Herd health

Maximising your herd's potential through improved health

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Introduction

Effective herd health planning should underpin any cattle enterprise. The impact of disease on the performance and profitability of Welsh beef herds cannot be underestimated with prevention and herd health planning being critical.

This booklet highlights the importance of prevention through herd health planning and biosecurity. It covers the clinical signs, diagnosis, treatment, and prevention of the main diseases impacting Welsh beef herds along with the potential economic impact of the diseases.

The benefits of health planning

In recent years there has been a significant drive to promote health planning and preventative treatment, with emphasis being placed on working with vets to try to reduce problems on farm and aiming to improve the farm's overall productivity and performance. The long-term goal is to help make the business more profitable and efficient. An annual health plan review to discuss problems on farm provides continuity and gives opportunity to review performance and improve knowledge and understanding of common diseases as well as improving communication between the farmer and vet.

Data and performance records are useful to help identify the key areas where the farm performance could be improved. The table below shows some simple areas that can be used to begin keeping records.

Data collected	Number
Number of cows put to the bull	
Number of cows scanned in calf	
Number of barrens	
Number of cows calved	
Number of calves born alive	
Number of cows aborted	
Number of calves lost	
Number of calves weaned (including data on weights and age at weaning)	
Number of cattle finished vs retained	

Once basic data is collected, this can be used to compare and monitor performance year on year.

Biosecurity

Biosecurity is very important as it can help protect and prevent the herd from health issues. Biosecurity is defined as undertaking actions to reduce or prevent the introduction of new disease into the herd from outside sources. Biocontainment is slightly different and focused on reducing or preventing the spread of a disease that is already in the herd.

While both successful biosecurity and biocontainment are critical to a herd's performance, it is crucial to prevent a condition entering the herd. This is significantly easier and cheaper than trying to remove or reduce the spread of an infection when it has already been introduced.

When thinking of biosecurity, infectious diseases that purchased animals can bring into the herd are primarily identified as risks, but thought should also be given to the infectious disease risk from animals returning to the farm; including those brought back when reared or wintered away, animals brought back from shows, on-farm visitors, public access/right of way, slurry from other farms used on land, and access or contact from neighbouring stock.

The table below highlights some of the infectious diseases that can have a serious impact on herds:

Table 1

Diseases to consider	Prevalence	Risk	Impact
	How common is this condition in Wales/UK?	**What is the chance of buying in or getting this disease? High, Medium, or Low**	**Potential impact on herd if condition is introduced to herd High, Medium, or Low**
Bluetongue Virus	Low	Low	High/Medium - notifiable disease
Brucella	Low - mainland UK free for 10 years, present in Ireland and Europe	Low for UK cattle	High - notifiable disease, all infected cattle and contacts slaughtered
		Medium/High for imported cattle	
BRD (Bovine Respiratory Disease) (caused by multiple pathogens)	High	High	High
			depends which pathogens are brought in and those already present on farm, can cause serious outbreaks of respiratory disease
BVD (Bovine Viral Diarrhoea Virus)	Reported 20 -25% Welsh herds affected	Medium	High
	England unknown	(Location dependent)	
	Scotland BVD Free		
Campylobacter Foetus Venerealis	Low-Medium	Medium	High
Digital Dermatitis	Medium	Medium	High

Diseases to consider	Prevalence	Risk	Impact
	How common is this condition in Wales/UK?	**What is the chance of buying in or getting this disease?** **High, Medium, or Low**	**Potential impact on herd if condition is introduced to herd** **High, Medium, or Low**
Endoparasites e.g., Lungworm, gut worms	High	High	Medium
Ectoparasites e.g., Lice, Mange	High	High	Medium
IBR (Infectious Bovine Rhinotracheitis)	43-84%	High	High
Johne's Disease (Mycobacterium Avium Subspecies Paratuberculosis)	Est. 20-50% UK herds affected	High	High
Leptospirosis	Approx. 75%	Medium/High	Medium/High
Neospora caninum	High	High	Medium/High
Salmonellosis	Medium-High (location dependent)	High	High especially if herd is naïve/ has not been exposed before
TB (Mycobacterium tuberculosis)	High (location dependent)	High	High

Points to consider when buying in animals from other herds?

- Herd health status - what is the status of the herd for infectious diseases? Are they part of any accreditation schemes? Do they have evidence that the herd is free from any infectious diseases?
- Vaccination history of the animals: products used, including dates when given and when boosters are due.
- Consider blood test to check for exposure to conditions.
- Parasite treatments, management and testing - what have they been treated with and when together with any evidence of anthelmintic resistance on the farm.
- Health history - history of pneumonia, scours and other condition.
- Age of animals.

Breeding stock, pregnant animals - if buying in pregnant animals, it is important to consider that the unborn calf could be infected with BVD and be a PI (persistently infected) animal, so the calf could be tested once born. Maiden heifers and virgin bulls will often be safer than older animals, but it is still important to consider the health status of all bought in/purchased animals. Buying virgin bulls will reduce risk of them having Campylobacter Foetus Venerealis.

Points to consider when bringing animals back home that have been away from the home farm?

- Have they had contact with stock from other farms? If yes, then manage as though newly purchased.
- Have they been on land that other stock has previously grazed? If yes, test and treat with appropriate parasite control.
- Do they need to have a PRMT or PMT TB test?
- Quarantine on return home

Points to consider when bringing animals back from a show?

- Have they had contact with other stock from other farms, shared air spaces, is nose to nose contact possible? If yes, then manage as though purchased.
- Do they need to have a PRMT or PMT TB test?
- Quarantine on return home.

Farm biosecurity measures/ methods

- Risk from neighbouring farms
  - Nose to nose contact with neighbouring herds risks spreading infections, e.g. IBR, BVD, Lepto, TB and other respiratory pathogens.
  - Double fencing of all land and especially land between neighbouring farms is important to reduce this risk. Some health schemes now require a minimum of a 3m double fence boundary to protect against the spread of diseases such as BVD.
  - If stock from other herds get into farm stock (e.g. bull gets in with cows), check the health status of the other farm, and consider risk to the cows. This is a common entry of BVD into herds previously unaffected.
- Slurry from other farms and the risks
  - Slurry from other herds may contain bacteria that can survive and be spread on land and possibly infect cattle with diseases such as TB and Johne's disease. Important to check the health status, TB and Johne's status of the farms offering the slurry.
- Consider the risks of hired in bulls
- Visitors
  - It may be worth evaluating the risk from visitors to the farm and if public footpaths cross the land
  - Visitors to the farm should wear clean and disinfected waterproofs/wellies. Provide footbaths with regularly refreshed disinfectant at entry points.

Quarantine and isolation

- It is advisable to quarantine all new arrivals for at least 21 to 30 days
- No mixing with other stock on farm should occur during this time
- Isolation facilities must be separate from own stock, this means a separate airspace and must not share common grazing
- General health check: check body condition, signs of skin disease, any discharges from nose/eyes, coughing, panting, passing normal urine/faeces, feet/lameness
- Testing: consider any blood tests that need to be done, may be a need to consult the farm vet
- Treatments/vaccinations: if unvaccinated for conditions that purchased farm vaccinate for the animals should be fully vaccinated before entering herd. It is important to consider parasite tests and treatments for endo and ectoparasites. This should be done following discussion with farm vet about potential tests and treatments

Cattle diseases

Respiratory diseases in cattle

Bovine respiratory disease (BRD) is the name given to describe all the different factors that can lead to respiratory symptoms in cattle. Many different pathogens cause respiratory disease, and these can be grouped into viruses, bacteria, mycoplasma and parasites.

BRD tends to affect youngstock more than adults due to their lack of immunity to these pathogens. However, if a herd has not previously come into contact with a pathogen and there is no herd immunity, then outbreaks can occur in adult cattle too.

Clinical signs

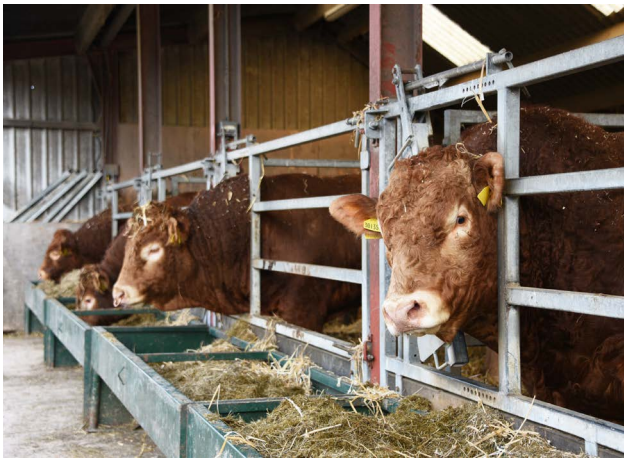
The clinical signs of respiratory disease vary depending on whether the disease is acute, sub-acute or chronic. Symptoms also vary depending on the number of pathogens involved; whether the animals have been exposed to the pathogen before; the general health and strength of the animals' immune system and other management factors.

Acute and sub-acute disease generally occurs quickly after the start of infection and causes any, or all, of the following clinical signs:

- Coughing
- High temperature (above 39°C)
- Difficulty breathing/panting. The animal can sometimes be seen breathing through its mouth instead of its nose.
- Loss of appetite
- Nasal and/or eye discharge
- Sudden death

In these cases, getting treatment quickly is important to help the animal recover and prevent lasting damage to the lungs. It is important to isolate any sick animals away from the rest of the group to prevent spread.

Chronic disease occurs over a longer period of time and is due to a slow build-up of infection which results in lung damage and scarring. This can often start as acute disease that was not treated properly.



