

Section 6

Calf diagnosis and Disease Prevention



Introduction

In order to identify potentially sick calves careful observation at, and just before, feeding times is crucial. Prevention of disease in calves should be a priority in all calf rearing enterprises and involves measures to limit the exposure of the calf to infectious organisms while also reducing its susceptibility to infection.

- ① Diagnosing a sick calf.
- ② Why prevention is better than cure.

Calf diagnosis and Disease Prevention

① Diagnosing a sick calf.

If a calf's response at feeding time is abnormal, further observation of its faeces and for signs of coughing or nasal/ocular discharge is essential. The calf's vital signs e.g. temperature, breathing rate, must then be checked and monitored.

Response of calves at feeding		
If you answer "no" to a question below, closer examination of the calf is required.		
Yes	No	
		Does the calf get up and actively position itself at its milk feeding station?
		Does the calf want to drink its milk?
		Does the calf drink its milk at its normal rate?
		With automatic feeding stations, does the calf drink its normal allocation of milk within the allocated time frame?
		Are the calf's ears erect, and is the calf alert? Drooping ears are a sign of illness.

Additional observations at each feeding:		
If any problems are detected, the calf's vital signs should be monitored more closely.		
What is the calf's faecal consistency? <i>Choose the most accurate description. Calves that are scouring need additional fluids; need to be examined more closely; and should be fed last to prevent disease spread.</i>		
		Pudding consistency – normal faecal consistency.
		Yoghurt consistency – semi-formed and pasty, does not warrant feeding electrolytes.
		Loose, syrup-like faecal consistency. Faeces stays on top of bedding, may have strong odour – calf needs closer examination, and electrolytes should be fed in addition to, and separately from, milk.
		Apple juice consistency, watery and runs through the bedding – calf needs closer examination, and electrolytes should be fed in addition to, and separately from, milk.
Yes	No	
		Is the calf coughing and/or has a discharge from its nose or eyes? Closer examination of the calf is needed for potential respiratory illnesses. Consult your vet.



Calf's vital signs			
If a calf's vital signs are outside the normal range, implement treatment protocols that have been developed with the help of your vet.			
Yes	No		Normal or expected vital signs
		Is the calf's temperature elevated?	38.5 to 39.5°C is normal.
		Is the calf breathing rapidly?	24 to 26 breaths per minute is normal in calves <1 month of age. 15 to 30 breaths per minute is normal in older calves.
		Is the calf's heart rate elevated?	100 to 140 beats per minute is normal in calves. An irregular heart beat is a sign of illness.
		Does the calf have a cough?	The calf should not have a cough. Induced repeated coughs or repeated spontaneous coughs indicate a respiratory disorder.
		What is the calf's ear score?	Ears should be up and alert. A head tilt or both ears drooping indicates a severely ill calf.
		Does the calf have a nasal discharge?	A calf can have a normal, serum-like nasal discharge. Calves with excessive mucous and/or cloudy discharge from both nostrils should be isolated.
		Are the calf's eyes sunken into the eye socket? Gently avert the calf's lower eyelid, observe the amount of space between the eyeball and the lower eyelid.	Healthy calves have a minimal amount of space between the lower eyelid and eyeball (<2 mm). As the calf becomes dehydrated, the amount of space between the eyeball and lower lid increases.
		When the skin of the neck is pinched and gently rotated 90°, a tent of the skin forms. Does this skin tent return to normal within two seconds?	The tenting of skin should return to normal within two seconds in a healthy calf.
		Are the calf's gums dry and white?	Normally, a calf's gums are moist and pink. Dry, white gums are a symptom of severe dehydration (8-10% dehydration).
		If the calf is lying down, does it fail to get up when given a small amount of persuasion?	For calves that are unable to rise, contact and follow your vet's recommendations immediately. These calves may need intravenous (IV) fluids to help treat the dehydration and possible acidosis. If not treated appropriately and quickly, the calf may die.

Adapted from an article by D.M. Amaral-Phillips (2012), Extension Dairy Specialist, University of Kentucky.

② **Why prevention is better than cure.**

Prevention, rather than cure, is the most effective approach to disease management in any calf rearing programme. In the animal health world, the aim is to change the focus of producer farm health management systems. The goal is to move from the era of post-event disease treatment/management to promoting animal health through preventative and biosecurity measures, ultimately increasing the calves' immunity while decreasing their contact with infections. This leads to reduced antibiotic usage, improved animal performance, increased farm profitability and the production of the best quality products for consumers.

