

Calf Housing and Environments Series

I. The Calf's First Environment – The Maternity Pen

There is no question that the first 24 hours of a calf's life are the most critical. Newborn calves have an immature immune system, providing pathogens easy access. The USDA reports that young calves have the highest rates of morbidity and mortality than any other age group on the dairy (USDA, 2010). Knowing that, it makes sense that calving should take place in an environment that gives them the best start. In this factsheet, the first 24 hours of the calf's life, in relation to its environment, health, and welfare, will be discussed along with recommendations to keep calves healthy.

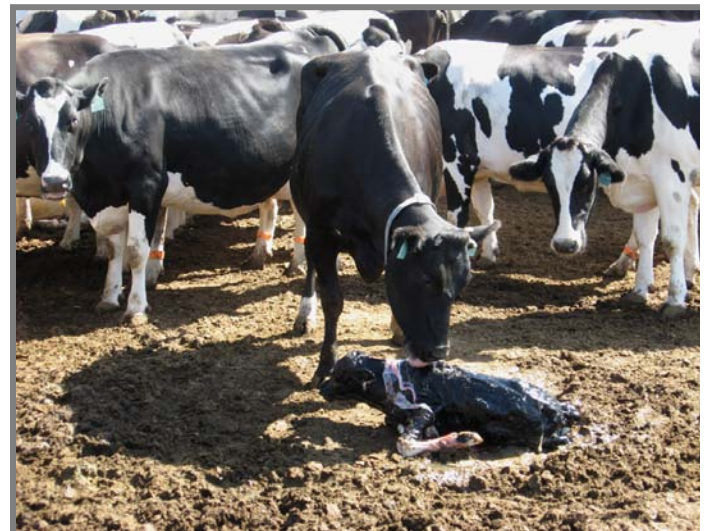
Most dairy producers have a separate calving area (USDA, 2010) because it allows workers to keep close watch over the cows to assist with calving, if needed, and may prevent injury to animals and workers (Croney et al., 2009). The main goals for the calving area are to minimize stress and disease. Calves born in maternity pens have lower mortality rates when compared to other indoor calving places (Waltner-Toews et al., 1986).

The maternity area should be disinfected, well-bedded (6 inches), and well-ventilated. The pen should provide 100-150 ft² for each cow (Graves, Engle, & Tyson, 2006; USDA, 2010) with flooring preferably of sand, dirt, or clay to aid in clean up and footing of the cow (Kammel & Graves, 2007). Whether using natural or mechanical systems, adequate ventilation is needed to reduce ammonia and hydrosulfide gases, moisture, microbes, and heat which can affect calf health (Moore, 1993). Adequate lighting is needed to allow for observation of delivery.

There are several options in regards to location and design of the calving area with the most popular being group and individual calving pens. Most producers in the US use a group calving pen (USDA, 2010).

Key Points

- **Have separate, clean, well-ventilated and lighted areas for calving**
- **Group calving pens need 100-150 ft² per cow**
- **Separate calf from the cow within 24 hours**



Example of a group calving pen

While there are variations to this system, the basic system is designed to hold 6-10 pre-parturient cows with each cow/calf pair removed just after calving (Graves, Engle, & Tyson, 2006). Many larger farms use this method with many more cows per pen because it is less labor intensive (Chastain, 2000) and fewer workers are needed to monitor expectant cows.



Example of an individual calving pen

Many authors believe that the individual pen is the preferred system (Kohlman, 2007; USDA, 2010), but to date there are no studies directly supporting this claim. There is a lower risk of *Salmonella* shedding of pre-weaned calves if they are born in individual areas (Losinger et al., 1995), but no significant difference in the occurrence of subsequent disease in preweaned calves from birth to 90 days of age born in individual vs. group calving pens. Other management practices probably play a more important role in calf health (Pithua et al., 2009). Single use calving pens with removal of feces, placental remains, and bedding materials, disinfection of floors, and placement of fresh bedding before the next cow enters are recommended (Pithua et al., 2009) but many farms successfully calve cows in group pens.

Separation of the Calf From the Cow -- Once the calf is successfully delivered, it must be fed colostrum, preferable within 6 hours. At this point, producers need to decide when to separate the calf from the cow. Reasons for early (before 24 hours) removal include: ensuring colostrum intake, reducing disease incidence, and reducing stress on both the cow and calf. Many calves remaining with their mother do not ingest adequate amounts of colostrum (Brignole & Stott, 1980). Hand-feeding colostrum to calves following early separation can be sure the calf is getting the best start.

Early removal of the calf is supported by studies showing reduced disease incidence. Calves left with cows for more than 2 hours had higher risk for infection, possibly due to exposure to large amounts of infectious agents in the maternity pen (Gulliksen et al., 2009). Separating the pair later increases risk for *Cryptosporidium* infection (Faubert & Litvinsky, 2000) and respiratory disease, which increase calves' risk of death by six times (Gulliksen et al., 2009). Whether because of inadequate colostrum intake or greater exposure to disease causing agents, many studies show a greater chance of dying if calves remain with the cow for more than 24 hours.

Contact time between the cow and calf increases their response to separation; the more time spent together, the more severe the response (Flower & Weary, 2003). Calves removed from the cow at four and seven days of age had faster heart rates for longer periods of time following separation than those separated early, indicating a higher stress level (Stehulova et al., 2008). It appears that calves experience less stress if they are removed from the cow earlier rather than later. From a socialization standpoint, it might be beneficial to keep calves with their mothers for longer than a day. Calves that stayed with their dam for two weeks after calving were more receptive of new calves (licked, butted or rubbed heads) (Flower & Weary, 2001) and displayed social behaviors (Flower & Weary, 2003). While there are some socialization benefits for keeping the calf with their mother, the risk or morbidity and mortality is higher and puts the cow and calf under more stress at the time of separation.

If the calf is separated early, the next concern is where to keep the calf until transport to the calf-rearing area. The newborn calf should reside in an isolated area of the cow barn or in a separate building (Clapp, 1981). If in individual housing, calves need 32 ft² of space and at least 28 ft² per calf with group housing (Stull & Reynolds, 2008). The resting area should have a comfortable, clean, dry surface to protect from cold temperatures, provide cushioning, and keep the coat dry (Gooch, 2000; Kohlman, 2007). These transition pens need routine cleaning, disinfection, and bedding replacement. To provide acceptable air quality, air exchange is needed and air supply should be unique to the calf housing area. For the very young calf, the thermal comfort level ranges from 15-25°C (59-77°F) (Clapp, 1981). To maintain these temperatures in the winter, the calf's coat needs to be dry and using a heat lamp is recommended. It is

important to keep the calf from experiencing cold stress because it increases its vulnerability to disease. To prevent cold stress there are several effective options: calf jackets, a hot box, or a warm water bath (Butler et al., 2006). Most sources report that the preferred option is to house newborns individually until they are moved to the calf-rearing area (Gooch, 2000; Kohlman, 2007; USDA, 2010), which lowers the risk of disease transmission, allows easier observation and eliminates competition for food.

Consideration of the environmental needs of newborns within its first 24 hours of life will provide them with a good start. Those needs are critical to the calf's health and welfare.

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Funded by USDA: National Integrated Food Safety Initiative # 2007-01877

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