

CONTROLLING RESPIRATORY DISEASE

> **Effective control of Bovine Respiratory Disease involves many factors. This guide aims to give you an extensive overview of many of the key issues involved and how you might be able to avoid, control or treat respiratory disease in your herd. For more detailed advice for your own farm situation talk to your veterinary surgeon.**

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Rispoval 4 - A freeze-dried pellet containing attenuated BRSV strain 375 minimum $10^{5.0}$ CCID₅₀ and PI3v ts strain RLB103 minimum $10^{5.0}$ CCID₅₀ together with inactivated, adjuvanted IBR strain Cooper minimum 2 log, and BVDv Type 1 viruses cytopathic strain 5960 and non-cytopathic strain 6309 minimum 5 log₁₀. For active immunisation of cattle to reduce infection, clinical signs and respiratory disease caused by BRSV, IBR (BHV-1) virus and PI3 virus; and leucopenia and viraemia caused by the BVDV, Type 1 cytopathic and non-cytopathic strains. Do not vaccinate pregnant animals. Do not use chemically sterilised syringes or needles. Reconstituted vaccine should be used within 2 hours. **[POM-V]**

Rispoval RS+PI3 IntraNasal - A freeze-dried fraction containing modified live Bovine PI3 virus, ts strain RLB103, ($10^{5.0}$ to $10^{6.5}$ CCID₅₀) and modified live BRSV, strain 375, ($10^{5.0}$ to $10^{7.2}$ CCID₅₀) supplied with sterile diluent. For active immunisation of MDA positive or negative calves from 9 days of age against BRSV and PI3v, to reduce the mean titre and duration of excretion of both viruses. Do not use during pregnancy/lactation. Vaccinate only healthy animals. On rare occasions repeated exposure to BRSV may trigger hypersensitivity reactions. Once reconstituted use within 2 hours. **[POM-V]**

Tracherine™ A freeze-dried pellet, containing live attenuated IBR virus strain ts RLB 106, minimum $10^{5.5}$ CCID₅₀ together with sterile diluent. Traces of neomycin sulphate and gentamycin sulphate (not exceeding 25 µg) are present in the final product. For the active immunisation of calves and growing cattle to reduce viral shedding and clinical signs caused by BHV-1. Do not vaccinate animals for at least one month after cessation of corticosteroid treatment. Do not vaccinate unhealthy animals. Vaccination may be followed by pyrexia, lasting from 1 to 4 days, which usually resolves without medication. If an anaphylactic response occurs, institute appropriate antihistaminic therapy. Reconstituted vaccine should be used immediately. **[POM-V]**

Rispoval™ 3 contains modified live PI3 virus, strain RLB103 and BRSV strain 375 with inactivated adjuvanted BVDV type 1, strains 5960 (cytopathic) and 6309 (non-cytopathic) **[POM-V]**

Cyductin Pour-On for Cattle contains moxidectin. **[POM-VPS]**

Store vaccines away from light and transport between +2°C and +8°C. Do not freeze. Do not mix with any other immunological product except the diluent provided. For animal treatment only. Keep out of the reach of children.

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Date of preparation: June 2014 AH445/14

A PRACTICAL GUIDE FOR BEEF FARMERS

> Maximise profitability by reducing respiratory disease in beef calves

zoetis™



> Introduction 04

> The Costs of Bovine Respiratory Disease 06

Bovine Respiratory Disease – a major threat to UK farms	08
The immediate cost of Bovine Respiratory Disease	10
Respiratory Disease can affect more calves than you think	12
BRD in beef calves can impact on future growth and carcass grading	14

> The Causes of Bovine Respiratory Disease 16

The organisms behind Bovine Respiratory Disease	18
Other factors which contribute to BRD	20
Recognising the symptoms	21
Summary	22

> Controlling Bovine Respiratory Disease 24

The principles of disease control	26
1. Improve building ventilation	28
2. Vaccination	32
Respiratory disease vaccination protocols	32
The benefits of vaccinating against respiratory disease	36
3. Protect against parasites	38
4. Treating an outbreak	40

> Conclusion 42



Bovine Respiratory Disease (BRD) or calf pneumonia as it is more commonly known, is a considerable cost to the beef industry. It can range from full blown clinical disease with the subsequent losses and reduced performance to underlying, sometimes unseen respiratory problems which may be less evident but can be just as costly.