Calf diagnosis and Disease Prevention

There are five key points to disease prevention:

- 1) Effective development of the calf's immunity. This is supported by:
 - Adequate colostrum intake.
 - Feeding high quality calf milk replacer and concentrates.
 - Free access to fresh water.
 - A sound vaccination programme.



An essential part of disease prevention is to ensure adequate colostrum intake in the first two hours of life.

Pneumonia	IBR	Clostridial Diseases
<ul style="list-style-type: none"> • Different programmes available. • Programmes cover RSV, PI3 and Pasteurella*. • Two shot program, four weeks apart. • Implemented from two weeks of age. • Booster shot required at next stress period. 	<ul style="list-style-type: none"> • One shot live vaccine. • Can be given with some pneumonia vaccines. 	<ul style="list-style-type: none"> • Essential to vaccinate twice, four to six weeks apart. • Vaccinate from two weeks of age. • Don't administer on same day as the pneumonia vaccine. • Annual booster required. • Use multivalent vaccine to deliver broader range of cover.

**Mannheimia haemolytica*

- 2) Biosecurity:
 - Know the disease status of the source herd.
 - Use and check colostrum status (contamination, quality).
 - Reject sick calves.
 - Aim to buy a three week old animal.
 - Isolate new animals on farm.
 - Practice good personnel hygiene e.g. foot baths placed outside calf houses, regular cleaning and disinfection of waterproof trousers/overalls/footwear.
- 3) Limit stress. Stress inhibits the immune system of calves. Factors such as transportation, sudden feed changes, poor ventilation, crowding, temperature fluctuations and drafts can all impact the disease resistance of calves. Adequate planning, scheduling and management of farm personnel and ongoing monitoring of calves are key factors in alleviating sources of stress.
- 4) Minimise the risk of exposure to bacteria, viruses and parasites in the calves' environment.
 - A broad-spectrum disinfectant should be used regularly to clean and sterilise pens, railings, water troughs, feeders and other equipment and surfaces.
 - Well-bedded and well-ventilated housing with a good protocol around hygiene and calf husbandry will also help to minimise disease risk.
- 5) Structure a management plan. Keeping a careful watch on calves and intervening early if they are not thriving is crucial. If in any doubt as to the diagnosis or best treatment of a calf, contact your veterinarian immediately for advice.

Section 6

Diarrhoea (scour)



Introduction

Scouring is the most common health problem affecting young cattle and milk-fed animals, and is the result of altered gut function which increases the amount of manure and fluids the calf eliminates. Calves are particularly susceptible during their second week of life. Up to 40% of calf deaths in the first six weeks of life are scour related.

- ① Causes of calf scour.
- ② Symptoms of scour.
- ③ Treatment of scour.
- ④ Why are electrolytes important?
- ⑤ Prevention of calf scour.
- ⑥ Coccidiosis.
- ⑦ Cryptosporidiosis.
- ⑧ *Rotavirus*.

Diarrhoea (scour)

① Causes of calf scour.

Scours can be classified into two types: nutritional and infectious. Nutritional scour is usually caused by stress due to a breakdown in management routine. Nutritional scour often progresses to become an infectious scour, which is caused by a high population of pathogens.

A number of infectious agents can cause scour in calves and often more than one of them is involved:

	Cause of calf scour	Age at which clinical signs most commonly appear
Parasites	<i>Cryptosporidia</i>	First week of life
	<i>Coccidia</i>	3-6 weeks of age
Viruses	Rotavirus	1-3 weeks of age
	<i>Coronavirus</i>	1-3 weeks of age
Bacteria	<i>Salmonella</i>	2-6 weeks of age
	<i>E. coli</i>	Calves <5 days of age

KEY POINT:



Calfhood diseases have a major impact on the economic viability of cattle operations due to both the direct costs of calf losses, the treatment required and the long term effects on animal performance.

② Symptoms of scour.

Calf scour is easily recognised, with calf faeces increasing in frequency and quantity, and having a higher than normal water content. Whatever the cause, farmers will see some or all of the following:

- Bright yellow or white faeces.
- Depressed calves who are reluctant to feed.
- Calves with sunken eyes and/or a temperature.
- Skin remaining peaked or tented when lifted, indicating dehydration.
- Weight loss and weakness.
- In severe cases, calves will collapse, become comatose and die.



