

Control of Pneumonia in Dairy Calves



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AHI gratefully acknowledges the financial and other contributions of our stakeholders.



Contributing to a profitable and sustainable farming and agri-food sector through improved animal health

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Why do calves get pneumonia?

Pneumonia in dairy calves is often referred to as a 'multifactorial disease'. This means that besides infectious agents, a multitude of environmental and management factors and their interactions are responsible for the outbreak of disease (Figure 1).

Many of the infectious agents commonly involved in calf pneumonia are actually present in healthy calves and in other livestock on farms without causing pneumonia outbreaks. However, these agents can cause pneumonia if the calf's immune system is compromised. Any one or a combination of the environmental and management factors outlined in this leaflet can make calves more susceptible to disease.

The recommendations in this leaflet refer mainly to dairy replacement heifers that are reared on the farm where they have been bred. If male calves born on a dairy farm are kept for beef production they should also be managed according to these recommendations.

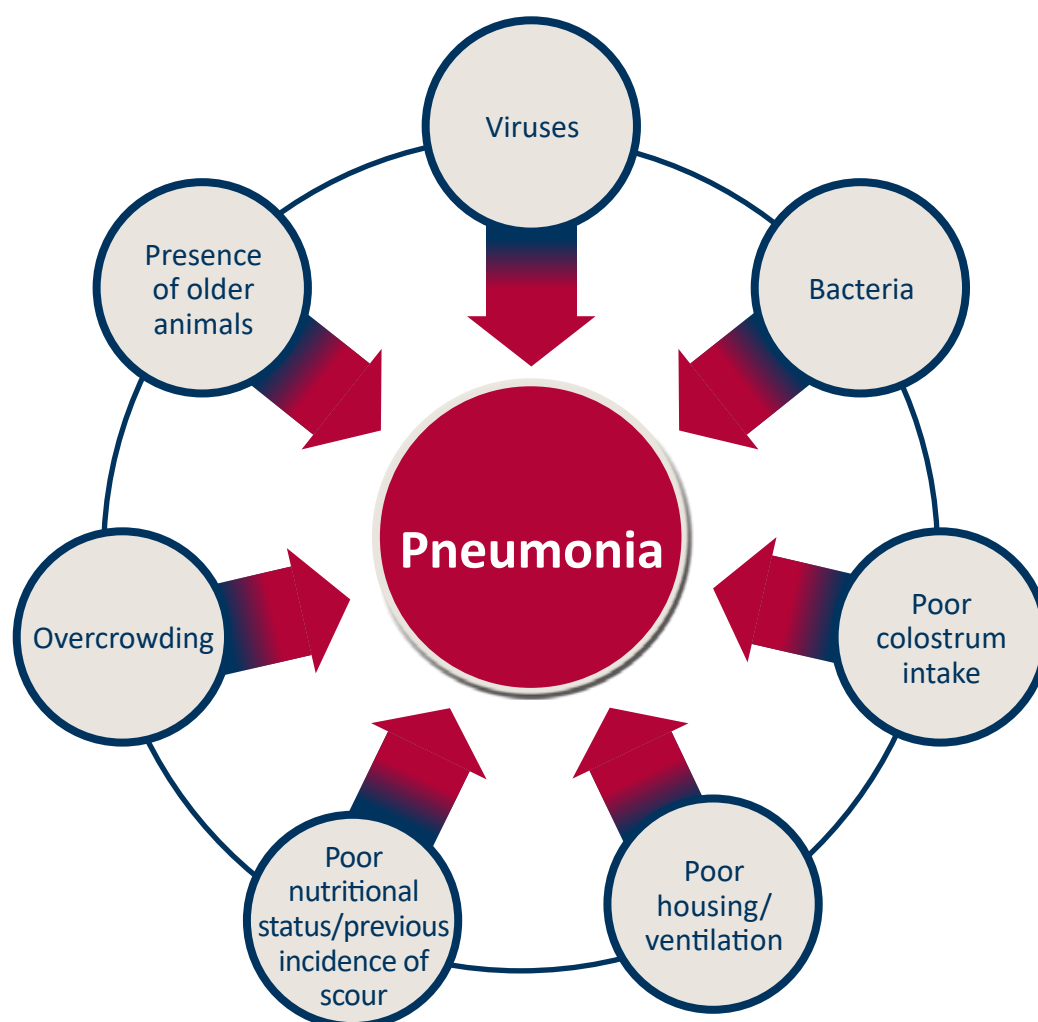


Figure 1. The multifactorial nature of calf pneumonia.