BRD causes damage to the animal's respiratory tract and lungs, reducing its ability to breathe and at its worst, damage can be so great it results in death. At all levels, the disease can reduce feed intake, feed conversion rates and affect subsequent weight gain, increasing input costs, and time to finish.

Bovine Respiratory Disease is what is known as a multifactorial disease,

with multiple factors involved in an outbreak. Whilst treatment can be effective in reducing losses, prevention is the most cost-effective way to manage the disease.

This guide aims to give a detailed insight into the disease, its costs and how to avoid its devastating consequences.



> The Costs of Bovine Respiratory Disease



Bovine Respiratory Disease – a major threat to UK farms

Bovine Respiratory Disease presents a serious threat to the profitability of the UK beef industry. The cost to the UK cattle industry is estimated at around £80 million per annum¹. If BRD takes hold on a farm, it has been estimated to cost around £82 per suckler calf². Longer term reduction in daily live weight gain, and potential for carcass downgrading at slaughter, can result in even further losses over the life of the calf.

It can also affect more calves than you initially think because some animals can be affected without showing obvious signs of disease. As such, the losses are often higher than is realised and therefore the impact of disease on profits underestimated.

Calf
Respiratory Disease
estimated to cost around
£80 million
per annum
to UK cattle
industry¹

The immediate cost of Bovine Respiratory Disease

The cost of respiratory disease in beef suckler calves is due to a number of elements.

Veterinary and medicine costs have been shown to make up about 41% of the total immediate costs², which may be lower than thought.

One of the major cost factors is weight loss during the outbreak and subsequent reduction in daily live weight gain, not only in obviously affected animals but also in those that may appear healthy but have underlying symptoms affecting their development.

The cost of £82 per calf² actually only accounts for weight loss during and immediately after the disease outbreak, and not for any longer term effect. BRD can have significant impact on future productivity, and quality of the carcass at slaughter.

A breakdown of the cost of Bovine Respiratory Disease² in beef suckler calves



Bovine
Respiratory Disease
estimated to cost around

£82
per calf²



> The Costs of Bovine Respiratory Disease

Respiratory disease can affect more calves than you think



The loss of calves to pneumonia can be devastating and put a serious dent in the profitability of a herd. But it's not just the obvious pneumonia cases that can be very costly. Many farmers see low grade respiratory problems as a fact of life. However, although the disease may be mild or even not show at all, underlying damage to the respiratory tract can limit growth rates.

In one study³ nearly 500 calves were monitored over 15 months from birth to slaughter, when the lungs were assessed for damage from respiratory disease. Although 35% of calves had been diagnosed and treated for pneumonia, at slaughter 72% were found to have lung damage. Outwardly these calves appeared healthy but they suffered lower growth rates gaining 21kg less during

the fattening period compared to calves with healthy lungs. Hidden disease can therefore have a serious impact on farm profitability.

68%

of apparently 'healthy' calves had lung lesions, which were associated with reduced weight gains

Results of a 15-month study

35%

of total group diagnosed with pneumonia

72%

of total group showed lung damage at slaughter



> The Costs of Bovine Respiratory Disease

BRD in beef calves can impact on future growth and carcass grading

BRD in beef calves not only has an immediate cost, but can also result in ongoing losses and reduced revenues at slaughter.