Bright yellow faeces are a predominant symptom of calf scours.

Estimation of hydration status in calves with diarrhoea.

Dehydration	Attitude	Eyeball recession	Skin tent (seconds)
<5%	Normal	None	<1
6-8% (mild)	Slightly depressed	2-4mm	1-2
8-10% (moderate)	Depressed	4-6mm	2-5
10-12% (severe)	Comatose	6-8mm	6-10
>12%	Comatose/dead	8-12mm	>10

Source: Smith, 2009. *Vet. Clin. North Am. Food Anim. Pract.*, 25; 55-72.

With careful observation, it is possible for calf rearers to anticipate the onset of scour the day before it occurs by looking out for the following signs:

- Dry muzzle, thick mucus appearing from the nostrils.
- Very firm faeces.
- Refusal of milk.
- A tendency to lie down.
- A high body temperature (over 39.5°C).



A rectal temperature above 39.5°C indicates calves that are likely to be developing scours.

③ Treatment of scour.

Although specific treatments are available for scour depending on the causal pathogen, the following steps should be taken in all cases to ensure calf recovery:

I. Isolation

- Scouring calves should be isolated in a clean, dry and warm pen.

II. Rehydration therapy

- Calves must receive sufficient liquid and electrolytes to replace those lost in the faeces.
- Frequent, small, feeds of electrolytes or milk are better than fewer larger ones.
- Healthy calves need up to four litres of fluid a day, and scouring calves need an additional four litres to replace lost fluids.

Diarrhoea (scour)

- Electrolyte scour treatments must have a Strong Ion Difference (SID) of 60mmol.

III. Milk feeding

- Continuing to feed milk or good quality milk replacer will not prolong or worsen the scour and can help to heal the intestine.
- Continue to offer scouring calves normal amounts of milk or milk replacer for as long as they want to drink it.
- If reintroducing milk, it should be offered full strength. Milk should never be diluted with electrolyte solutions as this can lead to poor milk clotting.
- Electrolytes should be given at least 30 minutes before a milk feed.
- Milk or milk replacer should not be stomach tubed.

IV. Antibiotics

- Antibiotics do not work against the parasites and viruses which are the most common causes of calf scour.
- Antibiotics should be given, by injection, only when the calf looks very sick or has a temperature outside of the normal range of 38.5 to 39.5°C.

KEY QUESTION:



Should I take dung samples from calves with scour and send them to the laboratory?

Yes, in the following cases:

- Calf scour is a regular occurrence on your farm.
- A number of calves have scour at the one time.
- The treatment that you normally use doesn't work.



Faecal samples should be taken directly from the animal rather than the pen floor.

4 Why are electrolytes important?

Once scouring, a calf becomes rapidly dehydrated, acidotic, and low in essential electrolytes such as sodium (Na), Potassium (K), and Chloride (Cl). They can lose 5% to 10% of their body weight daily in fluids. Treatment involves rehydration, correction of acidosis, and replacement of electrolytes.

Some electrolyte products on the market, while assisting with rehydration and replacement of electrolytes, often fail to effectively correct acidosis. Correcting acidosis is essential for calf recovery. This has led to the introduction of new legislation across the EU (EU regulation No. 1123/2014) which requires that all scour treatments must have an SID of at least 60mmol/litre which will assist in



correcting acidosis. Research shows that products meeting this specification restore blood pH and base excess within a 12-18 hour period and facilitate a quick and full recovery of calves from scour.

KEY POINT:



Products meeting the SID requirement will state that they are fit for the “stabilisation of water and electrolyte balance to support the physiological digestion”. Products with an SID of less than 60mmol/litre will only state that they are “complementary feeds”.

How much electrolytes are required?

The amount of electrolytes needed depends on the extent of the calf’s symptoms. Overfeeding electrolytes causes little detriment to calves. However, underfeeding electrolytes can prolong scours and not correct the dehydration and loss of electrolytes.

