

Calf Housing and Environments Series

III. Hutches or Group Pens for Pre-Weaned Calves?

The first question a calf raiser might ask when starting up a new operation or making changes to an existing one is: "Which is best for pre-weaned calves -- hutches or group pens?" The purpose of this factsheet is to provide a comparison of advantages and disadvantages of individual and small group housing for pre-weaned calves so that dairy farmers and calf raisers can make the best housing decision for their operation.

Disease Prevention -- The primary purpose of individual housing is to limit the spread of disease between pre-weaned calves. There is some evidence that the prevalence of some diarrheal disease agents like *Cryptosporidium*, coccidia, and *Rotavirus* is lower when calves are housed in hutches compared to group pens. Group housing of calves before weaning may also increase the odds of them shedding *E coli* O157:H7 (Garber et al., 1995).

Key Points

Advantages of individual housing:

- Can reduce spread of disease
- Can observe individual calf behavior and health
- Can provide specific feed and amount and observe consumption
- Can achieve reasonable weight gain with no effect on future performance

Advantages of small group housing:

- Better calf socialization
- Group size best 6 to 9 calves



Respiratory disease outbreaks tend to cluster within calf housing (Miller et al., 1980), which implies that close contact is indeed important in disease spread. Housing calves in individual hutches was a protective factor for pre-weaning calf pneumonia compared to calves raised in the presence of adults (Virtala et al., 1999). In a study of 236 French dairy farms, investigators found that compared to individual housing, calves housed in group pens after 1 week of age were more likely to get sick, particularly if they were housed in groups that had 3 or more weeks in age difference (Fourichon et al., 1997). Calf mortality appears to be lowest in herds housing calves in hutches compared to other types of housing (Lance et al., 1992; Losinger & Heinrichs, 1997). A Norwegian study found that calves housed in group pens had a greater risk of dying compared to calves housed in individual pens for the first month of life (Gulliksen et al., 2009b). However, if managed carefully, and infection pressure is not high, group housing for pre-weaned calves does not have to predispose them to infections. The incidence of diarrhea was actually lower in group housed calves compared to individually raised calves in a Finnish study (Hanninen et al., 2003).



Size of the Group Matters -- A prospective study of calves indicated that those housed in large group pens had a higher risk for respiratory disease compared to calves in individual housing or small group pens (Lundborg et al., 2005). Calves housed in group pens fare better in smaller groups of 6 to 9 animals compared to 12 to 18 per group (Svensson & Liberg, 2006). Respiratory disease incidence was lowest in calves housed individually, intermediate in those housed in small group pens (with 3 to 8 calves), and greatest in calves housed in larger group pens (6 to 30 calves with automated feeders) (Svensson & Liberg, 2006). A conclusion from this is that if pre-weaned calves are going to be housed in group pens, the numbers of calves per group needs to be considered.

Calf Welfare and Comfort -- Although there appear to be disease control benefits to rearing calves in individual hutches, animals raised in confinement cannot seek the most comfortable "microenvironment" for themselves (Brunsvold et al., 1985). However, if designed properly, hutches can allow calves to seek shelter or seek fresh air and sunshine. One study evaluated the amount of time spent lying in the hutch, in the doorway, and in the outside area of outdoor hutches. Calves could capture solar radiation as needed in cold weather, shade as needed in hot weather, and were most active during the times of moderate temperatures (Brunsvold et al., 1985).

The use of group housing might be beneficial when considering the welfare and socialization of the calf (Gulliksen et al., 2009a). Group housing, containing 2 to 6 calves, provides more calf interactions and enriches their environment by adding stimulus (Stull & Reynolds, 2008). Group housing can allow for proper socialization and fulfill calves' requirements for play and movement, but is challenging for caretakers to keep up on sanitation, manage nutrition, and control disease in large groups. Due to this, calves will typically encounter higher levels of pathogens at younger ages when housed in groups, causing higher disease incidence and death rates (Gulliksen et al., 2009b).

The specific effect of isolation on calf welfare and behavior has been examined. Individually-raised calves spent more time next to a man in a pasture than did group-raised calves (Le Neindre, 1993), indicating a greater bond to humans than to other calves. A drawback to group housing for calves is that they can develop cross-suckling behaviors (Stull & Reynolds, 2008).



A study of twin heifer calves and effects of isolation versus group rearing found no differences in average daily gain between isolated and group-reared calves, and no differences in the behaviors they measured. They concluded that isolation was not detrimental and may have enhanced the human-animal bond (Purcell & Arave, 1991). In one large, multi-site experiment, calves were raised without being able to see other calves (isolation) or in individual hutches with the ability to see other calves (Arave et al., 1992). Rearing calves in isolation had some effect on socialization (in the short-term) but did not affect health or subsequent milk production as it did in

an older study where milk production was greater in cows reared in isolation as calves (Arave et al., 1985). The social skills of individually penned calves can equal that of group reared calves if they are able to have visual contact with their peers (Le Neindre, 1993).