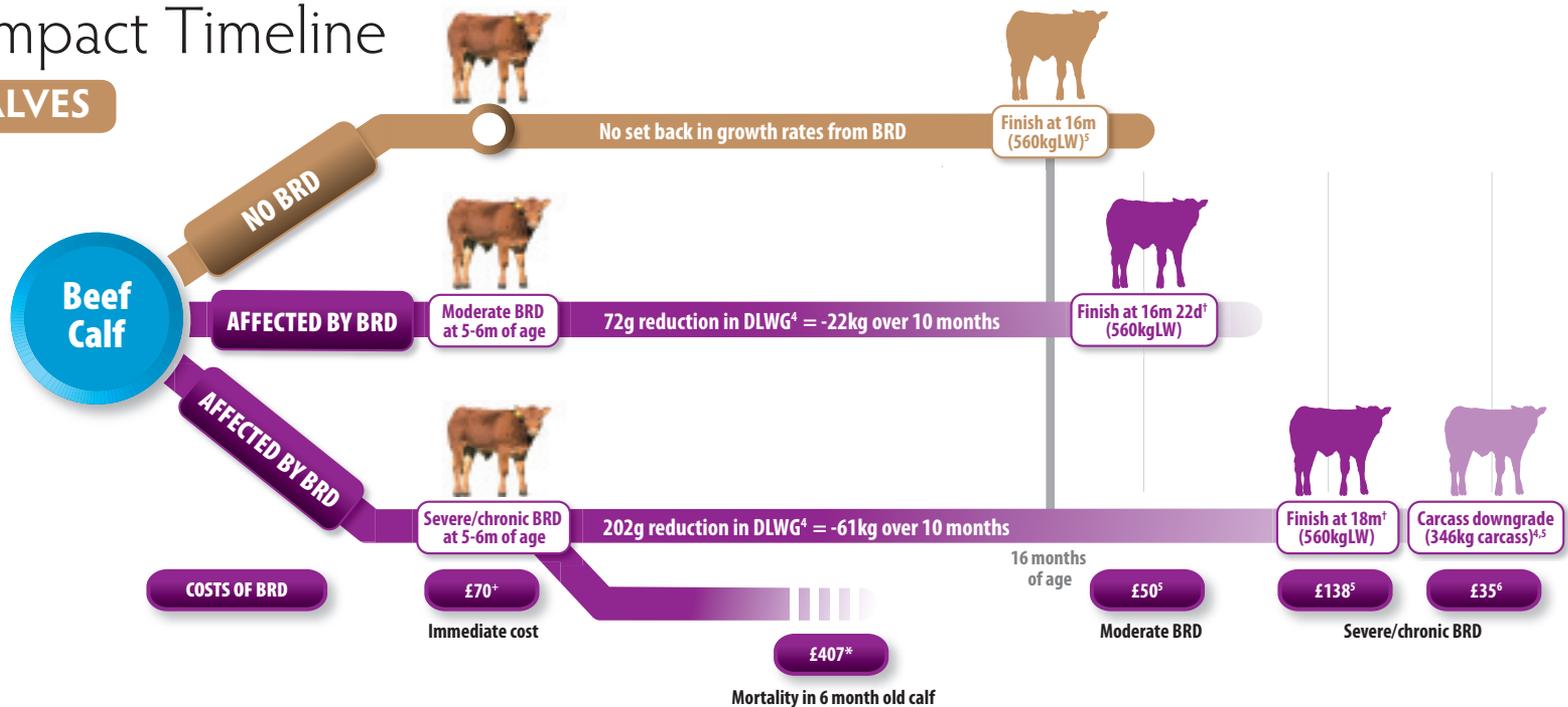
In a UK study involving 645 beef calves, lung lobes were scored at slaughter for the presence and severity of damage from respiratory disease. Calves with damage to half their lung lobes were found to have grown 72g/day less than calves with healthy lungs (22kg less over a 10 month fattening period). Calves in which damage was found in all six

lung lobes had grown 202g/day less (61kg less over the same period). Carcasses with lung damage also tended to grade down, meaning not only a potentially lighter carcass, but also a lower price per kg dead weight.

Careful thought and pre-planning with regards to disease management at housing is critical if herd performance is to be maximised.

BRD Impact Timeline

BEEF CALVES



+ANDREWS A.H., (2000) - Costing data in beef suckler calves, minus the cost of mortality

*Assumes a weight of 225kg and price of £1.81/kg liveweight (EBLEX weekly market data 20Jun14)

†Assumes a DLWG after 16 months of age at 1kg/day

Total cost for a case of moderate BRD = £70 + £50 = £120/case

Total cost for a case of severe BRD = £70 + £138 + £35 = £243/case

> The Causes of Bovine Respiratory Disease



> The Causes of Bovine Respiratory Disease

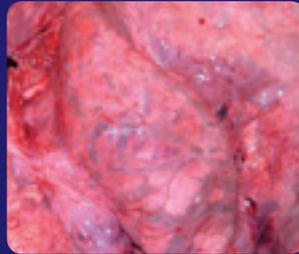
The organisms behind Bovine Respiratory Disease

Bovine Respiratory Disease is caused by a variety of infectious agents but the majority of outbreaks start with a virus. The key viruses involved in the disease are Respiratory Syncytial Virus (RSV), Parainfluenza 3 Virus (PI3v), Bovine Herpes Virus 1 (more commonly known as Infectious Bovine Rhinotracheitis or IBR) and Bovine Viral Diarrhoea virus (BVDv).