Clinical signs include:

- Increased breathing rate and effort; often with laboured movement of the stomach as well
- Persistent cough, often heard during exercise
- Weight loss
- General poor performance and weakness to other disease

Diagnosis

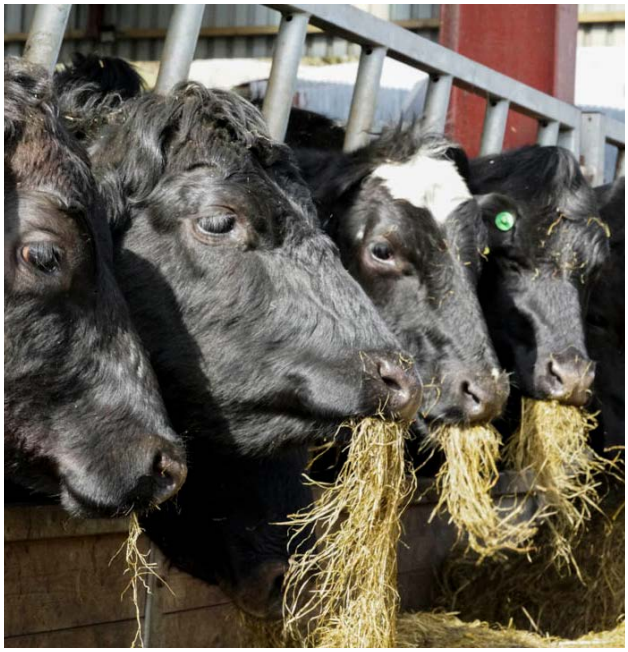
BRD is complicated, therefore it is important to involve the vet to diagnose the cause and advise on the correct treatment and management plan. The vet may wish to examine animals and collect some samples for testing.

If an animal dies from suspected BRD the vet may recommend a post-mortem to take lung and tissue samples. This is the best way of making a diagnosis so it is important to keep the vet updated and inform them promptly if an animal dies during an outbreak.

Treatment

In most cases of BRD the vet will give treatment to reduce any fever and inflammation in the airways and will usually give an appropriate antibiotic. This is to stop any bacterial infection.

Antibiotics will not be effective at tackling the problem if the cause is viral or mycoplasma, hence testing to establish the cause is important.



Control and prevention

There are vaccinations available for many of the causes of pneumonia. Vaccination is the most effective way of controlling BRD on farm, but it is important to diagnose the cause of pneumonia to select the correct vaccine for the animals.

Cattle management plays a big part of controlling the spread between animals including the following:

- Quarantine facilities should be available for sick and bought in animals which will need to have separate air space, and access to feed and water. Pneumonia is often introduced to a farm through bought in animals, if these are not isolated on arrival, they pose a high risk of carrying and spreading diseases.
- Reduce stress at housing and try to avoid handling for the first 6 weeks after housing.
- Avoid mixing different age groups, this includes avoiding shared air space.
- Ventilation: air should flow in through the bottom of a cattle housing and out from the top of the housing. It is important to ensure that the building is not under or over stocked and that there is good ventilation. Ventilation can be checked by a specialist who can test air flow and advise on improving ventilation.
- Animals should have appropriate nutrition, access to clean water, correct lying space and are otherwise well and treated against other diseases.

Parasitic respiratory disease

Dictyocaulus viviparous is the only parasite that causes respiratory disease and is responsible for lungworm or 'Husk' in cattle. It is most often seen in wetter parts of the UK and usually in younger cattle out grazing for the first time.

Lungworm larvae are eaten off the pasture by grazing cattle, and the larvae then travel from the guts to the lungs. It does not spread from animal to animal but animals grazing the same pasture will be at risk.

Clinical signs

Symptoms vary between individuals and include:

- Classic cough or 'Husk'
- Reduced appetite
- Difficulty breathing
- Weight loss
- Poor performance
- Death

As well as the lung damage caused by the worms, there can sometimes be a reaction to the dead worms themselves, which can often occur after treatment of a heavy burden. This can be fatal. Cattle with damaged lungs from a lungworm infection are more likely to get a secondary lung infection from a bacteria or virus when housed for the winter.

Diagnosis

The farm vet may be able to diagnose from clinical signs, history of the animals and through faecal samples.

Treatment

There is no evidence of lungworm anthelmintic resistance in the UK, so all classes of wormer are reported to effectively treat lungworm.

Animals with more serious symptoms such as difficulty breathing, fever and that are off their food may require additional treatment by the vet.

Prevention

There is a vaccine against 'Husk' available in the UK which should be used to vaccinate calves in their first grazing season in a high-risk area.

One-off or long acting/bolus wormers can also be used to control lungworm, and the farm vet can advise when and what to use to compliment the rest of the farm's worm control plan.

Gastro-intestinal diseases of cattle

Johne's disease

Johne's disease is caused by a bacterium called *Mycobacterium avium* subspecies *paratuberculosis* (MAP). It is widespread throughout UK herds and causes significant losses in the beef and dairy sectors.

Johne's disease affects the gut lining of adults, making it harder for them to absorb nutrients from the diet, leading to diarrhoea and extreme weight loss.

Transmission

Johne's disease is most commonly spread when youngstock (under 12 months) ingest either infected faeces or colostrum from an adult animal with the disease.

A mother can also spread it to her unborn calf whilst pregnant if she is in the latter stages of the disease.

The disease can remain dormant for a long time and be triggered suddenly by a stressful event when animals are older.

In a clean herd, one of the main ways to introduce Johne's disease to a farm is through buying in new cattle. Cattle can shed Johne's bacteria into the environment for years before showing symptoms, making control and eradication difficult.

The bacteria is robust and can survive for a long time in the environment. Faecal contamination on machinery, vehicles or clothing are a potential source of infection, as well as purchasing slurry from other farms to spread on fields.

Johne's can spread across species with direct link identified between Johne's in sheep and cattle as well as wildlife, including deer and rabbits.

Clinical signs

The symptoms of the disease are often triggered by a stressful event such as movement or calving.

Clinical signs include:

- Diarrhoea and weight loss which does not respond to treatment.
- The animal is otherwise bright with no temperature and appetite is good.

As the disease progresses during the following months, symptoms include:

- Profuse diarrhoea
- Marked weight loss
- Bottle jaw
- Emaciation; eventually resulting in either death or euthanasia on welfare grounds.

Diagnosis

When an animal is showing signs of disease, the bacteria can be detected through a combination of faecal and blood samples taken by the vet. Diagnosis in the early stages or within young cattle before symptoms appear is very difficult.

Treatment

There is no treatment for Johne's disease.

Prevention and control

There is no vaccine available in the UK, however a vaccine can be imported under licence. The farm vet can give more information on the most suitable Johne's eradication programmes available to protect the herd.

All purchased animals should be isolated and tested for the disease but unfortunately this does not necessarily identify all infected animals, so it is important to try to purchase animals from herds which are low risk and also carrying out regular testing.

Controlling the disease should focus on reducing the risk to youngstock. Here are some practical examples of ways to reduce the risk of infection spreading in the herd:

- Isolate and remove animals from the herd that have tested positive for Johne's disease. Any calves at foot from infected animals should not be kept for breeding.
- Calving pens need to be cleaned out and disinfected.
- Any cows that are known to be Johne's positive but are due to calve should have their calves removed at birth to stop the calf suckling infected colostrum.
- Replacement colostrum from other herds should be avoided unless their herd is known to be free from Johne's disease.
- Water troughs should be cleaned out regularly and areas around feeders or feed troughs should be clean and dry.
- If an animal has tested positive for Johne's disease. do not spread that animals' faeces on fields where it is planned to graze breeding cattle (or sheep) in the next 12 months.
- Try to avoid co-grazing sheep and breeding cattle. If this is not possible then the vet may decide to screen sheep for Johne's disease.
- Slurry from other, unaccredited, farms should not be spread on fields intended for grazing breeding cattle (or sheep, ideally).

Rumen acidosis in cattle

Rumen acidosis can be either acute or sub-acute. Acute acidosis occurs when there has been a sudden intake of large amounts of high carbohydrate feeds like grain or concentrates. This occurs when an animal consumes a large volume of concentrates too quickly (an example could be animals suddenly introduced to an ad-lib system).

Sub-acute acidosis occurs when animals have had a build-up of too much carbohydrate over a longer period of time. This is often seen in beef finishing units when animals have access to excess feed to encourage weight gain.

A cow's digestion relies on a balance between the animal and the rumen bacteria. Any sudden changes in diet can have a big impact on the bacteria that is vital to help the animal digest its food.

Grain overload causes the rumen to become very acidic, which stops the rumen contracting, resulting in a build-up of gas. The acidic conditions kill the 'good' bacteria in the rumen, leaving bacteria that produce even more acid, which is absorbed into the bloodstream. If not treated the animal can become unwell quickly.

Clinical signs

Clinical signs vary depending on the amount of grain eaten and whether the animal is adjusted to the diet already. It takes the bacteria in the rumen at least two weeks to adjust to a new diet, so sudden gorging can result in a life-threatening condition.

In sub-acute acidosis, the symptoms are more subtle and harder to spot as they are generally not seen following grain overload. It can be several weeks before a problem is noticed, usually when the daily live weight gain drops. These animals can develop liver abscesses making it difficult to recover long term.

Acute symptoms:

- Weakness and wobbly gait
- Colic (teeth grinding, kicking at belly, sweating)
- Bloat
- Dehydration
- Dull/depressed
- Loss of appetite
- Sweet smelling, watery diarrhoea after the first 12 to 24 hours

In severe cases, the animals are unable to stand and can die within 24 to 48 hours. Even those that recover initially, can then go on to develop further issues over the following weeks.

Sub-acute symptoms:

- Reduced appetite
- Weight loss or poor weight gain
- Diarrhoea
- Increased temperature
- Increased heart rate and breathing rate

Diagnosis

Acute acidosis is usually diagnosed through clinical signs along with the animal's history. The vet can take some rumen fluid samples to confirm diagnosis if it is not an obvious case.

In sub-acute disease, it would be advisable for the vet to examine the animals and may take rumen fluid and blood samples.

Treatment and prevention

In acute acidosis, if an animal has eaten a large amount of carbohydrates, quick action is needed. Treatment includes intravenous or oral fluids containing sodium bicarbonate to combat the acid. Antibiotics and multivitamins are usually given to control the bacteria in the rumen and support the animal.