Calf Symptoms	Dehydration %	Daily amount of electrolytes needed for 45kg calf	Total daily amount of fluids (milk + electrolytes)
Scours Strong suckling reflex Skin tent returns to normal in less than 2 sec	5-6%	3L of electrolytes plus 4-6L of milk	7-9L
Scours Calf still has suckling reflex Skin tent returns to normal in 2-6 sec Sunken eyes Mild depression; calf may be weak	6-8% (moderately dehydrated)	4L of electrolytes plus 4-6L of milk	8-10L
Scours Calf lying down; rises only when encouraged Skin tent returns to normal in >6 sec Very sunken eyes; white and dry gums Calf depressed; calf may be weak	8-10% (severely dehydrated)	Metabolic acidosis- intravenous fluids needed to correct blood pH caused by imbalance of acids and bases in the blood	Contact your vet
Death	Over 14%		

Adapted from an article by D.M. Amaral-Phillips (2012), University of Kentucky.

5 Prevention of calf scour.

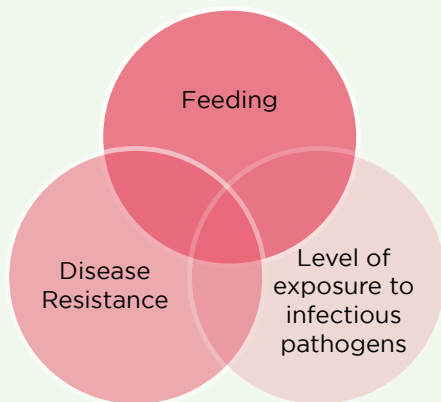
Whether a calf stays healthy or gets scour is determined by the balance between the resistance of the calf to infection and the level of infection to which it is exposed.

- Provide adequate colostrum in the first few hours after birth.
- Provide proper housing or shelter from the weather to reduce stress.
- Carefully plan shed designs to avoid overcrowding.
- Avoid mixing different ages (i.e. new born calves with calves older than 3-4 days) as younger calves will be more susceptible.
- Minimise stresses associated with routine management practices e.g. disbudding, castration.
- Maintain strict hygiene by cleaning and sterilising feeding utensils and facilities.
- Prevent the build-up of faecal contamination around feed and water troughs. Raise feeding and

Diarrhoea (scour)

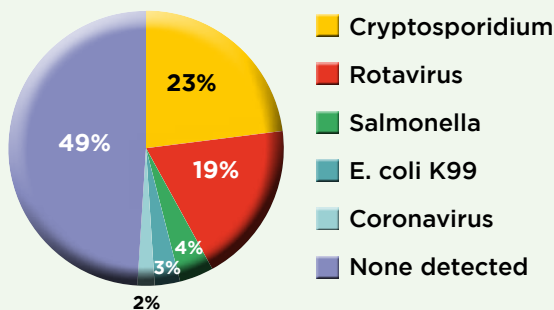
water troughs off the floor, to at least 0.75m.

- Individual or group calf pens/hutches must be cleaned out and disinfected between animals.
- Clean out bedding regularly or generously top up a straw bed. Check bedding by kneeling in the pen; your knees should not get wet if the bedding is dry enough.
- Develop a routine milk feeding program with as few people involved as possible.
- Respond quickly to symptoms of scour; isolate sick calves and address the cause.
- Purchase calves from cows that have been vaccinated with a scour vaccine before calving. The vaccinated cow produces more antibodies to rotavirus, coronavirus and *E.coli* and delivers them in her colostrum.



KEY FACTS:

In Ireland, *Cryptosporidium* and *Rotavirus* are the two most common causes of calf scour.



The relative frequency of enteropathogens identified on post-mortem submissions of calves less than one month of age to DAFM RVLs during 2012. Source: All-island Animal Disease Surveillance Report 2012: A joint AFBI / DAFM Veterinary Laboratories publication.

6 Coccidiosis.

Coccidiosis is usually seen in calves from three weeks to about nine months of age. Infected calves excrete vast numbers of oocytes which then contaminate the environment for other calves. Resistant oocytes can survive for long periods.

Although cattle develop immunity to the condition over time, young calves with an underdeveloped immune system placed in a dirty environment can acquire the disease.

Symptoms

- A watery scour due to damage of the intestinal mucosa.
- Calves become dehydrated, may start to pass blood, shed part of the intestine lining and can become weak and uncoordinated.
- In many herds there may be sub-clinical infection where animals show very few symptoms and will recover with time but thrive will be affected.

