices can impact performance later in life.

Calves born to heat-stressed dams absorb fewer antibodies

Heat stress to the dam does not alter the concentration of IgG or antibodies in colostrum. However, calves born to heat-stressed dams absorb fewer antibodies, resulting in higher rates of failed passive transfer. Thus, reducing heat stress in dry cows impacts not only the body size of newborn calves, but also their potential health.

Calves treated with antibiotics give less milk

A study showed no difference in first-lactation milk production between calves with or without diarrhea; however, scouring calves treated with antibiotics gave 1,086 lbs. less milk during their first-lactation than those not treated (Soberon and others 2012). These data do not indicate that antibiotics should not be used when needed, but that prolonged damage to the intestinal tract or other complications may occur. Besides scours, respiratory disease is a common problem in calves. Dr. McGuirk (University of Wisconsin) estimates that three to four times more calves are affected with respiratory problems than are treated or identified by producers. Studies have shown decreased growth, decreased survival to first calving, and increased age at calving in calves with respiratory disease within the first 60 days following movement to group housing (Stanton and others, 2012). Vaccines, minimizing stress, and providing proper ventilation in the microenvironment around the calf without causing drafts are important components in preventing respiratory illness.