In very severe cases the vet may need to empty the rumen.

Treatment of sub-acute acidosis is more difficult as the acidosis is mild but long term. The secondary symptoms can be treated but focus should be on prevention in the future, reviewing rationing and liveweight gain targets and ensure any diet changes are done so gradually.

Bloat

Bloat is a build-up gas in the rumen. Gas produced by the bacteria in the rumen as part of digestion is released by the animal belching. When this gas cannot be released the rumen swells. If left untreated the cattle will die.

There are two types of bloat:

1.) Gassy bloat: when the gas cannot escape from the rumen due to a blockage or because the animal is unable to belch, as in cases of milk fever.

2.) Frothy bloat: this is more common and occurs during the spring and autumn when there is an increase in the growth of lush pastures. Bi-products from the breakdown of legumes, particularly clover and alfalfa, causes the build-up of a sticky foam on the rumen contents. This prevents gas bubbles being released.

Clinical signs

- Large gassy swelling on the left side of the stomach.
- The animal is in pain, with signs of colic, including, kicking at abdomen, sweating, straining and bellowing.
- Sudden death (in some cases death can occur just 15 minutes after the start of the problem).

Diagnosis

Gassy bloat tends to affect one or just a few individuals in a group, whereas frothy bloat can affect up to 25% of animals grazing on the same pasture.

A stomach tube can be passed in affected animals. If it is gassy bloat, passing a tube, if possible, into the rumen will release a large amount of gas. If it is frothy bloat, passing a tube will not produce any gas.

Treatment

If diagnosed, using a stomach tube will treat gassy bloat. If a tube cannot be passed or the animal re-bloats, the vet may, as a last resort, fit a trocar device into the rumen to allow a permanent escape for the gas, although culling is more likely.

To treat frothy bloat, an anti-foaming agent can be given via a stomach tube. The group of animals should be removed from the pasture and put on a high fibre diet of straw or hay and monitored closely for signs of bloating.

Prevention

Strategic pasture and grazing management is key to preventing bloat. Clover rich pastures in late summer and autumn are higher risk areas and cattle should be introduced gradually on a full stomach to allow gut bacteria to adjust.

> **“Gas produced by the bacteria in the rumen as part of digestion is released by the animal belching. When this gas cannot be released the rumen swells.”**

Salmonellosis

Salmonella can cause a range of symptoms in all ages of cattle from septicaemia and diarrhoea, to joint ill and abortion. The most common species of salmonella in cattle in the UK are *Salmonella Dublin* and *Salmonella Typhimurium*. These two species of salmonella are zoonotic, meaning they can also spread to humans, so special care should be taken when handling animals with a suspected salmonella infection.

Spread:

- The main route of bacteria spread is the faecal-oral route between infected animals and the rest of the animals in the group
- Faecal contamination of food and water troughs, housing, equipment, and clothing.
- Vermin and birds that have access to feed and water sources can also spread the bacteria
- Cattle that have aborted, along with the aborted calf, afterbirth, discharges and milk are also contagious.

Calves infected with salmonella very rarely go on to become carriers, but almost all adult cattle infected will continue to shed the bacteria into the environment for a period of time. Some cattle can be carriers of salmonella for years without ever showing symptoms. Often shedding can start in these animals by a period of stress such as calving or movement. For this reason, purchased cattle can carry risks of introducing an outbreak of salmonella on farm.

Clinical signs in calves:

Calves under one week of age with salmonella will often have a poor prognosis due to their limited immune system and low body weight. As salmonella can affect many different parts of the body, the symptoms can be varied. Here are some of the most common ones:

- Dullness/depression
- Weakness/unable to stand
- Fever
- Lack of appetite
- Bloody diarrhoea
- Seizures
- Joint ill which can also involve the joints in the spine
- Dry gangrene of the extremities (ear tips/hooves)
- Pneumonia

Symptoms in adult cattle include:

- Bloody diarrhoea
- Fever
- Depression/weakness
- Lack of appetite
- Abortion; around 5-8 months of pregnancy
- Retained afterbirth

Diagnosis

Diagnosis of salmonella infection can be confirmed by testing faeces, blood, milk or any other infected fluid or tissue from a sick animal.

Treatment

The treatment for salmonella infection requires the use of an appropriate antibiotic, anti-inflammatory and supportive fluid care if necessary. Vet advice should be sought on the most suitable treatment.

Prevention

- Understanding and identifying the source of the outbreak is the key to controlling the disease
- The main sources of infection to rule out are bought in animals, contaminated feed or water stores and potential environmental sources. It is important to involve the farm vet to get advice and to carry out this necessary testing and discuss control of the disease.
- Limiting and controlling spread within a herd during an outbreak needs close attention to biosecurity and hygiene. Animals with confirmed salmonella should be isolated for a minimum of five weeks to allow follow up testing to assess if they have become carriers. Removing the animal from the herd may be a more sensible approach.

Abortion in cattle

Abortions in UK suckler herds are rarely reported or diagnosed. Abortion from one cow causes significant financial loss to a herd (including direct loss of calf, the indirect fertility losses of poor calving interval and the vet and med costs of any treatment). It is important to diagnose the cause of abortion to avoid future loss in the rest of the herd.

Causes of abortion

Causes of abortion may be infectious and non-infectious. Table 2 shows the infectious causes of abortion. See pages 16 and 17.

For information on salmonella abortion, please see the section on salmonellosis.

Non-infectious causes of abortion

Abortion may occur due to non-infectious causes such as:

- Trauma: handling or moving animals, or bullying behaviour within the herd, can cause stress and lead to abortion.
- Heat stress: anything that causes the cow's body temperature to raise can damage the placenta and calf, resulting in abortion.
- Trace element deficiencies: there is more detail in the trace element section but deficiencies can lead to infertility, abortion, stillbirth and the birth of weak calves with possible birth defects.
- Toxins: exposure to toxins can result in abortion.

Managing the aborting cow

Regardless of the cause, there are some basic principles that should be followed when dealing with a case of abortion in the herd:

- Isolate the aborting animal(s) from the rest of the herd immediately until any follow up testing is performed or until at least three weeks after the vaginal discharge has stopped.
- Contact the farm vet and discuss whether diagnostic testing is appropriate.
- Keep the foetus and afterbirth in a clean empty bag, so that samples can be sent for testing, if appropriate. Safely dispose any remaining material.
- Thoroughly clean out and disinfect any pens or handling facilities used by the cow and the aborted calf. This includes workers' clothing and footwear and any equipment used.
- Careful monitoring of the remainder of the herd in case another cow begins to abort.
- Keep in contact with the vet so that the plan of action can be adjusted should things change.

Diagnostic testing using samples from the mother, aborted foetus and afterbirth is recommended in cases of abortion where there is not an obvious explanation. Testing one abortion case may not always give an answer. It is important that samples from subsequent abortions are also tested.

> **"Abortion from one cow causes significant financial loss to a herd from both direct loss of calf to the knock-on indirect losses of poor calving interval and the vet and med costs of any treatment."**

Table 2

Infectious cause of abortion	Source	How is it spread?	Symptoms
Bovine Viral Diarrhoea virus (BVDV)	Other cattle and sheep	Nose-nose; Faecal-oral; Semen; Milk; Saliva; Calving fluids/placenta; Abortion calves	Early embryonic loss; Abortions; Mucosal disease
Salmonella	Infected/carrier animals and environmental contamination	Faecal-oral; Milk; Calving fluids/placenta; Aborted calf	Abortion 5-8 months Cattle can be systemically sick; other symptoms in younger calves
Bovine herpes virus-1	Other infected animals	Nose-nose; Faecal-oral; saliva; semen; vaginal fluids	Abortions; Genital infections of bulls and cows
Campylobacter	Carrier animals, hire bulls especially	Usually through venereal transmission (sexually transmitted)	Infertility; Early embryonic losses; abortions 4-8 months gestation
Leptosporosis	Carrier animals (including rats) and contaminated feed or water sources	Infected urine; aborted calves and calving fluids; infected milk	Reduced fertility; Milk drop; Abortion
Brucellosis abortus	Infected animals	Aborted calves and fluids/ placenta; Semen; Milk	Abortion in last trimester
Listeriosis monocytogenes	Mouldy/poor quality silage Soil contamination of feed	Inhalation; ingestion; direct access through cuts in the mouth	Abortion in the last trimester; Septicaemia; Neurological signs
Bacillus licheniformis	Mouldy hay, silage, straw or feedstuffs	Ingestion; inhalation	Abortion
Neospora caninum	Dogs and carrier cattle	Cows initially infected through infected dog faeces; Vertical transmission within the herd (cow to calf in utero)	Abortion 3-9 months; stillborn calves; calves with neurological signs
Mycotic abortion (fungal infection)	Mouldy hay or straw	Ingestion or inhalation of mould from the feed More common in winter during housing, it can effect up to 10% of a herd at once	Abortion, usually mid pregnancy onwards; Placenta often has a thickened leathery appearance; Calf may have ringworm like lesions over head and shoulders

Diagnosis of abortion	Treatment	Prevention	Is it zoonotic?
Testing aborted calf; Testing mother	There is no treatment	Vaccination	No
Testing aborted calves; Testing the mother	Antibiotics and anti-inflammatories if mother sick	Vaccination	Yes
Testing the aborted calf; Testing the mother	No treatment	Vaccination	No
Testing the aborted calf; Testing the mother; Testing bulls	Antibiotics	No vaccination. Test incoming bulls. AI	The venereal form of campylobacter is not zoonotic
Testing aborted calves; Testing the mother	No treatment in an outbreak. Carrier animals can be given antibiotics	Vaccination	Yes
Testing the aborted calf; Testing the mother	No treatment and notifiable disease so all infected cattle and any that have had contact must to slaughtered	No vaccination. Currently eradicated from mainland UK	Yes
Testing of aborted calves; testing of mother	Antibiotics and anti-inflammatories	No vaccination. Ensure feed is good quality	Yes, though very rare
Test of aborted calf Testing of mother	Antibiotics and anti-inflammatories may have some effect	No vaccination. Ensure feed is good quality	Yes, though very rare
Testing of the aborted calf; Testing of the mother	No Treatment	No Vaccination. Control of transmission from dogs	No
Testing of the aborted foetus and foetal membranes	No effective treatment once abortion storm starts	No vaccination. Feed good quality feed and ensure silage/hay is dried or stored properly	Humans can be exposed to the mouldy spores in the feed but they do not catch it directly from affected cattle

Bovine viral diarrhoea virus (BVD)

BVD is a highly infectious viral disease of cattle that causes significant health problems in UK herds. It is a complicated disease and managing it in a herd needs testing and decisive action. The main two conditions generally associated with BVD are cattle abortion and diarrhoea/wasting disease (mucosal disease).

