Calf Pneumonia

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Introduction:

30% of calves over a month old submitted for post-mortems in the Irish Regional Vet Laboratories died from pneumonia. More significant is the unseen disease. If 30% of the calves in a pen are seen with pneumonia, then another 40% will have their lungs affected.

A study by UCD on farms in Ireland found that the average prevalence of pneumonia in calf groups was 14%. Some farms had up to 50% of calves affected when the lungs were examined by ultrasound.

By the time a calf shows signs of pneumonia, the lungs are damaged and its ability to function normally throughout its life is impaired. A dairy heifer that has had pneumonia as a calf will produce up to 120 kgs less milk in the first lactation for every 'sick' day. Also, she is likely to be culled faster or die earlier. A beef calf can lose 0.2 kgs per day liveweight gain as an adult and take 14 days longer on average, to finish.

Antibiotic prescribing rules are changing and access to 'strong' antibiotics, the fluoroquinolones and macrolides that are used routinely to treat calves with pneumonia, are being restricted due to their importance for human medicine. The options for treatment in the future will be limited, and it is likely that more calves may suffer long term impacts from pneumonia if the root causes are not eliminated.

COVID-19 and RSV has tragically affected so many people this year. However, these viruses have made us familiar with the virtually untreatable nature of severe viral infections, the contagious nature of viruses, and the importance of whole population vaccination. In comparison, as the population of calves grows within a farm, the risk of rampant spread of a respiratory virus such as IBR, RSV, Pi3, is extremely high. 'Distancing' by controlling stocking density, having enough fresh air to reduce the number of virus particles and bacteria, and vaccination, are necessary strategies to limit the spread and impact of respiratory disease. Viruses allow bacteria like Mannheimia (pasturella) and Mycoplasma to get into the lungs and cause long-lasting damage if not treated effectively.

Farm control:

The goal is always to limit the amount of viral and bacterial challenge to the calf and on the other side of the scale, build up the resistance of the calf to prevent it from succumbing to the disease.

To control viruses amongst people, we think of handwashing, being in a properly ventilated room, and wearing masks, being vaccinated, well-nourished and warm. Translate that to a calf management system and the key areas that we can influence are colostrum feeding, good calf nutrition, vaccination, and providing fresh air and a clean, dry, draught-free environment.

Colostrum Feeding and Nutrition:

Follow the 3-2-1 rule, feed a minimum of 3 litres of clean colostrum, within 2 hours of birth, from the first milking. Colostrum quality is affected by the time from calving to first milking; the quality deteriorates by 3-4% every hour. Fresh calved cows that are held until the next milking before colostrum is harvested will yield varying quality first milk. Your vet can blood test 12 one-to-five-day old calves in February and check if there has been good colostrum transfer. This test can be repeated in March and confirms if the calves are consistently receiving enough colostrum. If the calves are testing poorly, the colostrum feeding system needs to be revisited and the quality of the colostrum collected can be checked with a refractometer.

Fig 1: Taking blood from a calf 1-5 days old to check for colostrum levels (Photo: Animal Health Ireland)

Over half of samples of colostrum taken from Irish farms contain too many bacteria. Bacteria interfere with the colostrum absorption in the newborn. Keep colostrum bottles and tubes clean and sterilized with peracetic acid, clean dump lines and dump buckets, and clean the cow's teats before first milking to help reduce the contamination of good colostrum.

Calves need enough energy to grow and fight infection. The calf is dependent on milk for the first 3-4 weeks of life for its energy and protein source as it cannot ruminate and use starter effectively. Calves need to drink a minimum of 15% of their body weight. As temperature drops during cold weather periods the calf's energy demand increases. If the temperature drops below 10o C, the calf will need 10-20% more feed per day to grow at the same rate. One of the first strategies when pneumonia is affecting groups of calves is to increase milk feeding.

Cold and moisture:

Young calves under three weeks of age perform best if the environmental temperature is between 15oC and 25oC. This is equivalent to nesting in a deep bed of dry straw. Wet beds, too much moisture in the shed, draughts and wind chill all put the young calf at risk of scours and pneumonia. Deep dry straw beds are a must. Floors under straw beds should have a 1:20 fall and well drained.

In the same UCD study, calf sheds that were assessed were on average only 0.7oC warmer inside than outside, and often sheds can be colder inside than outside. Large volume sheds built from steel and concrete can be like freezers for young calves. Using jackets, lamps, covered and heated areas for young calves will help.

Draughts and fresh air:

Every farmyard is different and calf houses need to be designed or modified for the conditions that prevail in that yard. In most calf sheds the 'Stack effect' where warm air leaves through an outlet in to roof and colder air comes in the sides does not exist as the calves don't generate enough heat. The position of other buildings, the direction of the prevailing wind, and the exposure of the site, all influence the speed and the amount of air getting into a shed. The door is the only moving part in most calf houses, so, ventilation is reliant on the changing wind.

The dilemma in calf housing is providing enough fresh air while avoiding draughts. If the airspeed increases to over 0.5 m/s at calf level – you will see the straw 'trembling' – the calf is exposed to a draught and at risk of wind chill. There must be enough inlet for air to enter, and this inlet must be limited or restricted enough to slow down the wind coming at it. The position and orientation of the calf house will determine how much wind hits the inlets.

Canopies that provide shelter from down draughts should be standard in large open sheds. They should be positioned at the back wall a minimum of 4 ft above the ground and extending 4 ft from the wall. Plyboard sheets, Kingspan insulating boards or wire covered with straw are all useful to shelter the calf.

Providing shelter for calves within the house, getting the feeding right, and providing a warm dry bed may be more important than trying to build the perfectly ventilated house. Calf houses where there are constant problems with air change, may need to be closed entirely and a mechanical system such as a positive pressure tube designed for the shed.

Stocking rate:

High six-week calving rates create a demand for calf housing space for a short-term period. The need for adequate space must be balanced with the economic limits within the system. Calves under 150 kg have a minimum floor space requirement of 1.5m2. The more space that is given to calves, the better they perform, and in large group pens or on auto-feeders, allowing more than 2m2 is beneficial in controlling disease outbreaks.

Vaccination:

Live intranasal vaccines for RSV/PI3 given to calves at a week old provide rapid protection lasting 3 months. There are also vaccines available that include mannheimia (pasturella) protection as well as RSV and PI3. These are generally given under the skin from 2 weeks of age and boosted 4 weeks later and offer longer lasting protection.

Fig 2 Deep straw bedding - Risk of pneumonia significantly reduced with higher nesting scores

Your vet is best placed to recommend a vaccine regime for your farm. Vaccines are an important tool in your armoury to drive the calf's immune system in conjunction with colostrum feeding and good nutrition.

Conclusion:

Calf pneumonia costs in terms of deaths, treatment, and hassle and there is a hidden cost in lost production and thrive. Designing the perfectly ventilated shed is not usually possible. Many new sheds can be too cold, draughty, and poorly drained. When building new or adapting old calf accommodation, follow first principles of dry bed, draught-free, adequate space, and make sure the calf is sufficiently fed for the demands of the environment. Vaccination is critical for large calf groups and vaccinating the whole group in the airspace makes sense.

Fig 3 A simple design with low walls, canopies to provide shelter, calf jackets, deep straw beds