Treatment

Where a farm has had previous trouble with *Coccidia*, farmers must be particularly vigilant as it can reoccur, especially where hygiene is poor.

- Prophylactic dosing of calves with Vecoxan (diclurazil) or Baycox (toltrazuril) is common.
- Typically calves are given an oral dose of between 20-30ml depending on the weight of the calf.

Prevention

- Maintain calf housing in a hygienic manner.
- Use effective disinfectants.
- Provide clean dry bedding.
- Raise troughs off the ground and clean regularly.
- Turn calves out onto pasture which has not been grazed by calves in over a year.

7 Cryptosporidiosis.

Cryptosporidium parvum is the causal pathogen of Cryptosporidiosis, which generally affects calves in the second week of life, although calves from five to 35 days are susceptible. The infection causes severe damage to the lining of the gut wall and destroys the calf's ability to absorb nutrients

The parasite is transmitted via the faecal-oral route, with calves becoming infected from calf pens, utensils or farm worker's clothing which has been contaminated with dung containing the parasite.

Diagnosis

It is difficult to distinguish cryptosporidiosis from other types of scour because the clinical signs are non-specific.

- Submit faecal samples (in sterile containers) from untreated, scouring, calves to the local vet or laboratory in the early stages of a disease outbreak.
- Take dead calves to the Regional Veterinary Laboratory for a post-mortem.



The optimal calf rearing system to control cryptosporidiosis is to rear calves in individual pens for at least the first two weeks.

Symptoms

- Persistent diarrhoea that is extremely difficult to cure.
- Calves become lethargic, stop drinking and can become dehydrated quickly.
- Once infected, calves will begin to shed vast quantities of oocysts in their scour after four days, leading to contamination of other calves with the infection.
- Where mixed infections (e.g. with *Rotavirus*) occur, mortalities can be high.

Treatment

- Calves must remain on milk and electrolyte therapy so that they are kept nourished and do not become dehydrated.
- The only licenced product that can be used therapeutically, or as a preventative, is Halocur (halofuginone lactate).
- Where there is a farm problem, calves should be given Halocur in the first 24 hours after birth. Halocur must be given daily for a further seven days. A typical 45-50kg calf will need 10ml/day for eight days.
- All unaffected healthy calves should be moved immediately from the contaminated environment.



Halocur is given daily for the first week of the calf's life to prevent cryptosporidiosis.

Diarrhoea (scour)

KEY POINT:

Cryptosporidium parvum can infect humans. Farm workers should wash their hands, change their clothes and footwear after handling sick calves. Children and immunocompromised adults should not care for sick calves. Farm owners should comply with all the regulations on slurry and run-off water from animal buildings.

8 *Rotavirus.*

Rotavirus is present in most cattle herds and typically causes diarrhoea in calves five to 14 days old. *Rotavirus* infections are self-limiting because once the epithelial cells are dead, the virus does not have anywhere to replicate. Transmission generally occurs as a result of oral contact with infected faeces.

One of the major sources of rotavirus infection is carrier cows showing no symptoms and shedding the virus around the time of calving.

Symptoms

- Pale yellow diarrhoea, sometimes with mucous and blood flecks. Usually lasts four to eight days.
- Calves can become dehydrated and pick up secondary infections.
- Some calves may drool and some may be seen to continually attempt, and fail, to defecate.
- In calves older than four weeks of age, there are often no signs or symptoms at all following re-infection.

Treatment

- Routine fluid therapy is the most important line of treatment aimed at correcting dehydration, electrolyte imbalances and acidosis brought on by fluid loss and the decreased absorptive capacity in the intestine.
- Antibiotics can reduce secondary bacterial infection.
- Cows can be vaccinated to increase the amount of rotavirus antibodies in the colostrum. If such colostrum is given to the calf within 12 hours it can provide protection for at least seven days.



Section 6

Pneumonia



Introduction

Pneumonia is the second most common health problem affecting young calves. Pneumonia is an inflammation of the lungs, which can cause permanent damage and even death. It can be viral or bacterial in origin. In most instances viral infection occurs first, followed by bacterial infection. High risk periods occur after grouping or mixing of groups; after weaning off milk or milk replacer; and in unfavourable or changeable weather conditions.