How do you recognise a calf with pneumonia?

Early diagnosis is essential for successful treatment. If you suspect calf pneumonia consult your veterinary practitioner to confirm the diagnosis and to get advice on treatment and prevention.

Initial signs of pneumonia may be non-specific such as:

- Being 'off-form'.
- Dullness.
- Reduced feed intake.
- 'Hollow sides'.
- Fever (over 39.5°C).
- Reduced milk intake or reduced visits to machine from automatic feeder information.

Other signs may include:

- Increased respiratory rate.
- Coughing.
- Watery discharge from the nose and eyes.

This calf has advanced pneumonia and had it been treated earlier, it potentially would have had a better outcome.



Early diagnosis and treatment is essential.

Careful observation of calves at a time when they are resting is required to pick up these signs. Checking the calves at feeding times only, may reduce the likelihood of detecting a calf with pneumonia, as the signs of the disease may not be as obvious when the calf is feeding.

Therefore, in addition to checking the calves at feeding times, observe them at least twice a day at a time when they are resting.

Later signs of pneumonia include pus-like nasal discharge, and severe respiratory distress. By the time these are noted the disease is advanced.

High risk periods occur after grouping or mixing of groups, after weaning off milk or milk replacer, and in unfavourable or changeable weather conditions.

Which viruses are involved?

The most important viruses associated with pneumonia are Bovine Respiratory Syncytial Virus (BRSV) and Bovine Herpes Virus 1 (the virus that causes Infectious Bovine Rhinotracheitis (IBR)). Parainfluenza-3-virus (PI3) and Bovine Coronavirus (BCV) may also be involved. These viruses suppress the calf's immune system, making it easier for bacteria to invade the lungs, or they can cause disease on their own.

Which bacteria are involved?

The most common bacteria that cause pneumonia in dairy calves are *Mannheimia haemolytica*, *Pasteurella multocida*, *Mycoplasma bovis* and *Histophilus somni*. In more chronic cases of pneumonia *Trueperella pyogenes* can be found. Bacterial infection often follows a viral infection, and can cause severe damage to the lung tissue if left untreated or if treatment is started too late.



Consolidated lungs identified at post mortem indicates pneumonia.

Which parasites are involved?

Lungworms are of particular concern in respiratory problems of young calves that have had access to grass.

For more information see the AHI leaflets on Parasite Control [click here](#).

How to diagnose the cause of pneumonia

Most cases of pneumonia are diagnosed based on the clinical presentation of the calf. A veterinary practitioner will diagnose individual cases of pneumonia based on the clinical examination findings. You should discuss with your veterinary practitioner appropriate diagnostics and treatment approaches. If a group of animals are affected, there is a range of further diagnostic tests available that may be warranted to investigate the causes of pneumonia specific to your farm and the risk factors for the outbreak of pneumonia. These include tests to determine the presence of certain pathogens, such as lungwashes, naso-pharyngeal swabs in the live animal or post-mortem samples in dead animals. These can be analysed for viruses and bacteria. Other tests include the use of thoracic ultrasonography or tests related to risk factors such as sampling for passive transfer of antibodies in young calves. In addition, further tests include assessments of housing and the calf environment.

At the first signs of pneumonia, if calves are not treated early and for the correct period of time, the surviving bacteria may grow again resulting in a relapse with recurrent bouts of pneumonia.



How should a calf with pneumonia be treated?

Discuss this with your veterinary practitioner before undertaking any treatment for respiratory disease, as the veterinary practitioner may decide to undertake diagnostic tests (mentioned above) to select the most effective treatment. Early, effective treatment is important to improve the chance of successfully treating the calf.

Antibiotics are ineffective against viral infections. However, where bacterial involvement is suspected, antibiotic treatment is required. If antibiotics are not used appropriately (i.e. correct drug for the disease at the correct dosage for the correct duration), there is an increased risk of creating bacteria that are resistant to further treatment. Non-steroidal anti-inflammatory drugs (NSAIDs) are used in combination with antibiotics to help reduce fever and relieve pain and importantly, they help reduce inflammation in the lungs.