BRSv, PI3v

These viruses can act individually or in combination to cause significant lung and airway damage. They also reduce the animal's resistance to secondary bacterial infection.

These viruses are also very widespread. A recent blood sampling survey of 1,731 calves from farms with previous pneumonia problems showed 75% had been exposed to BRSv and 82% to PI3v⁷.



IBR

IBR is caused by a virus called Bovine Herpes Virus 1 (BHV-1). IBR is very wide spread with 73% of suckler herds (83% in herds with grower cattle) testing positive in a recent study⁸. IBR typically affects older calves once protection from the colostrum has waned, and results in fever and classic upper respiratory tract signs including conjunctivitis and discharges from the eyes and nose. It can, however, also trigger BRD in younger calves by reducing the animal's immunity⁹ to the other viruses and bacteria.

BVD

The BVD virus acts as an important trigger as it suppresses the immune system allowing the other agents to multiply and cause disease.

BVD is most commonly spread by a PI (persistently infected) animal, which acts as a carrier for the virus. Originally infected in its mother's womb, a PI may be a 'poor doer' or die at a young age, however, many PI calves appear totally normal but continue to shed virus, acting as a constant source of infection and causing huge problems within a batch of calves, especially if bought-in and mixed with previously uninfected cattle.

Control of BVD is achieved through screening and removal of PI calves, protecting breeding stock before mating and protecting young stock to prevent immunosuppression.

Bacterial infection

Bacteria such as *Mannheimia (pasteurella) haemolytica*, *Pasteurella multocida* and *Histophilus somni* generally act as secondary invaders (taking hold once the viruses have reduced the animal's resistance), causing further damage.

Mycoplasma bovis



Calf lungs showing the damage caused by *Mycoplasma bovis**

Mycoplasma bovis is a type of bacteria with increasing importance and which can act as a primary agent. A recent screening study of 1,731 calves with previous pneumonia problems found 41% had been exposed to *Mycoplasma bovis*⁷.

In infected herds, calves can pick up infection at an early age via their dam's milk and then go on to shed *Mycoplasma bovis* in large numbers during the first 2 months of life.

Colostrum antibodies are not considered protective with primary disease occurring in calves less than 1 month old. Infection spreads rapidly and either alone, or in combination with other viral or bacterial agents, infection can lead to high levels of mortality¹⁰. There are no commercially available vaccines to protect against *Mycoplasma bovis*.

*Image from NICHOLAS R.A.J., (2011) *Veterinary Record* **168** (17) 459-462

Parasites

Dictyocaulus viviparus, a parasite more commonly known as lungworm can also cause respiratory disease. Disease is classically seen in older calves from July to October, approximately four months after turnout to pasture. Left untreated disease may not be noted until after cattle are housed.

Other factors which contribute to BRD

With the viruses that cause respiratory disease highly prevalent on farms, disease can be kick started by a range of triggers and spread rapidly through the group.



Poor housing/Inadequate ventilation

Calves carry the viruses that cause respiratory disease and spread infection as they breathe. So when they are housed the herd's exposure is increased due to close contact between animals

and the fact that viruses become 'trapped' and circulate in the stale air in the shed.

Weaning and housing are stressful times for calves and this can lower their resistance to disease.



Environmental stress

The weather plays a major part in respiratory disease outbreaks, particularly when involving extremes of heat or cold or very still, muggy days and weather is highly unpredictable, making it very difficult to predict if any one

year will be bad for respiratory disease.

High dust levels cause local irritation to the respiratory tract so management practices such as chopping straw can also exacerbate disease.



Nutritional stress

One of the greatest nutritional stressors is weaning. Others include high grain based diets (which can result in acidosis), diet changes, poor quality feed, poor

access to clean water and a lack of micronutrients (vitamins and minerals) which can all increase susceptibility to respiratory disease.