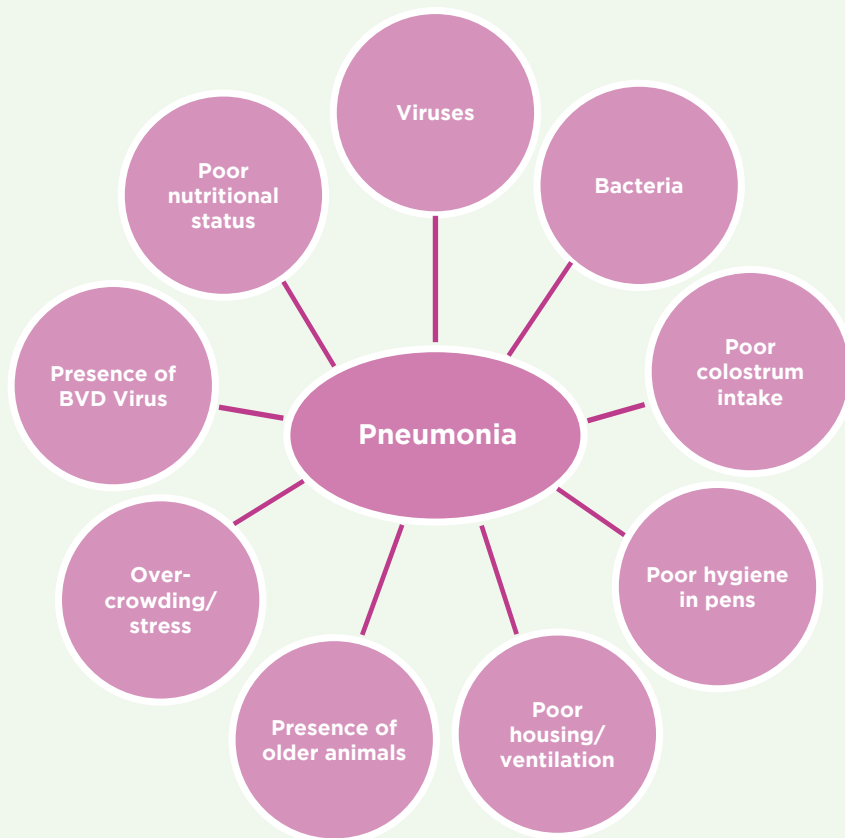
- ① Cause of pneumonia in calves.
- ② Symptoms of pneumonia.
- ③ Diagnosis.
- ④ Treatment of pneumonia.
- ⑤ Preventative measures.

Pneumonia

① Causes of pneumonia in calves.

Pneumonia is the most common disease associated with housed calves. Approximately 3% of calves born die from pneumonia in the first 12 weeks of life.

Pneumonia may be caused by a number of different things; therefore it is often termed a 'multifactorial disease'. Factors leading to pneumonia include:



Common causal viruses and bacteria:

Viruses	<i>Respiratory syncytial virus (RSV)</i>	Present in most herds, most common.
	<i>Parainfluenza type 3 (Pi3)</i>	
	<i>Bovine rhinotracheitis (IBR) (Bovine Herpes Virus 1)</i>	Less prevalent, more typically seen in older calves. Occurs from mixing or housing of groups of cattle from different sources.
	Bovine viral diarrhoea (BVD)	Does not cause damage to the lungs and airways, but can impair the calf's disease resistance.
Bacteria	<i>Mannheimia haemolytica</i>	Start to colonise the upper respiratory tract and move down towards the lungs, triggering pneumonia. Toxins produced cause tissue damage which can prove fatal.
	<i>Pasteurella multocida</i>	
	<i>Trueperella pyogenes</i>	
	<i>Histophilus somni</i>	
	<i>Mycoplasma bovis</i>	
Parasites	Lungworm	Particular concern for young calves who have been put out on grass early.

2 Symptoms.

It usually takes two to three days for initial infection to develop into bacterial colonisation and pneumonia but stock can deteriorate quickly from being apparently healthy to seriously ill within hours. Therefore, early diagnosis is essential for successful treatment. Initial signs of pneumonia may include:

- Reduced feed intake/ appetite (usually the first sign).
- Being 'Off form'.
- Dullness, drooping ears.
- 'Hollow sides'.
- Fever (over 39.5°C).
- Cough.