No matter which antibiotic is used, the most important factor for treatment success is to start treatment very early in the course of the disease and to treat for long enough (at least for another two days after the signs of disease have disappeared). Revert to the veterinary practitioner if the response to treatment is not as expected. Treatment of calves with oral antibiotics is not recommended as diseased calves often have a reduced appetite and will not receive a therapeutic dosage of the drug. In such circumstances, there is the potential to develop antibiotic resistance. Injectable antibiotics should be used instead.

In rare cases, lungworm infection may cause the pneumonia in young calves and this will not respond to antibiotic treatment. Discuss with your veterinary practitioner if you suspect that lungworm infection is the cause of pneumonia in your calves.

Why does treatment sometimes fail?

If calves already have severe trouble breathing, or pus running from their noses before treatment is started, it may not be possible to cure them.

If calves are not treated early enough and for long enough at the first signs of pneumonia, the surviving harmful bacteria may start growing again and the calf may relapse with recurrent bouts of pneumonia.

Calves that suffer repeated and/or severe bouts of pneumonia may end up stunted for life. Such calves appear healthy after the signs resolve but do not achieve the same growth rates as the healthy heifers in the group and may never reach an appropriate size for breeding. The cause of this poor performance is permanent lung damage and pleurisy from pneumonia.

Antibiotics work only against bacteria, thus in the cases of severe viral disease they will not succeed in curing the calves.

Pneumonia prevention is better than treating an outbreak.

The role of vaccination against respiratory disease in calves

Vaccination protocols are an essential part of herd health planning and should be developed by the farmer and veterinary practitioner together. The exact programme will differ for each farm, depending on what infectious agents you want to protect against. In closed herds, vaccines targeting specific viruses or bacteria may be selected on the basis of diagnostic tests mentioned above. In open herds, the unpredictable nature of incoming infections requires the use of vaccines which provide protection against a broad range of infections. Infection frequently starts with primary agents, often viruses. Once these have caused initial damage, bacteria can enter as secondary invaders, causing further damage to the lungs. Vaccination reduces both the severity of disease in the vaccinated animal and the amount of pathogen that is 'shed', thereby reducing the infection pressure on surrounding animals.

Currently available vaccines protect against lungworm, IBR, RSV, PI3, *Mannheimia haemolytica* and *Histophilus somni*. Unfortunately, there are no vaccines available for other bacteria such as *Pasteurella multocida* or *Mycoplasma bovis*. This means that vaccination should always be used in conjunction with efforts to reduce risk factors involved in respiratory disease.

When handling vaccines, it is vital to follow the manufacturer's instructions. Poor storage, wrong dose rate or timing reduce their effectiveness significantly. Vaccines may be ineffective if the manufacturer's instructions are not followed precisely. Vaccines are particularly vulnerable to temperature damage so vaccines must be kept in reliable fridges and kept cool during transit. Vaccines must not be used after their expiry date. Where a course of vaccination is necessary, this must be completed before the predicted period of risk, for it to be effective. Immunity begins as soon as four days after administration of the vaccine for some intra-nasal vaccines and up to three weeks after a second dosage for some injectable vaccines. If an annual booster is required, delaying beyond this time period will result in vaccine failure.



Treat calves with the correct drug, at the correct dosage,
for the correct duration.

The importance of good injection technique cannot be over emphasised. Always follow the product data sheet and avoid injecting in the rump. Injecting with dirty equipment may interfere with the effectiveness of vaccines. Consider the health status of the calf. The effectiveness of the vaccine will be reduced if the animal is run-down or under stress, particularly if housed in a poor-quality environment. Always seek veterinary advice before combining vaccines or treatments.

How can you improve your calf's immune system

Ensure good colostrum intake

Good colostrum intake is the first and most important step to provide the newborn calf with good immunity. If you follow the 1-2-3 of colostrum management, you can be certain that your calves will get off to a good start.

For more information see the AHI leaflet *Colostrum Management* [click here](#).



The importance of proper colostrum management in ensuring good development of the calf's immune system.

