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Bovine Respiratory Disease

A BEST PRACTICE GUIDE

CONTENTS

INTRODUCTION

This guide aims to offer helpful information about the disease, ways of preventing it and options for treatment.

WHAT IS BOVINE RESPIRATORY DISEASE (BRD)?

Bovine Respiratory Disease (BRD) can refer to any disease of the lungs and airways of cattle, but most often refers to infections of the lung tissue by viruses and bacteria, also known as pneumonia. For such infections to establish, there are often multiple contributing environmental factors, and the damage may be irreversible if not treated.

The disease is often not detected in its early stages, so has often spread rapidly within the herd by the time of diagnosis.

This condition is mainly seen during the housing period and is a huge concern both in terms of animal welfare and economic loss across both the beef and dairy herd. Most BRD disease is seen in young stock (calf pneumonia).

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THE COST OF BRD

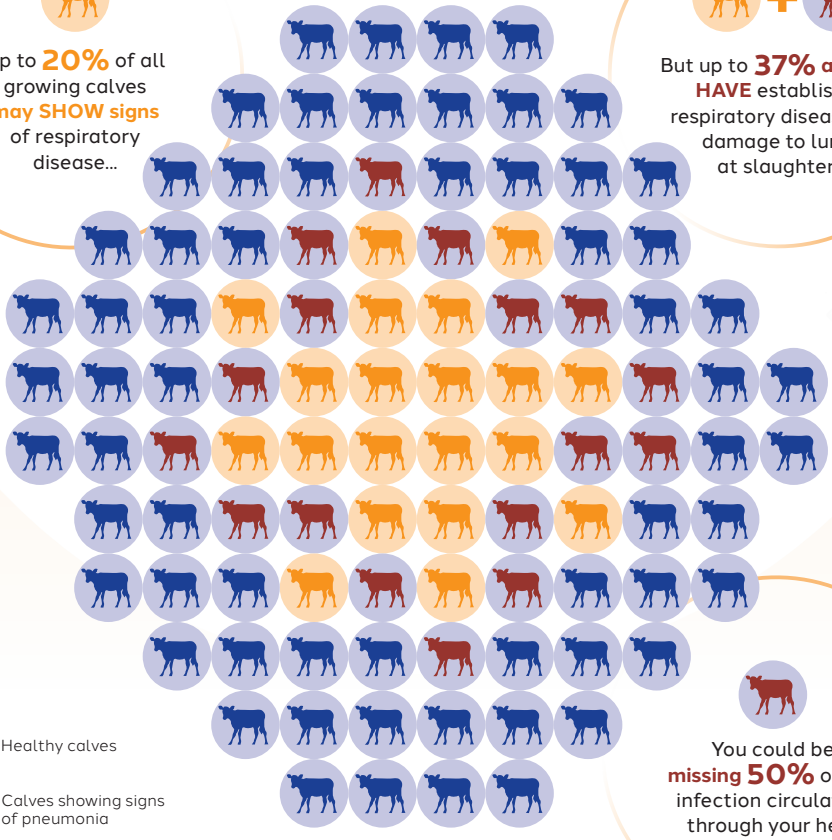
The average cost per calf in an outbreak of calf pneumonia can range between £30–£80[1], but can increase to £500 or more if an animal dies because of the disease.[1]

1

Up to **20%** of all growing calves **may SHOW signs** of respiratory disease...

2

But up to **37%** **actually HAVE** established respiratory disease and damage to lungs at slaughter...



Healthy calves

Calves showing signs of pneumonia

Calves not showing signs but still affected

Reference [2]

3

You could be **missing 50%** of the infection circulating through your herd

The total cost to the UK cattle industry is estimated at £80 million per year.[3]

Financial losses are incurred by:

- Reduced liveweight gain of up to 0.2kg per day[1]
- Cost of medicines and treatment
- Extra labour required to treat sick animals
- Calf losses and costs of disposal
- Extra feed and time required to bring animals to slaughter weight
- An additional 14 days taken to reach breeding weights in young beef stock. Some calves will need re-treatment, which will push costs up even further.[1]

It's not just a calf disease - pneumonia in adult cattle can lead to reduced fertility and productivity which can also cause financial losses in the long term.

