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Calf Note #82 – Housing and behavior revisited

Introduction. In a previous Calf Note ([#64](#)), we looked at the effect of housing on animal behavior and later performance (milk production). The study that evaluated different housing methods (groups, hutches, isolation) did have an effect on behavior and performance – calves housed in isolation produced more milk after calving compared to calves housed in hutches or groups.

Well, this is an active area of research (particularly in Europe), so there's much more to be considered. Before going into this research, however, I should point out that in many parts of the world, animal behavior is a very important topic. In some countries, laws and regulations have been written that mandate how animals must be housed, managed and even fed to ensure that their behavior is as “normal” as possible. For example, EU regulations require that veal calves must be housed in groups and must be fed roughage during their growing period. Regardless of your position on veal calves or veal calf housing, it is important that we need to understand more about animal behavior and how it affects production and public policy. We need to know this before management practices are mandated to us by the government.

Calves are usually housed in separate housing (e.g., hutches) to minimize the risk of cross-contamination with pathogenic organisms. One of the primary reasons that calves are housed in hutches is to keep them from making each other sick. Research since the 1950's has documented reduced morbidity and mortality when calves are isolated to reduce the risk of transmission of pathogenic organisms. However, many people believe that, because calves are social animals, that they must be housed in groups to allow normal social behavior and social development.

A recent contribution to the question of housing and behavior comes from British Columbia. The researchers (1) compared the behavior and performance of 10 calves housed individually in hutches to 10 pairs of calves ($n = 20$) housed in group pens. All calves were fed milk replacer to weaning at 5 weeks of age and the study was completed at 8 weeks of age.

Calves in the study ($n = 30$) were raised on a closed herd, fed maternal colostrum from the dam (although the degree passive transfer status was not reported) and then moved into their experimental housing for 8 weeks. Calves were housed in individual pens (1.2×1.7 m) or group pens (2.4×1.7 m). Pens had solid wooden sides with openings in the front and rear. Calves housed individually could not contact other animals, although the method of ventilation (which could influence transmission of airborne pathogens) was not reported. Further, the methods (if any) of management to minimize transmission of pathogens (order of feeding, method of disinfection of pens, utensils, etc.) were also not reported.

What were the results of the study? The authors reported was no difference in intake, growth or other performance parameters in calves housed in isolation, although calves housed in groups ate more feed and gained more body weight during the week of weaning. There were, however, some

differences in behavior (measured by videotaping the calves periodically). Calves in group pens spent more time standing and moving (although all calves spent about 70% of their time laying down) and less time with their heads stuck out of the pen. Calves in group pens also engaged in “social” behavior about 2% of the time. There was no difference in mortality, nor in the incidence or severity of diarrhea (however, neither of the data were reported). From these results, the authors concluded that *“Housing young dairy calves in small groups appears to be viable in terms of calf health, performance, and behavior.”*

Based on my experience on dairy farms throughout North America, it is difficult to concur with this conclusion. While there may, in fact, be scenarios where group housing is appropriate and would be useful, I do not believe that we can recommend group housing in all cases. In the study in question, calves were (presumably) fed sufficient colostrum and were exposed to few pathogens prior to placement in pens. When animals are housed in very clean conditions – when individually or in groups -- the risk of infection is reduced. If group housing were to be an appropriate method of housing, it would be under conditions of adequate passive transfer and minimal pathogen exposure. However, in other, less well controlled conditions (calves with FPT, calves obtained from multiple sources, etc.) the risk of transmission of infectious organisms among calves would be much greater when they are housed in groups. These differences likely account for why animals housed in groups in this study did not transmit diseases when housed in groups, whereas many other studies have reported increased morbidity and mortality when calves are housed in groups.

The critical point is – the incidence of morbidity and mortality in preweaned calves is a function of **pathogenic exposure** and **disease resistance**, which is best estimated by the degree of passive immunity. When animals are fed large amounts of high quality colostrum and are managed to minimize pathogen exposure (e.g., disinfecting utensils, conscientious biosecurity, all in-all out management, frequent disinfecting of housing, etc.) then the method of housing (i.e., grouping vs. isolation) will not matter greatly. There are many reports of calves raised successfully in groups. And, there are many reports of devastating death losses in calves housed in groups in less than optimal conditions. Remember, too, that a calf’s behavior does not change once it is dead.

In their research paper (1), the authors questioned the utility of isolation systems, saying *“In human and veterinary medicine, social isolation is sometimes used to reduce transmission of disease, but normally only in health-care settings with immunocompromised individuals ... or in settings with unusually virulent and zoonotic pathogens...”* Based on these criteria, dairy calves would certainly qualify. Many, if not most calves are immunocompromised due to inadequate colostrum intake. According to USDA, over 40% of calves in the U.S. have FPT. A recent study in California utilizing tens of thousands of calves indicated that 45% of bull calves brought onto a calf ranch had FPT (2). In our own experience with purchasing Holstein bull calves (n > 600) for nutrition research, we found that >50% of calves have FPT (<10 g of IgG/L of plasma). Many of these calves have received no colostrum at all. Furthermore, many of the pathogens important in neonatal disease ARE zoonotic (e.g., *Cryptosporidium parvum*) although the concept of isolation of calves to reduce zoonoses is unimportant in this context. Therefore, it would seem that isolation in the case of multiple sourced, immunocompromised young dairy calves would be appropriate in most situations.

The behavior of calves may be affected when they are housed in groups vs. individually. But a critical question is whether changes in behavior affect an animal’s welfare. For example, if we restrict a calf’s movement so that it can’t go outside, we will certainly change the animal’s behavior. However, if the ambient temperature outside is –40 C, restricting the calf’s movement may actually

be beneficial to it's welfare by reducing the risk of permanent injury. Surely, this is an extreme example. My point is that modifying behavior is not necessarily related to animal welfare. These are very different concepts and they should not be confused.

It is easy to *assume* that particular behaviors (e.g., “play”) are associated with welfare. But determining the relationship *quantitatively* has been far more difficult. It is very important that animal behavior research be based on sound physiological concepts that can be evaluated objectively. For example, in the BC study, calves housed in groups spent less time with their heads outside of the pens. The authors explained it this way “[c]alves in individual stalls spent more time with their head out of the pen, perhaps in an attempt to interact with other calves and barn workers.” It is impossible to **know** unequivocally why the calves housed in isolation spent more time with their heads outside the pens. The more important question would seem to be “is this behavior associated with the welfare of the calf?”. In the study in question, there were no effects on animal performance, including diarrhea and body weight at the end of the study. This might allow one to conclude that housing calves in isolation does not negatively affect animal welfare, if you assume that animals with poor welfare will be stressed and this stress will be exhibited through increased susceptibility to disease, poor growth, etc.

Can calves be raised in groups? Yes. Should they be raised in groups? Not always. There are many situations where individual housing will improve animal welfare by reducing disease. Remember, it is the ultimate insult to the welfare of the animal if it is exposed to conditions where it gets sick and dies.

Animal behavior and animal welfare research is a rapidly growing field of endeavor that affects all of animal agriculture. In many parts of the world, these data are used to establish policy and regulations that affect farmers directly. In the U.S., behavior/welfare research has become the basis for policies established by large companies (e.g., Burger King) that may affect animal agriculture. It is important that producers, researchers and policy makers understand the value of this type of research, as well as its limitations. All of our management practices should be considered in the context of animal welfare. We raise animals because we love them. We have been and should continue to be the people more concerned about the welfare of their animals.

References:

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