

CALVING EASE

October 2011

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Needed: Good Air (Part 2: Managing Housing)

Summary: Calves need good quality air if they are going to be healthy. Ventilation management is essential to achieve this goal. Managing ventilation means:

- setting air quality goals,
- comparing air quality to these goals, and
- managing the housing to achieve “good air” as economically as possible.

Part 1 last month was about setting quality goals and measuring air quality. Naturally ventilated barns require frequent adjustments of curtains and end doors to provide “good air.” Mechanically ventilated barns most often need a “tune-up” of the ventilation controls and equipment to correct “poor air” issues.

Goals and Measurement

Let’s say we set three air quality goals: (1) little or no ammonia odor in the barn, (2) the relative humidity inside the barn is no more than 10 % higher than outside, and (3) the air temperature inside the barn is no more than 10°F warmer than outside. Ammonia odor we measure by the “sniff test.” For relative humidity we use an inexpensive hygrometer. A thermometer is used to estimate temperature.

Managing housing – if you are already meeting your goals right now

The first two steps in managing housing for maintaining good air quality are (1) identify specific goals, and (2) measure air quality regularly. Let’s say that you compare current readings with your goals. Everything is okay today.

Nevertheless, only one thing is certain: Nothing will stay the same! Weather changes from season to season. Numbers of calves in our barn go up and down. We use different bedding depending on cost and availability. People providing calf care change.

Expect your air quality values to change. Therefore, be consistent in collecting information and recording it. Make changes in ventilation before you start treating sick calves.

When threshold values are not met – what to do

What if differences in relative humidity inside the barn compared to outside exceed 15 or 20 percent? And/or differences in temperature are over 15 or 20 degrees? You can pick up an ammonia odor in pens of older calves? These facts suggest that inadequate air exchange is a problem.

Low air exchange rates favor high concentrations of pathogens. Also, when there are many small airborne water droplets pathogens hitchhike rides from sick animals to others in the same air space. Ammonia reduces the effectiveness of the natural defense mechanisms designed to keep bacteria and viruses out of calves' lungs.

In **naturally ventilated barns** (usually less than 35 feet wide, most often only two rows of pens) our challenge most often is how to: (1) open up the sides and ends of the barn without letting in too much precipitation and, (2) depending on the temperature, not creating excessive draftiness.

“Research has shown that a New York State naturally ventilated calf barn’s curtains needed to be repositioned as many as 7 to 10 times per day during transition weather periods in order to maintain a quality environment.” (Gooch 2007, p137). This need for constant attention is why they recommend if feasible “an automatic control system that continuously monitors the barn environment and makes appropriate system adjustments is best.” My rule of thumb? Plan on being in the barn at least 4 different times throughout the day to assess conditions and make needed changes.

Regardless of the type of pen (individual or group) it is essential to maintain dry bedding to suppress ammonia release in calf barns. Scrape alleys and areas around automatic or mob feeders accumulate manure. That can release ammonia as well. It is essential to schedule cleaning these areas frequently enough to control ammonia production.

In **mechanically ventilated barns** where our air quality goals are not met we need to review our maintenance schedule. I have observed that the most common cause of poor air quality in these barns is not incorrect design. It is inadequate maintenance of ventilation controls and equipment.

If maintenance does not improve conditions for sure check ventilation design. Gooch describes two design approaches: “the room volume air exchange method” and “the per animal head method” You can find suggested minimum ventilation rates for 4 weather conditions (summer, warm, mild and cold) for both design methods at this URL: <https://ecommons.cornell.edu/bitstream/handle/1813/36959/pdpreweanedcalfhealth.pdf?sequence=1&isAllowed=y>

Reference: Gooch, Curt “Role of Facility Design and Ventilation on Calf Health.” Proceedings of the Professional Dairy Calf and Heifer Conference, March 20-23, 2007, Burlington VT, pp135-146.

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