

# OPTIMIZING RESPIRATORY HEALTH IN CALF BARN



As dairy farms grow and expand their milking herd numbers, so does the dairy replacement herd.

With eight percent of the total number of cows represented by pre-weaned calves, the number of calves for operations 500 cows and larger can be a minimum of 40 calves on milk at one time. With more calves to feed as the dairy operations grow, time, labor and facilities devoted to the replacement herd also increases.

Although individual calf hutches are the industry's preferred housing for pre-weaned calves, dairy operators continue to build calf barns to address the discomfort and inconvenience of cold weather, snow and rain for the calf raiser. Regardless of the type of housing provided, the facility must meet certain criteria to provide a healthy environment and optimize calf growth:

- Minimize calf stress
- Provide fresh air, which limits drafts
- Provide clean, dry and comfortable resting places
- Provide adequate feed and water
- Manage effects of extreme weather

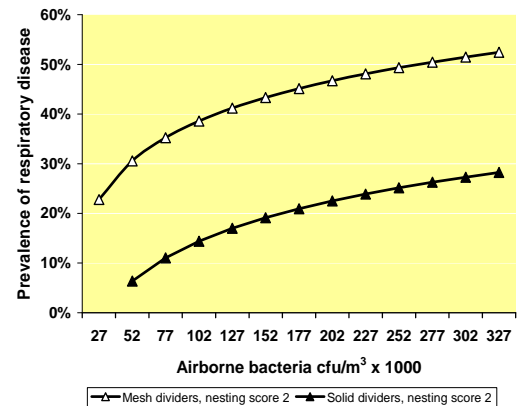
Providing an excellent, well ventilated environment for the calf is a key component in successfully raising calves. In 2004, Lago, et al. at the UW-Madison School of Veterinary Medicine determined that calf pens can be "microenvironments" within the barn. Inside the barns, even when naturally ventilated and maintained as "cold barns", many calf pens are enclosed on three or four sides to prevent contact between calves. Some pens, in the winter, may have a hover on the back one-third of the pen to minimize draft conditions. Even though air movement appeared to be fine in the barn, these enclosures were found to restrict air movement within the calf's individual

environment. In addition to the restrictive air movement provided by solid sides, calves produce very little body heat compared to adult cows, which limits the potential to ventilate the pen by thermal buoyancy. These factors result in poorly ventilated "microenvironments" within the individual calf pens.

Based on recent research in 13 different calf barns (Lago et al., 2006), three key factors were determined to reduce "microenvironments" and optimize calf respiratory health:

- Solid panel between calves
- Nesting in deep bedding
- Low airborne bacteria counts

**Solid panel between calves:** Researchers found a substantial difference of respiratory health in calves housed with mesh pens versus solid walls.



As recommended by veterinarians and industry experts, solid panels limit the disease transfer from one calf to another by direct contact.



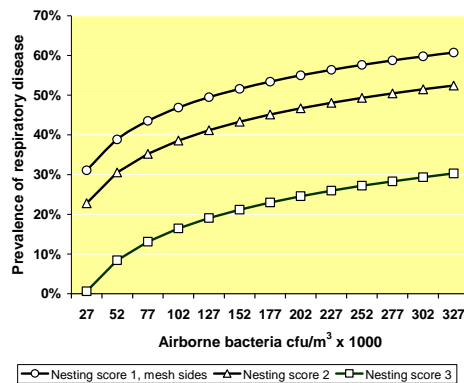
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**Nesting in deep bedding:** Calves are born with little body fat which is essential for immune function as well as maintaining body heat during the cold season. Newborn calves are cold-stressed at 50<sup>o</sup>F while a month old calf is cold stressed at 32<sup>o</sup>F. Bedding provides a method for the calf to reduce heat loss. It provides an insulation of heat for the calf as it nests in the bedding. Researchers looked at three nesting scores to determine prevalence of respiratory disease. As the calf is allowed to nest, respiratory disease prevalence is reduced. This may be correlated to the fact that the calf is able to maintain its immune system instead of expending fat reserves to maintain body heat.



**Low bacterial counts within the calf pen:**

Airborne bacterial counts are directly associated with poorly ventilated facilities, when total counts increase, so does the prevalence of respiratory disease. Most airborne bacteria are non-pathogenic, but with continuous chronic exposure, the pathogens can be a burden to the respiratory defenses. Researchers identified four factors to lower airborne bacteria within the calf pen:

- Lower temperature
- Larger pens
- Fewer solid sides
- Supplemental calf ventilation

**Fewer solid sides:** Even though it is recommended to have solid sided calf pens to reduce disease transfer, too many sides can impede ventilation. The solid panels separating calves should be limited to two per pen. A short wall limited to 20” may be used on the backside to help keep bedding in place. Even though we want to minimize drafts, it is recommended not to use a hover since it limits ventilation and increases airborne bacteria counts. Instead, it is strongly encouraged to use deep straw bedding for calves to nest in as well as calf blankets.

**Supplemental mechanical ventilation:**

Providing 15 cfm fresh air per calf pen provides just enough air to ventilate the “microenvironment” of the calf pen without creating a draft in the winter months. Utilizing a positive-pressure tube system can provide adequate ventilation in both naturally ventilated and enclosed calf barns.

**References:**

“Housing Factors Optimize Respiratory Health of Calves in Naturally Ventilated Calf Barns in Winter”, ASABE Publication #701P0507e, Dr. Ken Nordlund  
 “Practical Considerations of Ventilating Calf Barns in Winter” Pre-Conference American Bovine p Conference, 2007, Dr. Ken Nordlund  
 “Calf Respiratory Disease and Pen Microenvironments in Naturally Ventilated Calf Barns in Winter, A. Lago, et al, JDS 2006.  
 Dairy Freestall Housing & Equipment, MWPS, 2000  
 Raising Dairy Replacements, MWPS, 2003



**Nesting Score 1**  
Legs entirely visible



**Nesting Score 2**  
Legs partially visible when laying



**Nesting Score 3**  
Legs generally not visible when laying



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