Other later signs may include:

- Increased respiratory rate (rapid and laboured breathing).
- Watery discharge from the nose and eyes.

By the time these symptoms are visible the disease is advanced. Where there are one or two calves showing obvious signs of pneumonia, four to five times more in the same group are likely to be in the early stages of infection and experiencing high temperatures.

3 Diagnosis.

Careful observation of calves at a time when they are resting is necessary to observe signs of ill-health. Checking the calves at feeding times only can reduce the likelihood of detection as the signs of pneumonia may not be so easy to observe at that time.



In severe pneumonia cases, veterinary intervention may be required.

4 Treatment of pneumonia.

Pneumonia may easily be treated and prevented by isolating sick calves, using proper management techniques, vaccinating young calves, providing good ventilation, and using antibiotics as necessary.

- Veterinary advice should be sought on the treatment and control of suspected pneumonia outbreaks.
- Antibiotics are ineffective against viral infections. However, where bacterial involvement is suspected, antibiotic treatment is required.
- In rare cases, lungworm may be causing pneumonia in young calves and these will not respond to antibiotic treatment.

5 Preventive measures.

- Practice good hygiene at calving and remove the calf immediately from the calving pen.
- Ensure good colostrum intake after birth and good nutrition for growing calves.
- Check for nutritional deficiencies such as vitamin E and selenium, which will weaken the animal's immune system.
- Provide appropriate calf housing with good ventilation; plenty of air, no draughts and a well bedded dry lying area.
- Prevent scour and manage outbreaks properly if they occur.
- Prevent BVD in the herd through culling and testing practices.
- Minimise stress.
- If forming groups, put animals of about the same age and size together. Keep groups stable.
- Outdoor reared calves are generally at lower risk of pneumonia.
- Implement vaccination policy. Calves can be vaccinated from two weeks of age (i.e. IBR vaccine). The vaccination program is two shots, four weeks apart. A booster dose should be given before the next risk period.

KEY FACTS:



Calves that have suffered from scour are more likely to develop pneumonia later in life.



Section 6

Other Common Conditions



Introduction

Although scour and pneumonia are the two most common calf diseases, there are a number of other pathogens and parasites (internal and external) that can pose problems for calves during rearing and during their first season at grass.

- ① Umbilical infection (navel ill).
- ② Pink eye.
- ③ BVD (Bovine Viral Diarrhoea).
- ④ Clostridial (bacterial) diseases.
- ⑤ Internal parasites.
- ⑥ Cerebral cortical necrosis (CCN).
- ⑦ Lice.
- ⑧ Calf diphtheria.
- ⑨ Ringworm.
- ⑩ Bloat.

Other Common Conditions

① Umbilical infection (navel ill).

Navel or joint ill is a disease of young calves, usually less than one week of age. It occurs as a result of infection entering via the umbilical cord at, or soon after, birth.

Symptoms

Navel ill:

- Swollen, painful navel that does not dry up.
- An abscess may develop from which pus may burst.
- The calf may have a high temperature and reduced appetite.



A healthy navel.

Joint ill:

If the infection spreads from the navel, or navel ill is not treated, further signs will develop as bacteria spread via the bloodstream and establish themselves in other parts of the body.

- The most common sites for bacteria to settle are the joints. This leads to swollen, stiff painful (often hot) joints.
- Temperature will be raised while the bacteria spread but by the time the disease is noted it may be normal.
- Loss of appetite and depression.

Other sites where bacteria can settle include the eyes, around the heart and the brain. Death is common in the latter case.

In some calves, infection spreads from the navel to the liver causing a liver abscess. In this case problems may not be noted until the calves are older (one to three months).

Treatment

- Separate and isolate infected animals.
- Antibiotics and painkillers are effective in most mild cases.
- Antibiotic treatment should continue until after the signs have disappeared. Severe cases may not recover even with prolonged antibiotic treatment.
- For large navel abscesses, veterinary intervention to drain and remove the infected tissue is often necessary.

Prevention

- Ensure adequate colostrum intake and a clean calving environment.
- Apply disinfectant (such as 7% iodine solution) shortly after birth to the navel.
- Bulls' navels tend to dry more slowly than heifers' making them a higher risk. Applying disinfectant two or three times to bulls can reduce this risk.
- Ensure calves are not moved to other pens or contaminated pastures until the navel has dried completely.