For further information on BVD please refer to HCC's Booklet: Controlling BVD & Johne's

Lameness in beef cattle

Lameness in cattle is historically more common in dairy than beef herds. If untreated, lame cattle become thin, have low weight gains, milk yields and poor fertility.

Lameness can be caused by an injury, a deformity or an infection. It is important to examine the foot to identify the cause of lameness. Help could be provided from a foot trimmer or a vet if unsure of the diagnosis and there is a need to treat quickly to avoid production loss and animal suffering. An action plan should be produced to prevent further lameness.

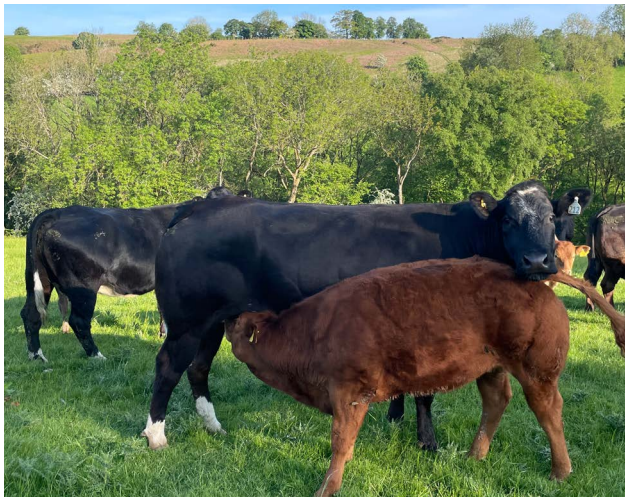
Mastitis in beef cows

Mastitis is the inflammation of the mammary gland (udder). It is most commonly caused by bacteria getting in through the teat canal, multiplying in the udder and causing infection. This is either during lactation or in the dry period (known as summer mastitis). A beef cow's profitability comes from her ability to rear a calf, therefore if she loses a quarter from an infection then this will be compromised. There are many direct and indirect losses associated with mastitis in beef cattle:

- Cost to treat the animal.
- Reduced milk yield: it is estimated the loss of a quarter can result in a 10% reduction in yield.
- Poor fertility:animals with mastitis may fail to get back in calf.
- Early culling.
- Sub-optimal growth of the calf at foot.

Mastitis during lactation

Mastitis during lactation is caused by infection, either by a gram-positive or a gram-negative bacteria often during winter housing when the bacterial load of bedding is higher compared to outdoor grazing. When cows lie down on bedding the teat can become contaminated and the infection starts. Calves suckling multiple cows can spread infections from cow to cow.



Summer mastitis

Summer mastitis refers to bacterial infections during an animal's dry period. It occurs in the summer when the infection is usually spread through head flies during mild, humid weather. Good fly control is important to controlling summer mastitis.

Symptoms of mastitis

The severity of the symptoms will often depend on the type of infection present and when the infection started.

Symptoms include:

- Affected quarter can become swollen, hot, and painful to touch.
- When stripped the milk will either be:
  - Clotty/thick/purulent often with a smell if the infection is a gram-positive bacteria.
  - Thin/watery/brownish milk with no smell seen in gram-negative infections, especially *Escherichia coli* (E.coli). The cow will usually be very unwell with this infection.
- The cow may show signs of depression, fever, off-food, and reluctance to stand, if severe.
- In summer mastitis the first sign often spotted is a stiffness or hindlimb lameness.

E.coli infections in beef cows are most commonly in cows calving indoors. The cow will quickly become unwell and have watery brownish milk from that quarter. These animals need urgent medical attention; delaying their treatment can result in death.

Diagnosis

In most cases of beef cow mastitis, the diagnosis is obvious from the clinical signs. Unlike dairy cow mastitis, infections in beef cows tend to be confined to individual cases as there is limited cow-to-cow spread. Milk samples can be taken and tested to identify the bacteria responsible.

Treatment

The farm vet may recommend a course of treatment depending on the type and likely source of infection, and the clinical condition of the cow. Treatment is usually intra-mammary antibiotic tubes, injectable pain relief and antibiotics.

Stripping the affected quarter to remove the infection is essential to combatting mastitis. The more frequently the affected quarter is stripped the better the prognosis for the cow in future lactations.

Prevention

Mastitis in lactation:

- Good biosecurity and hygiene of the calving pens.
- Ensure all bedding is clean and dry (lime or other drying agents can be used).
- Isolate cows with mastitis and make sure stripped milk from the affected quarter is disposed of appropriately and the area disinfected.
- Do not allow calves from infected cows to suckle other cows.
- Do not keep or breed from cows with bad udder conformation that will make them more susceptible to infection.

Summer mastitis:

- Good fly control.
- Avoid certain at-risk pastures (usually these are pastures with woodland or high hedges where flies are common). Generally, more exposed ground is better.
- Try to avoid drying cows off when they are still producing a large volume of milk. If this is unavoidable, options to minimise risk should be discussed with the farm vet.

If there is a recognised issue on the farm, an action plan should be produced with the vet to reduce the risk.

Internal parasites of cattle

The two main types of internal parasites that affect cattle are liver fluke and gastrointestinal worms. Generally adult cattle are less susceptible and less affected by these parasites when compared to adult sheep, but it is still important to monitor the herd and ensure that any significant burdens are treated properly to prevent poor performance and ill thrift.

Liver Fluke (Fasciola hepatica)

Adult liver fluke are parasites that live in the liver and bile ducts of cattle, sheep, deer, rabbits and horses. Their lifecycle involves an intermediate stage inside the mud snail and without this intermediate host, the life cycle will not continue. The annual burden of fluke on a pasture will depend on the population of mud snails in the environment.

The life cycle:

- Adult fluke in the liver of cattle produce thousands of eggs a day.
- These are passed out onto the pasture in the faeces.
- The eggs hatch into larvae and these enter the mud snail.
- The larvae develop inside the mud snail and leave the mud snails in the late summer/early autumn.
- The fluke is consumed from the pasture by grazing animals.
- The immature fluke then burrows from the intestines of the animal towards the liver, causing internal damage.

If the pasture burden is very high and a high number of immature fluke is consumed, then this can result in death. This condition is known as acute fluke and tends to be seen in the UK during autumn/early winter.

Adult fluke numbers build up and are at their peak during the winter months. They can cause significant blood loss, leading to the condition known as chronic fluke.

Only a few mud snails survive over winter and the level of fluke infestations falls from spring onwards.

Symptoms of fluke

Cattle are less challenged by fluke than sheep and acute fluke is much rarer in cattle by comparison.

The severity of cattle symptoms depends on the level of pasture burden and the age and condition of the animals. Generally, youngstock or animals with a weakened immune system are more likely to be affected.

Symptoms seen with chronic fluke:

- Poor condition (weight loss, poor coat quality etc).
- Symptoms associated with anaemia (bottle jaw, weakness, pale gums and eyes).
- Diarrhoea.
- Pregnant cattle may abort or give birth to weak calves.
- Reduced milk yield, which usually results in a poor calf.
- Susceptibility to other diseases.
- In rare cases it can cause death.

Diagnosis of fluke

- Look for the presence of fluke eggs in cattle faeces. Depending on the time of year and the weather conditions, the vet may send off some faecal samples for more sensitive testing at a lab which can detect fluke presence a little earlier. This is called copra antigen testing.
- Abattoir reports will report any evidence of fluke damage in the liver.
- Post-mortem examinations.
- Blood samples of youngstock could also be taken by a vet to indicate seasonal exposure to fluke.

Treatment of fluke

It is vital to treat cattle with an appropriate flukicide in order to manage liver fluke. Advice on the most suitable drug for the time of year should be sought. Emphasis should be focused on prevention of fluke infestation in the herd.

Prevention and control of fluke

It is important to work with the farm vet to discuss a preventative treatment plan. It is advisable to treat separate management groups differently and consider the weather conditions for the previous 12 months, and how that influences the fluke risk on the pasture.

Winter housing provides a break from parasite exposure on the pasture. This is the most important time of year to consider addressing the fluke burden in cattle.

NADIS forecasting for farmers and vets can be a useful tool to help predict the fluke risk level for the year at different locations across the Wales. This can be found at **https://www.nadis.org.uk/parasite-forecast.**

High risk autumns are common when the previous May or July has been particularly wet and mild, as these are the optimum conditions for the mud snail.

Controlling mud snail habitats

The mud snail holds the key to the level of fluke risk on a pasture each year. If the snail is absent, then the fluke life cycle stops. With concerns over the growing resistance to flukicide products, it is important to consider alternative control methods.

Gaining knowledge about pastures and understanding the high risk areas that could be fenced out or grazed more strategically is a good way of reducing the threat to stock. The mud snail is usually found in areas that are suitable for algae growth, as this is its main food source.

Optimum mud snail habitats:

- Predominantly wet ground, that is dry for a few months of the year.
- Areas with little fast-flowing water i.e. stagnant pools etc.
- Quiet areas without too much traffic from animals or humans.
- Areas with exposure to sunlight. Wooded areas are too shaded and well drained so tend to be lower risk.
- Areas populated by rushes, reeds, meadowsweet or valerian tend to indicate the perfect mud snail conditions in terms of pH etc.