If calves are grouped, how close is too close? Stocking density for grouped calves was an important risk factor contributing to the risk of diarrhea in a prospective study (Bendali et al., 1999). If calves had less than 3.28 ft² they had a 74% greater risk of developing diarrhea.

Based on the available evidence, individual housing for pre-weaned calves, particularly those less than 30 days of age, appears to be the soundest recommendation for neonates, as long as they have adequate hutch or pen size and can see and hear their peers. Calves can be grouped but attention to group size and space requirements is still critical as is attention to early signs of disease.

References

- Arave, C. W., Albright, J. L., Armstrong, D. V., Foster, W. W., & Larson, L. L. (1992). Effects of Isolation of Calves on Growth, Behavior, and First Lactation Milk Yield of Holstein Cows. *Journal of Dairy Science*, 75, 3408-3415.
- Arave, C. W., Mickelsen, C. H., & Walters, J. L. (1985). Effect of early rearing experience on subsequent behavior and production of holstein heifers. *J Dairy Sci*, 68, 923-929.
- Bendali, F., Sanaa, M., Bichet, H., & Schelcher, F. (1999). Risk factors associated with diarrhoea in newborn calves. *Vet Res*, 30, 509-522.
- Brunsvold, R. E., Cramer, C. O., & Larsen, H. J. (1985). Behavior of dairy calves reared in hutches as affected by temperature. *Trans Am Soc Ag Eng*, 28, 1265-1268.
- Fourichon, C., Beaudeau, F., & Seegers, H. (1997). Critical points related to housing and management in control programmes for calf morbidity and mortality in French dairy herds. In *Ninth International Congress on Animal Hygiene* (pp. 32-35). Helsinki, Finland: ICAH.

- Garber, L., Wells, S. J., Hancock, D. D., Doyle, M. P., Tuttle, J., Shere, J. A. et al. (1995). Risk factors for fecal shedding of *Escherichia coli* O157:H7 in dairy calves. *J Am Vet Med Assoc*, 207, 46-49.
- Gulliksen, S. M., Jor, E., Lie, K. I., Loken, T., Akerstedt, J., & Osteras, O. (2009a). Respiratory infections in Norwegian dairy calves. *American Dairy Science Association*, 92, 5139-5146.
- Gulliksen, S. M., Lie, K. I., Loken, T., & Osteras, O. (2009b). Calf Mortality in Norwegian dairy herds. *J Dairy Sci*, 92, 2782-2795.
- Hanninen, L., Hepola, H., Rushen, J., de Passille, A. M., Pursioainen, P., Tuure, V. M. et al. (2003). Resting behavior, growth and diarrhoea incidence rate of young dairy calves housed individually or in groups in warm or cold buildings. *Acta Agric Scand, Ani Sci*, 53, 21-28.
- Lance, S. E., Miller, G. Y., Hancock, D., Bartlett, P. C., Heider, L. E., & Moeschberger, M. L. (1992). Effects of environment and management on mortality in preweaned dairy calves. *JAVMA*, 201, 1197-1202.
- Le Neindre, P. (1993). Evaluating housing systems for veal calves. *J Anim Sci*, 71, 1345-1354.
- Losinger, W. C. & Heinrichs, A. J. (1997). Management practices associated with high mortality among preweaned dairy calves. *J of Dairy Research*, 96, 1-11.
- Lundborg, G. K., Svensson, E. C., & Oltenacu, P. A. (2005). Herd-level risk factors for infectious diseases in Swedish dairy calves aged 0-90 days. *Prev Vet Med*, 68, 123-143.
- Miller, W. M., Harkness, J. W., Richards, M. S., & Pritchard, D. G. (1980). Epidemiological studies of calf respiratory disease in a large commercial veal unit. *Research in Veterinary Science*, 28, 267-274.
- Purcell, D. & Arave, C. W. (1991). Isolation vs. group rearing in monozygous twin heifer calves. *Applied Animal Behaviour Science*, 31, 147-156.
- Stull, C. & Reynolds, J. (2008). Calf Welfare. *Vet Clin Food Anim*, 24, 191-203.
- Svensson, C. & Liberg, P. (2006). The effect of group size on health and growth rate of Swedish dairy calves housed in pens with automatic milk-feeders. *Preventive Veterinary Medicine*, 73, 43-53.
- Virtala, A. M. K., Grohn, Y. T., Mechor, G. D., & Erb, H. N. (1999). The effect of maternally derived immunoglobulin G on the risk of respiratory disease in heifers during the first 3 months of life. *Preventive Veterinary Medicine*, 39, 25-37.

Written by: Dale Moore, Katy Heaton, Sandy Poisson, and William Sischo

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