COLOSTRUM 1→2→3 FOR DAIRY CALVES

1

Use colostrum from the **FIRST** milking for the **FIRST** feed

2

Give colostrum within **TWO** hours of the calf's birth

3

Give at least **THREE** litres

The importance of nutrition in developing a healthy immune system

Inadequate nutritional intake has a negative effect on the immune system of the calf and leads to a greater risk of developing pneumonia and other diseases. After the first feed with colostrum, good nutrition is vital for strong, healthy calves. To ensure that calves grow well and are not marginally malnourished, they should get a daily amount of at least 13- 15% of their birth weight (e.g. 6 litres per day for a 40 kg calf) of whole milk or a good quality milk replacer, mixed as per the manufacturer's instructions

For more information see the AHI leaflet *Technical Notes on Calf Milk Replacers (CMR) for Rearing Dairy Replacement Heifer Calves* and the AHI leaflet *Early Nutrition and Weaning of the Dairy Calf* [click here](#).

Prevent scour and manage outbreaks properly if they occur

Calves that have suffered from scour (diarrhoea) are more likely to develop pneumonia later in life. Both diseases share the similar risk factors, and additionally calf scour makes calves more susceptible to other diseases like pneumonia. If calves develop scour, it is important to make sure that they get through the disease with minimum weight loss. Thus, it is important to keep the calves on normal levels of milk feeding throughout the period of the scour. Additionally, oral rehydration solutions should be provided between milk feedings.

For more information see the AHI leaflet *Management of the Scouring Calf* [click here](#).

Keep the calves on normal levels of milk feeding throughout the period of the scour if they are able and willing to drink.

Minimise stress

Any kind of stress will reduce the ability of the immune system to fight infection. In young dairy calves common stressors include weaning, cold stress and disbudding, in particular, any painful procedure that is very stressful for the calf.

To minimise stress for calves and reduce the likelihood that they will develop respiratory disease following disbudding:

- Ensure that disbudding does not coincide with other stressful events, e.g. grouping, re-grouping, change of housing or change of diet.
- Provide pain management. Discuss with your veterinary practitioner how you can provide the best pain management for your calves during disbudding and afterwards.

Don't put ill or stunted older calves back into a group of younger calves.



Sick calves should be removed from the group.



A deep straw bed is essential to prevent cold stress and straw bales can be used to stop draughts.

How can you reduce infection pressure?

Remove the calf early from the calving pen

The most common sources of a respiratory infection for the newborn calf is the cow, (or cows if the calf is born in a group calving pen), calving environment (exposure to aerosols from older animals) and the calving itself. Cows carry infectious agents that cause pneumonia as well as those that cause scour. In particular, the IBR virus can be latent in cows in the herd and they can shed it due to the stress of calving. To reduce exposure of the dairy calf to these infectious agents, remove the calf from the calving area immediately after it is born and bring it into a clean calf house.

Good hygiene in the calving pen

Hygiene at calving and in the calving pen is essential as the calf is most vulnerable to infection just after birth. See our leaflet *Calving and the Care of the Newborn Calf* [click here](#).

Calf housing

No matter what system is used for calf housing, it is important that calves always have access to fresh clean air, free of draughts, and have a well bedded lying area to keep them warm. Young calves will spend approximately 80% of their time lying down. Wet bedding or insufficient bedding underneath calves will draw away their body heat resulting in calves getting 'chills'. The optimal air temperature in the calf house, for calves under 3 weeks is 15° to 20°C which is difficult to achieve in Ireland from January to April. Low air temperatures in the calf's environment can suppress their immune system in the first 4 weeks of life and make them more susceptible to pneumonia.

No matter what system is used for calf housing, it is important that calves always have access to fresh air, free of draughts, and a dry well bedded lying area.



Dry looking beds may be wet - test with your knees.



Move calves into outdoor group hutches when weather conditions are good.



Portable shelters on well drained ground are very suitable for calf housing. Straw is suitable for bedding.

*S14/2008 EUROPEAN COMMUNITIES (WELFARE OF FARMED ANIMALS) REGULATIONS 2008 and Department Specification 124 MINIMUM SPECIFICATION FOR CALF HOUSING for further information [click here](#).

Why is proper ventilation so important for the prevention of calf pneumonia?