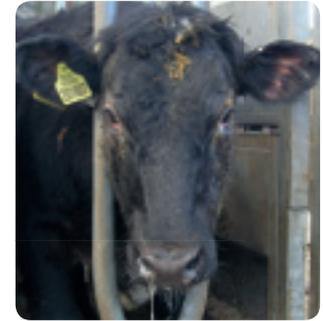


Management stressors

Weaning and transport can create stresses that lead to a greater susceptibility to disease. Mixing of different age groups should be avoided, if possible, to prevent spread of infection from older to younger, more vulnerable calves.

Bought-in cattle

Bought-in cattle may carry a whole host of infections which can be spread amongst the group or to home-bred stock if the groups are mixed.



Recognising the symptoms

Bovine Respiratory Disease can result in a number of symptoms, but as most of these are non-specific it is usually not possible to know what caused the outbreak from the symptoms alone. The following lists the common signs:

- In the early stages, depression and reduced appetite (off-feed)
- Breathing difficulty – rapid or deep chest movements +/- open mouth breathing
- Coughing
- Raised temperature of $>39.6^{\circ}\text{C}^{11}$
- Nose and eye discharge
- Death

Cattle which have respiratory disease often go on to become 'poor doers', a phrase that sums up the general appearance and performance of the animal.

Summary

Triggers

- BVD
- Stress
- Mixing
- Transport
- Handling
- Housing
- Nutritional deficiency
- Poor/insufficient colostrum
- Lungworm

+

Key Primary Agents

- BRSv
- PI3v
- IBR
- *Mycoplasma bovis*

+

Key Secondary Bacteria*

- *M.haemolytica*
- *P.multocida*
- *H.somni*

*can less commonly act as primary agents

=

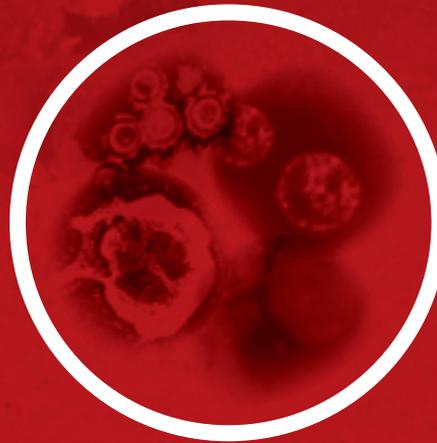
Bovine Respiratory Disease

- Calf death
- Chronic 'poor doers'
- Reduced growth rates
- Reduced carcass grade
- Economic loss