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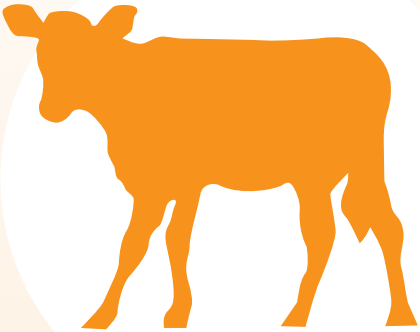
CAUSES OF BOVINE RESPIRATORY DISEASE

Usually pneumonia is caused primarily by a virus followed by secondary bacterial infections – together these have a negative impact on the animal. The animal's environment will be a major contributing factor as to whether it is likely to succumb to respiratory disease.



1 Infectious agents

Viruses – It is most common for cases of BRD to originate from a primary viral infection such as:

- Respiratory Syncytial Virus (RSV)
- Parainfluenza 3 virus (PI3)
- Infectious Bovine Rhinotracheitis (IBR)
- Bovine Viral Diarrhoea (BVD)

Bacterial Infection – These often act as a secondary attack after damage from initial viral infection, utilising the animal's reduced immunity. Bacterial agents such as *Mycoplasma bovis, Histophilus somni, Mannheimia haemolytica* and *Pasteurella multocida* are the main culprits.

Parasites – Lungworm can cause irreversible damage to an animal's lungs and can lead on to further respiratory disease if not treated.

2 Environment

Mixing Stock – Mixing bought-in stock with current stock can increase the risk of exposure to various different pneumonia-causing bacteria and viruses, which they have not encountered before and therefore have not developed an immunity to.

Weather – Fluctuations in weather from extreme warm temperature to sudden cold spells can be challenging to all ages of cattle.

Nutrition – Both colostrum and feed quality are vital during the highest risk period of winter housing.

3 Animal

Breed – Different cattle breeds can grow at different rates, which not only has an impact on an individual animal's lung capacity but can also affect how well the animal adapts to its growing body. Some breeds will have a lower lung capacity or less mature lungs, these factors contribute to the animal's susceptibility to BRD.

Age – Youngstock are naturally more vulnerable to BRD. Their immune systems are still developing, and as colostrum intake declines, the level of available antibodies drops - leaving them more exposed to disease.

There are a number of additional contributory factors associated with pneumonia, many of which could be managed through husbandry techniques or easily avoided as part of calf management on farm.

- **Stress on Calves** - Weaning, disbudding and castration can weaken a calf's immune system and make it less able to fight off pneumonia infections.
- **Bought-In Stock** - Mixing calves from different sources can lead to non-immune calves being exposed to various different pneumonia-causing bacteria and viruses.
- **Overstocking** - Can lead to stress and build-up of infection in closely stocked areas increasing the transmission of airborne pathogens. The table below indicates ideal minimum space allowances for different sizes of cattle.[4]

Images courtesy of NADIS

Sizes	Unobstructed space allowance
Up to 150kg	1.5m²
150kg to 200kg	2m²
Over 200kg	3m²

- **Ventilation** - Lack of adequate ventilation in livestock buildings can cause build-ups of infection and humidity which can spread infections rapidly.

However, over-ventilated buildings could leave calves in draughty conditions, which will not only predispose them to developing pneumonia due to being cold but more energy will be used on maintaining body temperature and immunity rather than going into live weight gain.

The 'stack effect' occurs when an accumulation of warmer air from the animals' body heat moves upwards, drawing cooler fresh air in from the side.

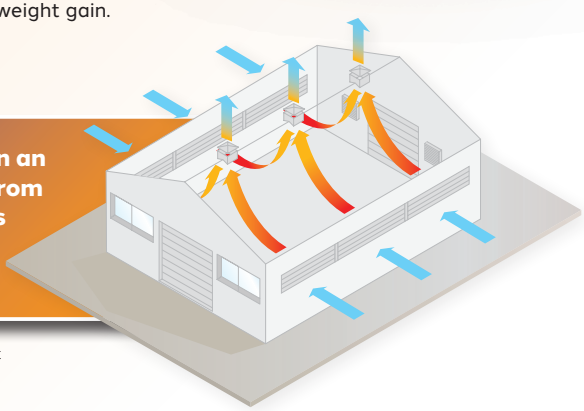


Fig 1. Ideal shed ventilation - the stack effect

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SIGNS

There are various signs that are associated with calf pneumonia, including:

- **Respiratory distress**
- **Nasal discharge**
- **Coughing**
- **Rapid, shallow breathing or mouth breathing**
- **Loss of appetite**
- **Weight loss or failing to gain weight**
- **Signs of pain**
- **High temperature (>39.5°C/ 103F)**
- **In some cases death**

Numerous field studies have suggested that rectal temperature is the most cost-effective method to identify respiratory disease in large groups as relying on signs such as coughing and nasal discharge will lead to under-diagnosis of the problem.