Some likely hot spot areas for mud snails include:

- Poached ground previously grazed by cattle.
- Cleared drainage ditches.
- Banks of streams or ponds.
- Soft ground around leaking water taps or natural springs.

Gastrointestinal parasites

The two main type of gut worms that pose a threat to cattle in the UK are Ostertagia ostertagi and Cooperia oncophora and they cause parasitic gastro-enteritis (PGE). This usually only affects youngstock grazing pasture for the first, or sometimes second, time, as they have no immunity to these parasites. Adult cattle rarely suffer from PGE, but it cannot be discounted.

Ostertagiosis is a disease caused by damage to the stomach by the worm ostertagia. There are two types of this disease.

Type 1 Ostertagiosis

- Tends to occur in the late summer when a number of worms are consumed from the pasture.
- Clinical signs include diarrhoea, weight loss and inappetence and tends to affect most of the group within a few weeks after the worms have been consumed.
- High risk years tend to occur when the beginning of the summer is dry with August/September wet. These are ideal conditions for the worms to multiply.

Type 2 Ostertagiosis

- The worms eaten off the pasture in autumn are able to hibernate in the gut lining of youngstock during the winter.
- These 'encysted' worms are triggered to emerge from the stomach lining on mass in late winter, causing significant damage.
- This causes severe diarrhoea which often does not respond to treatment, resulting in death. Treatment at housing is essential to prevent this.

Diagnosis

PGE can often be diagnosed through clinical signs, previous drenching history and recent grazing access.

Faecal samples can be examined for worm eggs during most of the year, but once the worms have encysted in stomach lining during the winter there is no way to detect them, as they do not lay eggs.

Treatment

PGE generally responds well if treated promptly with an appropriate anthelmintic treatment.

Type 2 ostertagia often does not respond to anthelmintic treatment and the animal(s) may need further veterinary attention and supportive care.

Prevention

As adults have immunity to gut worms, they do not need routine treatment for worms. Youngstock grazing for the first season need strategic worm control treatment plan, which may include preventing lungworm in late summer (see lungworm section). The farm vet should be consulted about a parasite control plan.

External parasites in cattle

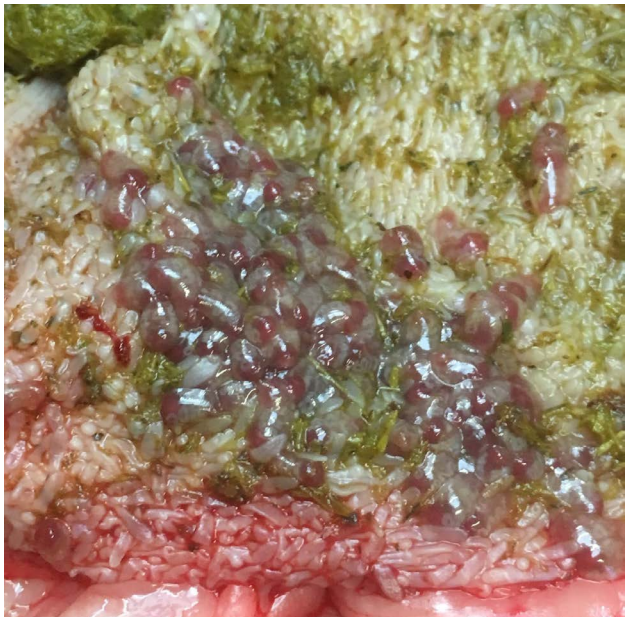
There are many external parasites and nuisance pests that affect cattle and spread disease. This impacts on their welfare and leads to production loss.

The main UK external parasites of cattle are lice, mites, ticks, midges and flies. The table below summarise these parasites.

Table 3

Parasite	Description	Where does it live?	How does it spread?
Biting lice	Small, visible with the naked eye	In the coat of cattle Does not survive long off the host	Direct contact between cattle
Sucking lice	Small, visible with the naked eye	In the coat of cattle. Does not survive long off the host	Direct contact between cattle
Mites	Small parasites not visible with the naked eye	Lives mainly on the host	Direct contact between cattle but contaminated bedding is a potential source
Ticks	Adults clearly visible on skin. Large grey bodies after feeding	Mainly in dense vegetation. Only visits the host animal to feed	From the environment to the animal when grazing
Midges	Small black flies, seen with the naked eye, usually out at dusk and dawn in late summer/autumn	Only visits the animal to feed	Airborne
Flies	20 species of flies affecting cattle in UK	Only visits the animal to feed	Airborne

Parasite	Clinical signs	Diagnosis	Treatment
Biting lice	Self trauma of the animal from itching, rubbing and licking	Examination of the coat and skin flakes with a microscope or magnifying glass for presence of louse	Pour on products are most effective for controlling biting lice
Sucking lice	Self trauma of the skin In addition large numbers of sucking lice can cause anaemia	Examination of the coat and skin flakes with a microscope or magnifying glass for presence of louse	Injectable or pour on products are effective
Mites	Self trauma of coat and skin resulting in lesions and crusting of skin Usually confined to legs, tail base and udder	Examination of skin scrapes under a microscope	Generally pour on products more effective
Ticks	Heavy tick infestations can cause anaemia Tick borne diseases a cause for concern	Ticks confirmed by visual inspection. Tick borne disease confirmed through lab testing	Spot on products, controlling tick populations and controlling tick habitats
Midges	Midge bites don't tend to affect cattle but they can transmit diseases such as Schmallenburg and Bluetongue	Schmallenburg and Bluetongue confirmed by veterinary testing	No control for midges, except housing at dusk and dawn. Vaccines available for Schmalleburg and Bluetongue
Flies	Can cause disturbance to grazing patterns, complicate wound healing and transmit diseases	Flies clearly seen	Topical products used on cattle to deter flies



Photograph of Rumen Fluke. (Credit WVSC)

Hypocalcaemia/Milk fever

Calcium (Ca) is needed by the body for many important functions.

A fine balance needs to be kept on calcium levels, and if the balance is altered then the levels can become too low. Hypocalcaemia, also known as milk fever, in cattle occurs at calving time due to the high demand on the cow's calcium reserves during labour. Milk fever can lead to other complications such as uterine prolapse, mastitis and retained afterbirth. Although more common in dairy cows, it can affect beef cattle.

There are some risk factors that can make milk fever more likely:

- Cows that have had a particularly hard, long labour.
- Cows in poor condition
- Older cows
- Cows carrying multiple calves
- Cows that have recently been grazing very lush grass pastures in the run up to calving

Clinical signs of milk fever progress quickly between three stages if untreated:

Stage 1 – the animal is unsteady on her feet, with mild muscle tremors, restlessness, twitchy ears and may bellow more than usual.

Stage 2 – the cow is unable to stand but can sit upright. She will often lie with her head tucked into her side or with a classic 'S' shaped bend in her neck. Animals are depressed, with a cold dry nose, droopy ears, low temperature, possible bloat and hard faeces/ constipation.

Stage 3 – The cow will start to lose consciousness. At this stage they become unresponsive and unable to sit up. There will be severe bloat due to the rumen filling with gas. Death occurs quickly if untreated.

Diagnosis

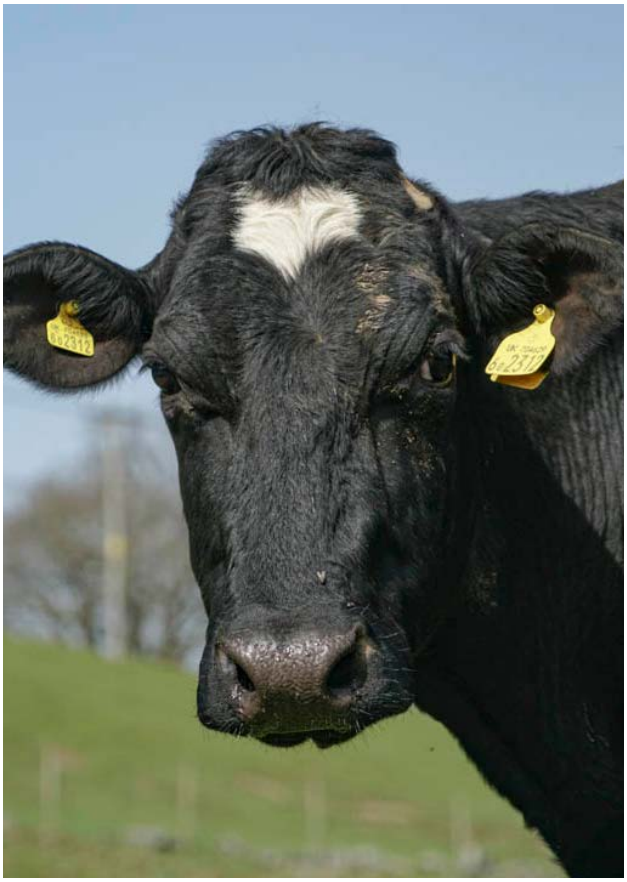
Diagnosis is usually made from clinical signs with a recent history of calving. However, in the early stages the symptoms can be harder to spot. A vet can take a blood sample to check calcium levels to confirm if the levels are low.

Treatment

Treatment involves giving a solution containing calcium. Depending on the severity, this can be given under the skin, or a vet can administer intravenously.

Prevention

- Managing body condition during pregnancy is important to ensure cows are in the correct body condition score at calving
- Cows in the last month of pregnancy should not be grazing lush green pastures
- If a cow has had a difficult labour or is known to have a history of milk fever, she can be given an oral drench containing calcium, or a calcium bolus in the early stages of labour or just after calving.



Hypomagnesaemia (grass staggers)

Grass staggers is caused by low magnesium levels. Cattle absorb magnesium from their diet. Some pastures can be too low in magnesium, or alternatively high in potassium or ammonia, both of which prevents the uptake of magnesium. Pastures that have been recently treated with a nitrogen or potash fertiliser, or slurry, can be high risk. Lush pastures with low fibre can mean the food passes through the gut too quickly, so magnesium cannot be absorbed.