> Controlling Bovine Respiratory Disease



Animal



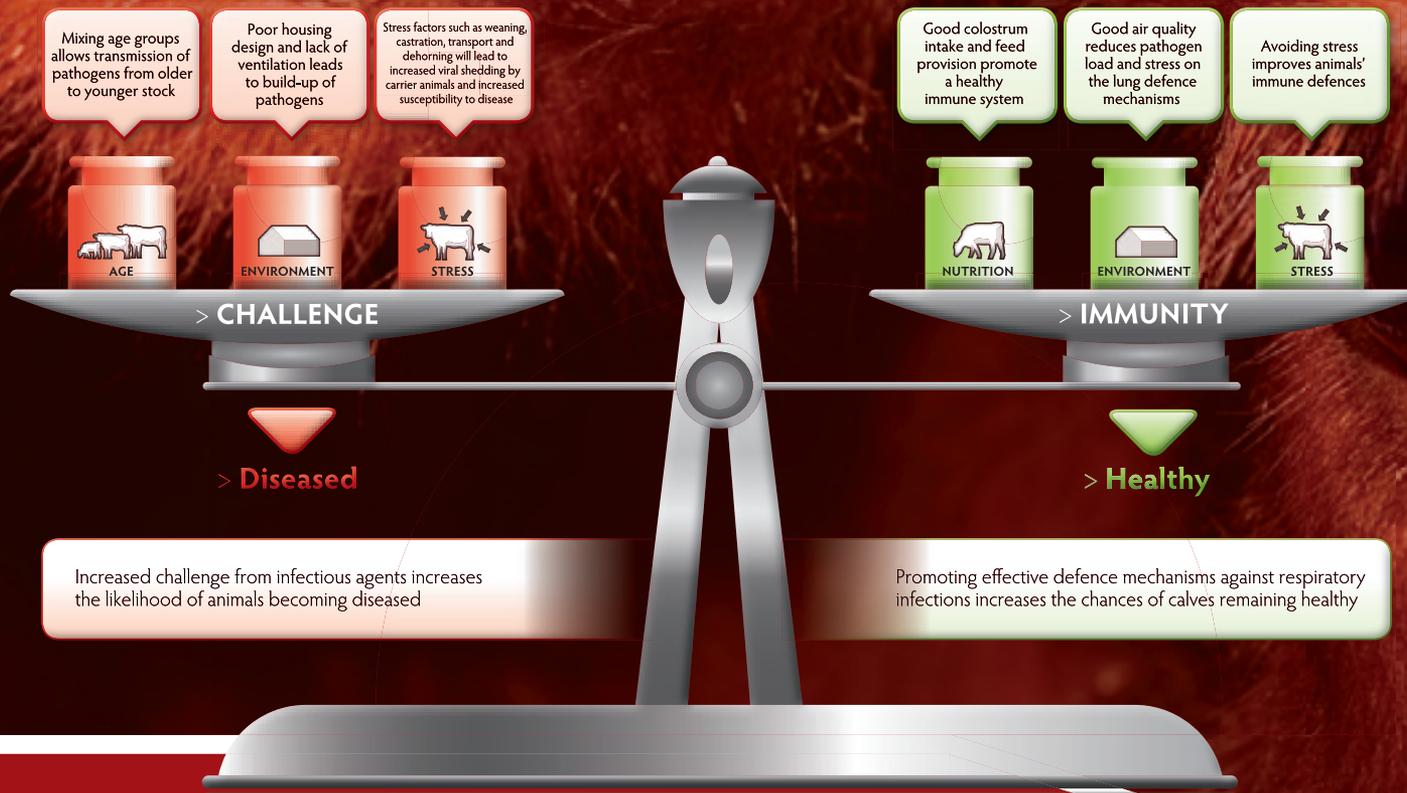
**Infectious
Agents**



Environment

The principles of disease control

BRD results from a combination of pathogens and risk factors. Controlling disease therefore requires the correct balance between the presence of infectious agents (challenge) and the calf's resistance to those pathogens (immunity).



Effective control of BRD therefore involves managing the herd to reduce the trigger factors (particularly through improvements to building ventilation), vaccinating against infectious agents when appropriate and having systems in place to ensure that if disease does occur, animals can be identified and treated early to minimise any losses.

> Controlling Bovine Respiratory Disease

1. Improve building ventilation

Maintaining a well ventilated, draught free environment (air flow <math><2\text{m sec}</math>) plays a vital part in preventing respiratory disease from taking hold. Good ventilation ensures a uniform air flow whether it is a still or windy day outside and ensures that excess moisture, dust, gases and germs all escape from the building. Drainage slopes, set at a 5° angle help keep the bedding dry, further reducing moisture and humidity, both important risk factors for BRD.

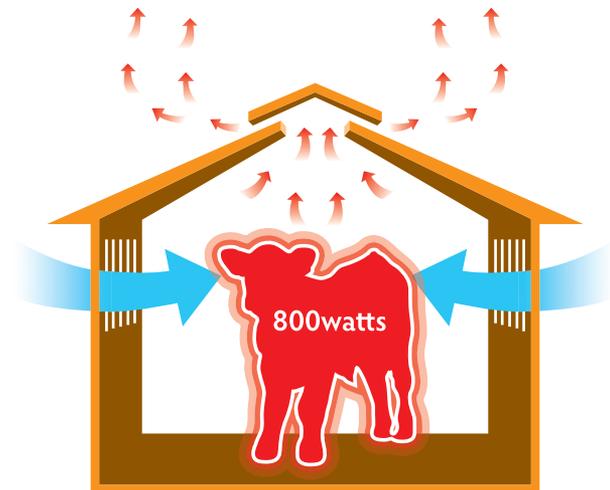
Naturally ventilated buildings rely on the 'stack effect'. Heat generated by calves warms the air, which rises and exits through outlets in the roof. The negative pressure this creates draws air in through inlets in the walls, ensuring fresh air circulates in the building even on the stillest of days. Effective ventilation helps to reduce the level of infectious agents circulating in the shed and reduces

gases such as ammonia and slurry gases which can be harmful to the respiratory tract.