The provision of adequate ventilation (without draughts) and supply of fresh air in calf housing will decrease the risk of calf pneumonia and other diseases. Dust and noxious gases, such as ammonia, irritate the mucous membranes of the respiratory tract and make them more susceptible to infection. Adequate ventilation is necessary to remove excess humidity and heat, gases, dust and airborne infectious agents.

The important points for proper ventilation in calf houses are available in the CalfCare leaflets [Existing calf shed assessment](#) and [Design of New Calf Accomodation](#) [click here](#).

The risk of calves sharing airspace with older animals

One of the biggest pneumonia risks for young calves is if they share airspace with older animals. If possible, calves should be kept away from adult animals and their airspace to minimise direct exposure to disease-causing organisms. If building a new calf shed the location of it in relation to existing farm buildings is a very important consideration.

If calf pneumonia is a problem on a dairy farm, housing and husbandry factors should be thoroughly investigated because to control pneumonia a holistic approach needs to be taken that assesses all of these factors.



Managing purchased calves to prevent pneumonia

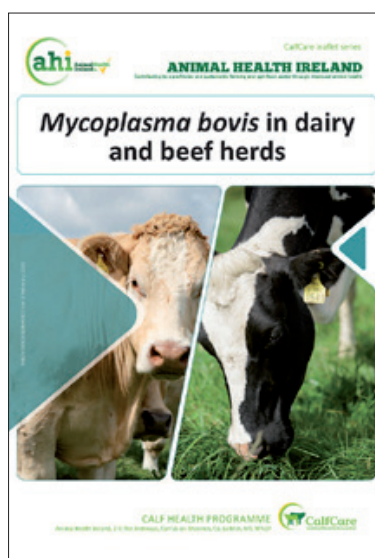
Purchasing of calves into a dairy herd always carries the risk of introducing infectious agents, the worst case being infections that have not been in the herd before. An example is *Mycoplasma bovis*, which is a widespread problem and can cause a form of pneumonia (and other diseases) that is very severe and difficult to treat.

See AHI leaflets *Mycoplasma bovis* and *Purchasing stock reducing disease risks* [click here](#).

- Never keep your dairy heifers together with calves that have been bought in for beef production.
- If you need to purchase replacement heifers preferably do so well after they are weaned.
- Always keep bought-in animals separate from your own stock in a quarantine area for at least four weeks, preferably in a sheltered outdoor area.
- Where possible buy heifers directly from farmers (from as few different sources as possible).
- Ideally buy from farmers you know and trust, and be as sure as possible that the calves you are buying have been managed according to the recommendations in this leaflet, and especially that they have had a good colostrum intake and from dams that have tested negative for Johne's disease.
- Examine calves and check the rectal temperature of bought in calves 1- 2 hours after the calves arrive on the farm for signs of illness due to the stress of transport.
- Observe bought-in calves very carefully twice a day while in quarantine and carry out any testing and administer any treatments recommended by your veterinary practitioner. If you detect fever (over 39.5°C) or clinical signs, contact your veterinary practitioner for advice.
- Bought-in calves released from quarantine should preferably be introduced to home-reared calves after turn-out to pasture to reduce disease transmission between both groups.



Checking temperatures of newly arrived calves is good practice



Key points to remember

- Early diagnosis and treatment of pneumonia is essential therefore it is important to seek veterinary advice early on in the disease.
- Prevention of pneumonia is better than treating outbreaks.
- If calves are not treated early enough and for long enough at the first signs of pneumonia with the correct treatment, the calf may relapse with recurrent bouts of pneumonia.
- No matter what system is used for calf housing, it is important that calves always have access to fresh air, free of draughts, and a good dry well bedded lying area.
- Do not put ill or stunted older calves back into a group of younger calves 'to bring them on'.
- One of the biggest risks of pneumonia for calves is sharing airspace with adult animals or other groups of animals especially bought in ones.
- Ensure vaccines are stored and used in accordance with the manufacturer's recommendations.

For more information consult the Animal Welfare Guidelines issued by the Farm Animal Welfare Advisory Council
<http://www.fawac.ie/media/fawac/content/publications/animalwelfare/Calf%20Welfare%20Guidelines%20%20FAWAC.pdf>

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