The condition is most common in recently calved beef cattle and usually occurs in late spring or early autumn. A mild deficiency in a group of cattle can lead to clinical cases when there is additional stress, for example with bad weather or while handling.

Clinical signs

Sudden death can often be the first sign of staggers as the disease progresses very quickly.

- In early stages there is:
  - Excitability
  - Muscle tremors
  - Unsteady on feet (staggers)
  - Increased blinking
  - Teeth grinding
  - Wild/startled expression
  - Animals will separate from the rest of a group
- Later symptoms include:
  - Seizures with paddling of the legs and frothing from the mouth
  - Death

Diagnosis

Diagnosis is usually made by clinical signs and by reviewing recent grazing of an at-risk pasture. Although a vet can take a blood sample, it is often not practical to wait for the results before starting treatment as the disease progresses quickly. The vet may take a sample to confirm diagnosis to prevent further cases.

Treatment

If the condition is suspected the vet should be contacted immediately and the animal is treated with magnesium through a mixture of intravenous and subcutaneous injections. Never give intravenous magnesium to a cow without veterinary supervision as this can cause cardiac arrest and death. Stress and handling can make the animal worse, so once treated, the cow should be propped into a sitting position and left. Once the animal has started having seizures the prognosis is worse. Speed is essential if treatment is to be successful.

Prevention

If an animal in a group has had grass staggers it is likely the rest of the group will be at risk. Vet advice should be sought on group management; which may include for example, moving to a lower risk pasture or supplement the rest of the group. Supplementation can be in the form of oral licks, adding magnesium to the water trough, or supplementing with high magnesium feed or bolus.

Sudden death in cattle

There are only a few diseases that cause sudden death with no other symptoms.

If an animal is found dead without an obvious reason, the vet may conduct a post-mortem as the causes may affect other cattle in the same group. Examples of conditions that cause sudden death include:

Blackleg (clostridial disease)

- Blackleg is caused by bacteria found in the soil. The disease is often seen when flooding, building or drainage causes soil to be disturbed.
- The spores of the bacteria get into the animal's body and lay dormant. The bacteria is triggered to multiply and produce toxins when muscles are damaged e.g. during bulling, cattle handling or fighting. Death usually follows within hours.

Clinical signs: Sudden death can be the main clinical sign but sick animals can show symptoms of:

  - High temperature.
  - Lameness with possible muscle swelling.
  - Depression.
  - Lack of appetite.

- Diagnosis is usually made by a vet on post-mortem by looking for the characteristic areas of muscle damage.
- Treatment is rarely successful, but penicillin can sometimes help if started in the early stages of disease.
- Prevention: this disease is easily prevented through vaccination.

Anthrax

Anthrax is an infectious disease caused by bacteria in the soil or contaminated feed. The bacteria can survive in the soil for many years with cases on the same farm reported 30 to 40 years apart. It is relatively rare, although there have been reports of anthrax on some UK farms in recent years.

- It is a notifiable disease and if the farm vet confirms this as the cause of death, they will report it to the divisional veterinary office.
- This a serious disease in people and can be fatal. It is not very contagious and tends not to spread from animal to animal, but the bacteria produce spores on contact with oxygen and these are a potential threat.

Clinical signs

  - The most common clinical sign is sudden death in healthy stock.
  - After death, the blood may not clot, causing a dark, tarry bloody discharge from the mouth, nose, and back end.

- Diagnosis needs to be confirmed by DEFRA.
- Treatment is rarely successful due to the speed of the disease.
- Prevention: if anthrax is confirmed, DEFRA will advise on further action for the farm. It is vital that infected animals are disposed of correctly.

Lightning strike

- This occurs in cattle usually out at pasture and in contact with a tree or a water source at the time of a storm. It can also occur in housed cattle that are near a metal object.
- Death results from a heart attack. The animal may have singe marks on its coat but can have no obvious signs.
- Diagnosis by the vet is normally made through looking at the recent weather conditions, where the animal was found and by ruling out any other cause of death from a post-mortem.
- The risk of losing cattle to lighting can be reduced by removing animals from grazing near water or trees when a thunderstorm is forecast.

Grass staggers

See the section on Hypomagnesaemia/grass staggers. (Page 26).

Bloat

See the section on bloat in beef cattle (Page 13).

Infections in young calves

Most infections in young calves arise from infections that the immune system cannot fight. Correct calf management in the first 24 hours of life is crucial to prevent or minimise the risk. This includes ensuring the calf has the correct quantity of good quality colostrum within the first six hours of life, as well as treating the calf's navel correctly.

Diarrhoea in calves

There are many different pathogens responsible for scour in young calves because their immune system is weak. Calves are more at risk if they have not had good quality colostrum in the first few hours of life.

Most pathogens target the intestines, damaging the gut and preventing absorption of milk nutrients, leading to diarrhoea. Some of the pathogens are more harmful than others causing more serious clinical signs as well as diarrhoea.

See table 4 below.

Table 4

Pathogen (name and type)	Source and route of spread	Clinical signs
E.coli (bacteria)	Contamination of the bedding in calving pens. Usually faecal-oral spread, but infection can also get access through navel	Profuse diarrhoea; Severe dehydration often follows quickly and the prognosis is poor without prompt treatment
Rotavirus (virus)	Usually spread through direct contact with other infected animals	Watery diarrhoea; Moderate signs of dehydration which may worsen if untreated
Coronavirus (virus)	Usually spread through direct contact with other infected animals	Watery diarrhoea; Moderate-severe signs of dehydration if left untreated. Less common than rotavirus but tends to be more serious
Salmonella (bacteria)	Direct contact and contact with contaminated bedding Usually ingested but can also gain access through the navel	Profuse diarrhoea, often contains blood Calf usually very sick and prognosis in very young calves is poor
Cryptosporidium (protozoa)	Direct contact with sick animals and contact with contaminated bedding Cryptosporidium can survive a long time in a shed Can be picked up in calving pens as well	Watery yellow/green diarrhoea Dehydration is usually mild – moderate Symptoms more severe if secondary pathogens also infect the animal

Diagnosing the cause of diarrhoea

As most cases of diarrhoea in calves have similar early symptoms it can only be diagnosed by testing.

Faecal samples can be tested by a vet or at a laboratory to confirm which infections are involved.

Treatment of calf diarrhoea

If the calf has a good immune system, good body reserves and is still drinking plenty of milk, it may recover from the infection relatively quickly (within 1-2 days) without any treatment.

If the animal has an aggressive infection or has a poor immune system, they will require treatment and possibly veterinary attention.

Antibiotics are only useful if the infection is caused by bacteria. Viral infections will not respond to antibiotics and just require supportive care. Antibiotics can be given to treat other infections that may also be present.

Cryptosporidium is a particularly aggressive pathogen and only responds to a specific treatment. Diagnosis is, therefore, vital.

Dehydration is the biggest risk to the calf and needs to be treated quickly.

When managing a calf with diarrhoea, the key points to remember are:

- Always consider oral fluids
- If a calf is unable to stand, it requires more than just oral fluids, so a vet may need to administer intravenous (IV) fluids.

Age of animals affected	Treatment	Control/prevention
Typically 1-3 days old.	Intravenous fluid therapy, anti-inflammatories and suitable antibiotics	Good colostrum management Hygiene in the calving pens Vaccination of the mother in late stages of pregnancy (maternal vaccines)
14 days old	Oral rehydration +/- intravenous rehydration Anti-inflammatories but antibiotics not needed unless there are other infections occurring	Good colostrum management Isolation of sick animals to stop spread Good pen hygiene Maternal vaccines
5-14 days old or older	Usually requires more aggressive rehydration compared to rotavirus Anti-inflammatories often needed but antibiotics not useful to treat viral infections	Good colostrum management Isolation of sick animals to stop spread; Good pen hygiene. Maternal vaccines
Usually more than 4 days old	Requires urgent medical attention for dehydration and treatment with appropriate anti-inflammatories and antibiotics	Good colostrum management Isolation of sick animals to stop spread Good pen hygiene Maternal vaccines
5-20 days of age	Once diagnosed, symptoms can usually be managed with the specific treatment Halofuginone lactate, plus oral rehydration Extra supportive care and intravenous fluids are needed in some cases	In the middle of a scour outbreak caused by cryptosporidium, Halofuginone lactate can also be given to prevent the infection Good disinfection, biosecurity and hygiene is essential to control spread

The table below gives more detail on how to tell how dehydrated a calf is:

Level of dehydration (%)	Signs of dehydration	Description of calf	Action required
0-3% Minimal dehydration	• Scouring only	• Bright • Alert • Standing • Suckling normally	May require oral rehydration, monitor closely
4-7% Mild dehydration	• Eyes starting to sink • Slight skin tent	• Quiet and subdued • Standing • Weak suckle	Oral rehydration needed. Vet may also consider intravenous fluids
8-12% Moderate dehydration	• Eyes sunk • Obvious skin tent • Ears and nose feel cold plus cold body temperature	• Unable to stand • Weak • Depressed • No suckle • Head tucked into side	Oral rehydration and intravenous fluids
12% Severe dehydration	• Eyes very sunk • Dry tight skin • Cold extremities • Cold body temperature	• Lifeless and unable to stand • Unresponsive • No suckle	Immediate veterinary attention needed. Intravenous fluids essential

Prevention and control of calf diarrhoea

During an outbreak, it is very important to isolate any sick calves as soon as possible, and clean and disinfect any contaminated areas. Any feeding equipment for the sick calves must be cleaned and disinfected correctly. During an outbreak attention to detail on hygiene is vital.

Diagnosis of the diarrhoea could support the identification of the source of infection and for the vet to offer advice on the correct disinfectants to use. Cryptosporidium is particularly hardy and can survive a long time in buildings or bedding. It is only killed by a certain type of disinfectant.

In some cases the quality of the mothers' colostrum as well as the intake of the calves should be tested.

If the source of the calf diarrhoea is rotavirus, coronavirus, E. coli or salmonella, then the appropriate vaccine can be given to the mothers in the last stages of pregnancy to boost antibody levels in the colostrum they produce for the calf.