In a poorly designed building, for example one which lacks an outlet in the roof, the warm air that animals breathe out cannot escape, so it condenses and falls, creating the ideal environment for the viruses and bacteria that cause respiratory disease to multiply.



Ideally, ventilation should work on the Stack Effect, shown in the diagram:



The Stack Effect gives efficient ventilation

- Animals breathe out warm air which rises and escapes from the highest point of the building (the outlet)
- This creates negative pressure within the building which draws fresh air back in through the inlets
- Doors are not suitable inlets; they create drafts, can result in 'wind tunnels' and are closed too easily



Overstocking reduces air quality

Overstocking a building will have a detrimental effect for **TWO** reasons:

1

More animals means more infectious agents are breathed out, increasing the challenge level in the building.

2

Cattle produce large amounts of moisture. Increased stocking rates increases air moisture levels, allowing bacteria and viruses to survive for longer.

You therefore need to ensure that stocking levels are correct, especially in sheds which may not be ventilating adequately.

How to check building ventilation

The quality of a building's ventilation can be assessed by using smoke cartridges. When set off these release smoke into the building and how or whether it dissipates will give a good idea of the quality of the ventilation. The test should be carried out when the building is full of stock (to get the stack effect) and when the air is still (to ensure that any wind does not skew the results). In a well ventilated building, the smoke will pass out through the outlets in the top of the building. If it hangs in the building there is a problem.

It is often a good idea to also test specific areas in a building – even if ventilation is good in the centre, there may be corner areas where ventilation is not so good.

Nearly half of all naturally ventilated buildings investigated in research projects do not supply adequate airflow for the amount of cattle housed.

Adequate ventilation is a long-term investment so you should seek professional advice when constructing or changing housing.



2. Vaccination

Vaccination can play an important role in protecting a herd against the infectious agents that cause respiratory disease. Vaccination works in two ways:

- Increasing the calves' immunity so they are better protected
- Reducing the challenge, as vaccination reduces the amount of virus the calves breathe out, hence reducing viral levels in the shed

Vaccination against respiratory disease requires a group approach. Ideally all calves, especially those sharing an airspace, should be vaccinated and, where possible, this should be done before they are housed. Remember that BVD is an important trigger virus, so the

BVD status of the herd should be taken into consideration when implementing a calf pneumonia vaccination programme.

The most appropriate vaccination protocol will depend on a number of factors, including the age of the calf, and how quickly protection is needed.

Respiratory disease vaccination protocols

For Home-Bred Spring Born Suckler Calves



5ml dose given IM

3-4 weeks later



5ml dose given IM

At least 2 weeks before housing



6 months protection against BRSv, Pi3v, IBR and BVDv

Weaned and housed in autumn, these calves can benefit from the broad protection provided by a 2 dose course of Rispoval 4, giving cover against the key viral causes of respiratory disease for up to 6 months, ensuring protection throughout the winter housing period.

For Autumn Born Suckler Calves



(From 9 days of age)
2ml dose given IN

12 weeks protection against BRSv and Pi3v

If ongoing protection is required



5ml dose given IM

3-4 weeks later



5ml dose given IM

6 months protection against BRSv, Pi3v, IBR and BVDv

Born just before or during the winter housing period, these calves need a vaccine which works fast to provide protection and minimise viral loads in the shed. Calves can be vaccinated with a single dose of Rispoval IntraNasal from just 9 days of age, providing rapid cover against BRSv and Pi3v (2 key viral causes of pneumonia in young calves) for up to 12 weeks. Where required Rispoval 4 can be used, from 12 weeks, to provide ongoing broad, long lasting protection.

For bought-in calves or as an alternative option for spring/summer home-bred calves where fast onset protection is required

For bought-in calves not vaccinated pre-sale the challenge lies in getting **protection** in place quickly enough. In these situations a 2 dose vaccine programme may not be appropriate. An alternative option for **rapid protection** is to use vaccines which require only a single dose start, and which can be delivered intranasally.

This approach ensures calves are protected as quickly as possible but may compromise the duration and breadth of cover (for example this programme does not include protection against BVDv), so you should consider the need for further vaccination during the housing period. Where, for example, ongoing protection against BRSv and Pi3v is required, a further dose of Rispoval IntraNasal can be given to ensure calves are covered for a full 6 months.