In mild cases there can be significant damage to the lungs before any of the above clinical signs are evident. By the time a severe clinical case is obvious, there are likely to be more sub-clinical cases within the exposed group of calves.

This can mean that any calves in contact with a clinical case could already have significant lung damage from infection. These calves often go on to develop clinical pneumonia unless treated.

In the face of a severe outbreak of pneumonia, all in-contact calves can be treated to help prevent infection. The most common age for calves to be affected is between four and six weeks of age, as their colostrum antibodies decline, and their own antibodies have not yet reached significant levels.

Even after they recover affected calves are often slow to put on weight and fail to grow properly.

CONTROLLING BRD

Calf pneumonia is a multifactorial disease and single elements cannot be considered in isolation. There are various things that can be done to help prevent outbreaks or limit the length and severity of outbreaks. These include:

- **Colostrum** - Adequate intake of colostrum in the first six hours of life is important. It provides the calf with antibodies whilst the gut wall is able to absorb them. Failure to ensure colostrum intake during this period can lower calves' resistance to microbial causes of pneumonia.
- **Bought-in stock** – When buying in weaned calves or cattle for finishing it's advisable to group these separately. Mixing calves from different sources can lead to non-immune calves being exposed to various different pneumonia-causing bacteria and viruses. Ask your vet for advice on an effective assessment routine and vaccination for bought-in stock.
- **Stress on calves** - Weaning, transporting, disbudding and castration could all weaken a calf's immune system and make it less able to fight off pneumonia infections. Avoid disbudding and castration around the time of weaning as it has been suggested that these practices could be best conducted when the calf is young and still having a benefit from colostrum intake.
- **Housing conditions** – Having a well-ventilated building will reduce the risk of pneumonia pathogens being transmitted in the herd due to humidity and enclosed spaces. Ensuring ventilation above calf level will help to maintain calf body temperature; calves are susceptible to temperature stress if they are too cold. Also reducing calf core temperature means that more energy will be used up by maintaining immunity and body temperature rather than converting feed into all important live weight gain.
- **Cleanliness & biosecurity** - Dirty, wet, unhygienic calf accommodation can lead to build-up of bacteria and viruses, and also harmful substances in the air such as ammonia. Not only that, the virus causing IBR can survive for 30 days inside troughs and feeders. Routine cleaning and decontamination will aid in the reduction of pneumonia spread at these key communal points in the shed. Also ensuring bio-security measures are adhered to on the farm will be key to success of overall herd health.
- **Vaccination** – Like flu viruses in people, calf pneumonia viruses are not controlled by antibiotics, but may be prevented by vaccination. The type and use of vaccines against calf pneumonia viruses should be discussed with your vet, and some laboratory tests may be necessary to identify which viruses are present if the vaccination strategy is to be cost-effective. The choice of vaccination will depend on what age the animals should be treated, how long the vaccination is desired to last and also other likely diseases to be accounted for. Vaccination offers a good route to protecting the entire herd from the beginning of the risk season for pneumonia as even low level disease in calves can negatively impact on growth rate and productivity.

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TREATMENT

Affected calves require extra nursing and treatment with **antibiotics** and **anti-inflammatory** medicines. To minimise the risk of spread of disease, sick calves should be isolated from the rest of the herd as soon as signs are spotted.

Treatment should be discussed with your vet.

Antibiotics control primary and secondary bacterial infections. Used with an antibiotic as an adjunctive therapy, the anti-inflammatory will aim to:

- **reduce temperatures**
- **reduce coughing**
- **reduce pulmonary congestion**
- **reduce relapse rate**
- **prevent residual lung damage**
- **combat the effects of bacterial toxins**

References:

1 Better management of Bovine Respiratory Disease. AHDB 2018. Available at https://ahdb.org.uk/knowledge-library/better-management-of-bovine-respiratory-disease

2 Investigating Bovine Respiratory Disease and Associated Farm Level Risk Factors: A Pilot Study. Jonathan ME, Statham MA VetMB DCHP MRCVS

3 BARRETT D.C. (2000) Veterinary Record 146, 545-550

4 https://www.gov.uk/government/publications/code-of-recommendations-for-the-welfare-of-livestock-cattle

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