Navel ill

The condition occurs when the navel becomes infected with bacteria from the environment, usually in the first few days of life, and more commonly in calves born indoors during the winter.

- The risk of infection is higher in calves born in an unclean area, if the navel is not treated properly after birth, or if the umbilical remnant is short. It is also more common in calves that did not receive enough colostrum.
- The infection of the navel can spread into the abdomen causing peritonitis, which is usually fatal, or through the blood which can lead to infections of the joints (joint ill) or brain (meningitis).
- **Clinical signs** of navel ill include:
  - Hot, swollen navel
  - There may be pus dripping from the navel
  - Calf is usually in pain when the navel is touched and may stand with a tucked-up appearance/arched back
  - Calf may be reluctant to stand and suckle

If the infection has spread to the joints, brain or abdomen, there will be other more serious clinical signs and the prognosis is poor.

Diagnosis

Diagnosis is usually made from clinical signs.

Treatment

Treatment of navel ill when the infection has not spread usually involves a course of antibiotics and anti-inflammatories. The farm vet may also lance the abscess and flush it out, which may need to be repeated for a few days, to clear the infection.

If the infection has spread to other parts of the body, the treatment is usually more intensive and will likely require veterinary care.

Prevention

Preventing infection should include ensuring the navel is clean and treated with iodine solution, ideally, twice in the first four hours of life. Clean calving pens, good colostrum management and care of the calf in the first 24 hours of life are also essential in preventing infection.

Joint ill

Joint ill is the infection of the joint(s) with bacteria that has spread in the bloodstream from the gut or upper airways. It can also spread from a navel infection.

It usually occurs when calves are born in unclean conditions and/or have not received enough colostrum. Calves can start to show clinical signs from four-to-five days old.

Clinical signs

- Hot, swollen and painful joints, resulting in lameness
- Usually affects the knee, hock and fetlock joints
- Calves may be unwilling to stand and suckle, especially if more than one joint is affected.
- Over time, muscle will be lost in the affected leg.

Diagnosis

Diagnosis is usually made from clinical signs. If many calves are affected and are not responding to treatment, then test samples from infected joints to determine which bacteria is causing the infection could be taken. This will inform what treatment should be used.

Treatment and prevention

The farm vet will advise on appropriate antibiotic and anti-inflammatory treatments to use. Prevention is key, with attention to hygiene and calf management in the first 24 hours crucial.

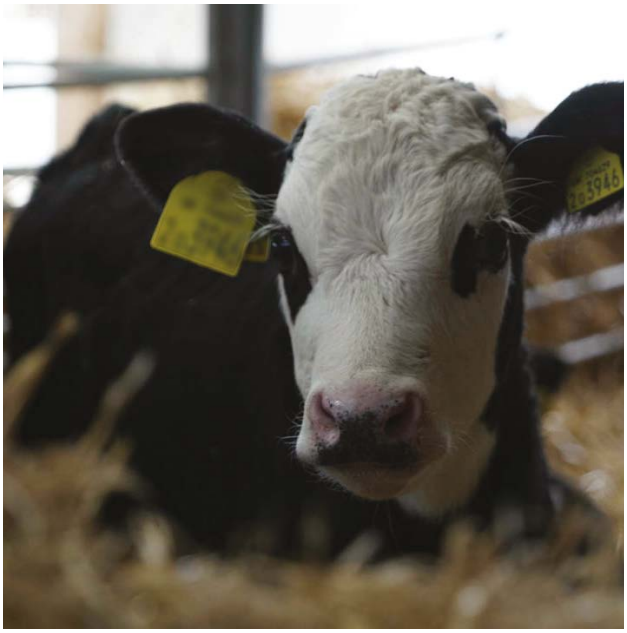
Respiratory infections

The section on respiratory disease in calves is generally focused on respiratory infections which occur in slightly older calves. However, infections can occur in young calves too.

Calves suffering from respiratory disease in the first six weeks of life will rely entirely on the antibodies received from the mother's colostrum to protect them. If a calf has not received enough, then the chances of infection are higher, and recovery is harder.

If a vet has diagnosed respiratory disease on the farm, they will need to test to identify which pathogens are responsible. This will allow them to advise on vaccinations that can be given to young calves to prevent infection. Many vaccines can be given after the first few weeks of life. Up to this point, it is important to limit the chances of infection through good management practices, these include:

- Good colostrum management
- Good ventilation of the calving pens, free from draught or dampness.
- Avoid mixing age groups
- Avoid stress



Trace elements in beef cattle

The most important trace elements in beef cattle are copper, cobalt and selenium (closely linked to Vitamin E). Magnesium is an important mineral in deficiencies within beef cattle. Trace elements in excess can be toxic. As key trace elements are interlinked it is advisable to test for a suite of elements rather than the individual elements.

Trace Element Deficiencies

Table 5

Trace element	What does it do?	Signs of deficiency
Copper	Essential trace element Needed for: Growth; Making red blood cells; Nerve functions; Blood vessels; Healthy bones; The immune system	Youngstock more commonly affected, signs include: Poor growth; Dull, dark speckled coat; White/grey speckles around the eyes - Diarrhoea; Lameness in growing animals; Sudden death Signs in adults: Can cause infertility, especially in heifers, this is usually when molybdenum is in excess
Cobalt	Essential trace element Needed for: Making vitamin B12; Vitamin B12 is essential for energy metabolism and the production of red blood cells	Youngstock more commonly affected but can affect adult cattle, signs include: Poor growth; Reduced appetite; Rough pale coat; Diarrhoea in calves; animals eat bark, leaves, or dirt Signs in adults: Reduced appetite; Rough pale coat; Poor milk production
Selenium and Vitamin E	• Healthy immune system • Antioxidant which helps to protect cells from damage	Youngstock under a year old most commonly affected, signs include: • Stiffness, weakness, unable to stand. • Unable to suckle, suckling reflex is absent • Muscle tremors • Struggling to breathe, fast breathing • Sudden death Signs in adults: • Still birth or weak calves at birth (if mother has deficiency during pregnancy) • Retained placentas
Iodine	Essential trace element Needed for: An essential component of thyroid hormones which are needed for metabolism and growth	Commonly affects pregnant animals and their offspring Signs in adults: • Abortion late in pregnancy • Still born or weak calves • Goitre - large thyroid in calf • Retained placenta • Poor milk production Signs in youngstock: • Poor growth rates
Magnesium	Essential mineral Needed for: Bone growth and stability; Nerve flow; Muscle contraction; Acts as an antioxidant	Occurs at any age and often at turnout in spring or when moved onto lush new pasture, known as 'grass staggers' or 'grass tetany' Signs in cattle: • Muscle tremors, spasms and convulsions • Staggering • Rolling eyes • Head held high • Death when affected animals are stressed

Individual and herd level status of trace elements are important to consider and depend on many factors including soil levels, forage, nutrition, stage of growth, production cycle and supplementation provided. A trace element audit takes these into account and should form the basis of recommendations for supplement or bolus. See the HCC factsheet 'Managing Trace Elements in Beef and Sheep Systems' for more detail: **https://meatpromotion.wales/en/industry-projects/red-meat-development-programme/flock-and-herd-health-project/animal-health-advice**

Cause of deficiency	How to test for deficiency	How to treat/prevent deficiency
• Poor levels in soil, grass or feed • At risk animals are those not fed any/little concentrates • Excess molybdenum or iron in the diet will bind up the copper and make it less available to the animal causing deficiency	• Sample batch of animals in conjunction with clinical signs and diet assessment (testing one animal will not diagnose accurately) • Liver biopsy is only way to truly assess the levels of copper stored in the body • Forage testing is important to assess diet levels • Check copper levels in any concentrate feeds	• Full diet assessment of copper levels is important • Boluses, drenches and licks are available to supplement copper • Due to the risks with over supplementing copper, only bolus animals under veterinary advice when deficiency has been diagnosed
• Grass or crops are often deficient if grown on cobalt deficient soils	• Soil and forage testing is important to assess diet levels • Difficult to test animals but response to vitamin B12 injections often confirms suspicion • If testing liver for copper levels, test for cobalt/vitamin B12 at the same time	• Assessment of diet levels important to know when to supplement • Slow release rumen boluses or drenching with cobalt salts every 2-4 weeks if in affected area
• At risk animals are those not fed any/little concentrates	• Check levels in supplemented feed	• Treatment of affected animals is possible by a vet • Boluses can be given to animals to ensure adequate levels as a prevention when deficiency in the diet is suspected
• Low iodine on grazed pasture soil. Some legumes or brassicas can disrupt iodine absorption • Low selenium can cause signs of iodine deficiency • At risk animals are those not fed any/little concentrates	• Post-mortem of still born or dead calves to find enlarged thyroid gland (goitre) • Blood tests for iodine and thyroid levels helpful	• Assessment of diet levels important to know when to supplement • Iodine rumen boluses are available and using appropriate fertilisers on deficient pastures
• Low levels of magnesium in the soil • Lush fast-growing grasses can be low in magnesium • High levels of cations like potassium in the soil can interfere with magnesium being taken up by the plant causing low levels in plants	• Animals should be approached in a calm and quiet manner • Reduce noise and light. Extra stress can cause a very sick animal to die • Blood tests are diagnostic • Post-mortem samples of eye fluid is diagnostic in cases of sudden death • Soil and forage analysis are important for potassium and magnesium levels	• Magnesium supplementation is very important especially at pasture. Supplementation can be available in the form of in feed minerals • Licks/mineral blocks do not ensure all animals get the correct levels and should not be relied upon on their own for magnesium supplementation

Trace Element Toxicities

Trace element	Signs of over supplementation	Cause of over supplementation/ excess	How to test for excess	How to reduce supplementation
Copper	Copper is stored in the liver. Over time excess copper can build up and causes damage Young animals are more susceptible than adults but toxicity can happen in any age Signs: • Lack of appetite • Dehydration • Jaundiced (yellowing of the mucus eyes and mouth) • Severely depressed • Urine is red in colour • Often leads to death • Sudden death	• Over supplemented with boluses over time • Cattle fed lots of concentrates that are high in copper	• Sample batch of animals in conjunction with clinical signs and diet assessment • Liver biopsy is only way to truly assess the levels of copper stored in the body • Forage testing is important to assess diet levels • Check copper levels in any concentrate feeds	• Assessment of diet levels and reduction for all stock is important • Can take time for built up levels in the liver to reduce
Selenium	Can be from acute poisoning or chronic through over supplementation over time Signs of acute toxicity: • Blindness • Excess salivation • Shortness of breath • Death Signs of chronic toxicity: • Depression • Poor or loss in body condition • Lameness • Hair loss or alopecia	• If dietary levels are not assessed properly, could get over supplementation through boluses or feed	• Blood test of affected animals • Forage and soil testing are important to assess diet levels • Check levels in supplemented feed	• Assessment of diet levels important • Reduce amount of mineral supplementation if levels are too high
Iodine	Signs: • Poor appetite • Clear discharge from eyes and nose • Excess salivation • Increased breathing rate of over 20 breaths per minute • Coughing	• If dietary levels are not assessed properly, could get over supplementation through boluses or feed	• Blood test of affected animals • Forage and soil testing is important to assess diet levels • Check levels in supplemented feed	• Assessment of diet levels important
Cobalt	Very uncommon			
Magnesium	Uncommon in beef cattle			

Treatment of disease and handling of medicines

There are many common conditions which, in the early stages, can be treated and managed with veterinary guidance and advice.