Note: no information is available on the safety and efficacy of concurrent use of Rispoval[®] IntraNasal and Tracherine[™]. The decision regarding timing of administration of either vaccine in relation to the other should be made on a case by case basis.



Calves vaccinated with RISPOVAL 4* or Rispoval IntraNasal and Tracherine that then go on to be sold are eligible to be registered under one of the schemes within the the SureCalf programme.

This programme aims to minimise the impact of post-movement respiratory disease by encouraging investment in vaccination of cattle pre-sale.

There are three schemes within the SureCalf programme, with eligibility determined by the vaccines used, or by sale date in relation to vaccination dates.

By providing a certification system the programme aims to increase the value of the calves sold within it and, through a reduction in BRD incidence, to help protect the buyer's investment.

For more information please visit

www.surecalf.co.uk

* Rispoval 3 and IBR vaccine combination alternatives available

The benefits of vaccinating against respiratory disease

Because more calves can be affected by respiratory disease than just the obvious clinical cases, many farmers see an improvement in performance across the whole herd when they start protecting against respiratory disease. Underlying respiratory problems can affect growth rates and therefore profitability and many leading

farmers now see a vaccination programme as an essential part of their herd health plan, with the subsequent improvement in their overall herd profitability. It's no coincidence that the Beef Farmers of the Year 2005, 2006, 2007, 2008, 2010 and 2011 all vaccinated their stock against the viruses to protect against respiratory disease.



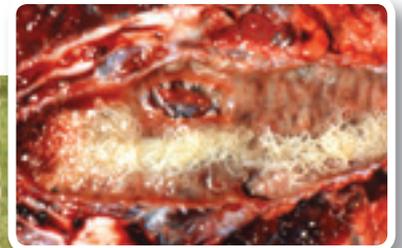


3. Protect against parasites

Lungworm is a parasite that can cause respiratory disease in older calves at grass. Lungworm are particularly prevalent in the autumn and can cause lung damage which increases the risk of pneumonia soon after housing when animals are exposed to the viruses and bacteria as well. A vaccine is available to protect against lungworm, or alternatively control can be achieved through use of an appropriate endectocide or anthelmintic treatment programme.

If the pre-housing anthelmintic treatment can be given some weeks before housing, this will help ensure calves are free of lungworm and therefore healthier, and less at risk of BRD in the early housing period.

Some endectocides (for example Cydectin® Pour-On for Cattle) allow treatment up to 5 weeks pre-housing which for convenience could coincide with vaccination against the respiratory viruses.



4. Treating an outbreak

If pneumonia occurs in your herd, rapid and effective treatment with an antibiotic is necessary to help ensure a rapid recovery and limit the potential negative impact on future performance. Remember that these antibiotics only treat the secondary bacteria involved in the infection. In some cases it might be appropriate to treat the whole group based on criteria such as disease history, speed and severity of the outbreak. The decision to group treat should be made in conjunction with your vet.

Some of the key considerations when choosing an antibiotic treatment are:

- **Correct spectrum of activity** – the antibiotic needs to have reliable activity against the key bacteria, specifically *M. haemolytica*, *H. somni*, *P. multocida* and *Mycoplasma bovis*.
Mycoplasma bovis in particular can be difficult to treat and many antibiotics have no activity against it.
- **Fast acting** – the antibiotic needs to be rapidly absorbed and start to work quickly.
- **Optimum duration of activity** – once an animal is infected it takes approximately 7-10 days for the lung tissue to repair itself¹², so any antibiotic treatment needs to be effective over that period of time.

In some cases, anti-inflammatories may be used alongside antibiotic treatment to reduce inflammation in the lungs and reduce the animal's temperature.





Bovine Respiratory Disease is a very common problem in young stock: its severe economic effects make effective countermeasures a high priority to maintain herd profitability, especially as not just sick animals contribute to the cost of the disease.

The most effective approach will combine good husbandry and disease prevention, together with careful monitoring of your herd for signs of disease. While the investment in housing, vaccination and good management practices may initially seem an unwelcome extra expense for a tight farming budget, the economic gains from healthy, high-quality cattle nearly always considerably outweigh the costs.

Speak to your vet about control of Bovine Respiratory Disease on your farm