Key medicines and veterinary treatments should only be given by a competent person and it is recommended that at least one person on farm has undergone an approved training course in the handling and administration of medicines.

The main areas which need to be considered when treating cattle include:

- Correct administration of drugs to the animal such as identifying suitable injection sites
- The use of the correct equipment
- Drug selection
- Drug dosage
- Correct course and length of treatment
- Drug storage
- Disposal of waste drugs and sharps
- Recording of drugs administered

Correct administration of medication

Giving drugs in the correct way is important to prevent further issues arising from the treatment. Abscesses from injection site reactions, usually resulting from a dirty needle or syringe, can cause a lot of pain and issues for the animal, as well as potentially resulting in part of the animal being condemned at slaughter. When giving injections the needles and syringes should always be new or cleaned and sterilised properly.

Before giving medication, the datasheet supplied should be checked to identify the correct site of injection (intravenous, intramuscular or subcutaneous) as well as how much of the drug can be injected at one site. If a large volume is required, then the dose could be spread between different injection sites.

Use of the correct equipment

Before giving a drug, it is important to ensure that the correct size of needle and syringe is being used. Some drugs are very thick and difficult to administer, so a thicker needle may be needed.

If using a vaccinator gun, ensure the gun is suitable for the vaccine and that it is calibrated correctly for the dose needed. Sterimatic vaccinator guns are always preferable as these automatically sterilise the needle between each animal, reducing the chances of injection site abscesses.

Correct drug selection

Before treating an animal, it is important to diagnose the animal correctly. If unsure or the animal seems very unwell, then it is always better to speak to a vet and get advice.

There are two basic principles to follow:

1. Antibiotics are recommended to treat bacterial infections e.g. wounds, foot infections, mastitis, etc
2. Anti-inflammatories are needed to take down swelling, reduce pain and reduce a fever.

There is no point giving antibiotics to something without an infection as this will not correct the problem and is an inappropriate use of antibiotics. It is no longer advised to blanket treat animals in an affected group with preventative antibiotics, as this can result in a number of animals being treated unnecessarily and is not an appropriate use of antibiotics on farm.

There are a number of scenarios which require both antibiotics and anti-inflammatories.

Correct drug dosage and length of treatment course

When a drug is administered, it is important to check and give the correct dosage according to the animal's bodyweight. Under dosing may not achieve the desired outcome and can lead to bacteria developing resistance. Meanwhile over-dosing can be harmful for the animal and lead to organ damage.

The drug data sheet will also state how many days the drug should be administered. It is important to comply with the recommended length of treatment, as stopping treatment early may not fully treat the condition and could also lead to resistant bacteria developing.

Storage of drugs

Always read the drug package insert to check how to store the drug properly. If in doubt, contact the vet for the storage instructions.

All vaccines require refrigeration until use. This means a continuous "cold chain" from manufacture to farm.

It is important to check the temperature of medicines fridges to make sure it is keeping within the correct range.

Once opened, nearly all vaccines must be used within hours.

Other medications will have a recommendation on the datasheet on how long drugs can be kept once opened.

Disposal of drugs

Used needles should be disposed of in an approved sharps container and used syringes into a designated clinical waste bag (these can be sourced from a vet practice). Any drug bottles with or without medication should also be disposed of properly through the vet practice.

Recording medical treatments

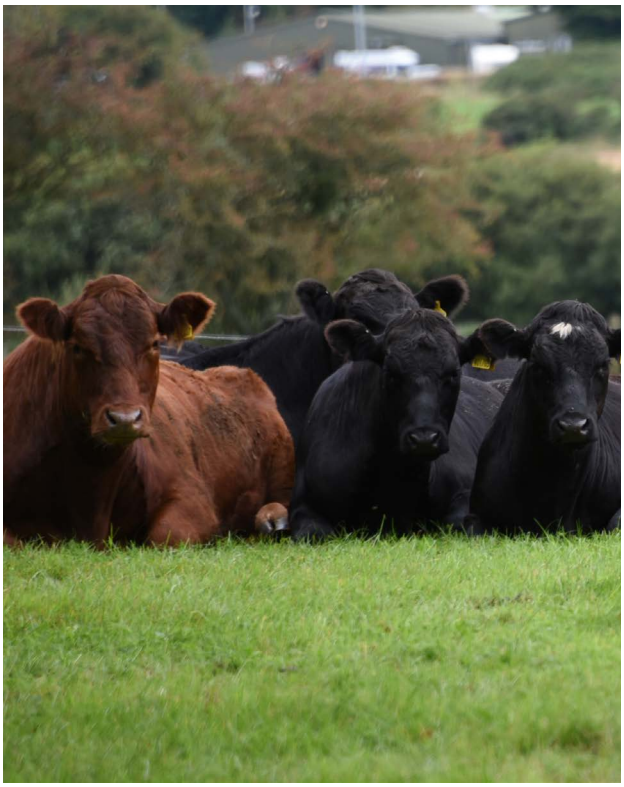
All treatments given to animals, either the whole group or an individual, should be recorded in the farm medicine book.

The use of antibiotics on farm and in food producing animals in the UK/globally

Over the last decade there has been increased activity towards reducing the use of antibiotics in food producing animals. This comes from a wider concern globally regarding the development of antibiotic resistance in bacteria to many of the commonly used antibiotics in both animal and human medicine. Antimicrobial resistance is a global health and development threat and it is important that all sectors play their part in trying to reduce usage.

The main ways that resistance can occur is through the repeated use of a certain drug over time (including blanket treatment), and through incorrect usage.

While it is extremely rare for extensively reared animals, such as suckler beef herds in Wales, to develop resistance, it is something to be aware of. It is the bacteria on the farm that become resistant not the farm animal being treated.



Economic impact of health issues

In addition to animal health and welfare considerations of disease, the economic cost cannot be underestimated. Disease impacts the productivity of Welsh beef herds through fertility, growth rates and susceptibility to other disease.

The financial cost at farm level can also be reflected in treatment costs, increased culling rate and mortality, highlighting that a preventative approach is cost effective.

The following table highlights the potential cost of various diseases and health issues.

Disease/ Condition	Impact	Prevalence/incidents	Cost
Respiratory (incl. BRD)	• Mortality rate • Cost of treatment • Growth rates • Delay in recovery	Can affect up to 50% of a given group of cattle	£30/head for milder cases £500/head death
Gastrointestinal diseases (incl. Johne's)	• Fertility • Increased culling rates • Mortality rates 1-5% • Subclinical disease	Suspected to affect up to 20% of UK herds	£45/cow
Abortion in cattle	• Unproductive cow • Potential of fertility issues	Prevalence hard to determine due to lack of reporting but thought to be considerable	£500-1,200/cow (loss of store or finished animal)
BVD	• Increased risk of abortions • Supressed immunity • Fertility • Increased culling rate	Suspected that 65% of UK herds have encountered the virus 95% of the national herd has been exposed to the virus at some point	£50/cow
Lameness	• Reduced weight gain • Depressed growth rates • Longer finishing times • Fertility	Limited data, but thought to affect most herds to some degree	Believed to be in the region of £54m for the UK cattle industry (both dairy and beef) but no specific breakdown
Mastitis	• Calf growth rate • Cow liveweight reduction	Limited data available for prevalence in beef herds	Believed to be in the region of £180m for the UK cattle industry (both dairy and beef) but no specific breakdown
Parasites – internal	• Reduced feed intake • Growth rates • Fertility • Reduction in carcass value	Limited data available	Likely to impact the Welsh beef breeding herd by approximately £4.6m/year. The costs reflect the loss in productivity, rather than the possibility of death of affected animals
Parasites - external	• Feed intakes • Poor growth rates • Susceptibility to other disease		Costs difficult to quantify

Summary

Effective herd health planning, alongside a veterinary professional, is key to preventing and tackling herd health issues. Developing bio-security measures as part of the plan and considering other farm factors, such as soils and silages, are key to limiting these health problems.

Recognising the early clinical signs or opting for routine testing helps to minimise the prevalence and therefore, impact on the herd, both improving animal health and welfare, and farm business profitability.

It is important to recognise the key risk factors for the farm and ensure that preventative measures are in place to limit the impact. This can be achieved through working alongside the vet to tailor build a health plan for the farm, which is both a point of reference, as well as being something that can be updated and adjusted as the farm encounters new opportunities and challenges. Working with the farm vet also helps build a relationship and opens channels of communication, so that they can help make the system more efficient whilst farming in a more sustainable and potentially profitable way.

Further information

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For further information on this booklet or the work of HCC please visit **meatpromotion.wales**