② Pink eye.

Pink eye, or infectious bovine keratoconjunctivitis, is an inflammatory bacterial infection of the eye that can cause permanent blindness in severe cases.

Pink eye commonly occurs during the calf's first summer and is contagious. It can affect up to 80% of a herd, with affected weanling calves losing up to 10% of their body weight.

Cause of pink eye

Most cases of pink eye are caused by the bacterium *Moraxella bovis*. The bacteria produce a toxin which attacks the surface of the eye (cornea) and conjunctiva, causing inflammation and ulceration.

Infective material discharged from the eyes of affected cattle can be spread to other animals by flies, or onto long grass grazed by the cattle. Sunlight and dust make the problem worse. There may also be other organisms, such as viruses and mycoplasmas, which cause eye damage and allow *Moraxella bovis* to become established.



Symptoms

The first signs of pink eye are:

- Watery eye discharge.
- Aversion to sunlight.
- Signs of irritation e.g. excessive blinking.
- Reddening and swelling of the eyelids and the third eyelid.

The eye will then go cloudy in the middle and the cornea may ulcerate over the following two days. In a small number of untreated cases, ulceration may progress to abscess formation, with possible rupture of the cornea and permanent blindness.

After recovery, about 2% of affected eyes have a residual white scar on the cornea. Most animals are completely recovered three to five weeks after infection without treatment and usually only one eye is affected.

Treatment

Many cattle recover from pink-eye without treatment. Treatment options are based on antibiotics to counter the bacteria and anti-inflammatory drugs.

Application of Cloxicillin based eye antibiotic ointment into the conjunctival sac (under the upper and lower eyelids) is effective. Other topical preparations include antibiotic sprays or powders. However, these only give short term antibiotic coverage and must be repeated several times per day to be effective.

In late and more severe stages, injection of a combination of a broad-spectrum antibiotic and an anti-inflammatory drug underneath the upper eyelid is often successful. Eye patches offer protection from further irritation from sunlight, dust and flies and reduce the weight loss often caused by pink eye.

Prevention

- Maintain an irritant-free environment. Irritation to the eye allows *Moraxella bovis* to invade and cause pink eye.

- Limit the spread of the bacteria by controlling fly numbers on cattle with the use of pour-on synthetic insecticide.
- Ensure the prompt segregation and treatment of any stock with pink eye.

3 Bovine Viral Diarrhoea (BVD).

Bovine Viral Diarrhoea (BVD) is a highly contagious viral disease of cattle caused by Bovine Viral Diarrhoea Virus (BVDV). It can be spread directly by infected animals, or indirectly, for example via slurry and contaminated visitors or equipment.

Transmission

There are two types of infected animal: Persistently infected (PI) or Transiently infected (TI).

PI animals are those that have been exposed to the virus during gestation, i.e. unborn calves exposed within the first 120 days of pregnancy. These animals shed BVDV at high levels for life, and PI animals are therefore the most significant source of the BVD virus. There is no cure for these animals and their movement is restricted under the National BVD Eradication Scheme. They should be euthanised or slaughtered immediately on confirmed identification.

Most infections with BVD are Transient Infections (TI). A transiently infected animal is one that became infected after it was born and does not show any clinical signs. After being exposed to BVD and becoming a TI, the animal will develop long term immunity to the disease.

Clinical signs

PI animals can look completely normal, but also may be stunted or fail to thrive. Eventually the majority of PI animals will develop a severe, and always fatal, wasting condition with diarrhoea called Mucosal Disease, typically between six and 18 months of age.

In calves the most commonly recognised birth defect is *cerebellar hypoplasia*. Signs of this are:

- Ataxia/lack of voluntary coordination of muscle movements.
- Tremors.
- Wide stance.

Other Common Conditions

- Stumbling.
- Failure to nurse.

Transient infections include diarrhoea, calf pneumonia, increased occurrence of other diseases, and death. Often animals fail to thrive for no apparent reason and sick calves respond poorly to veterinary treatment.

Treatment and prevention

There are three key steps to control BVD:

1. *Remove the infection*

Where individual animal testing has confirmed the presence of PI animals, these PIs should be isolated immediately and slaughtered at the earliest possible opportunity.



Ear notch testing is mandatory in newborn calves at registration and identifies infected animals.

2. *Preventing infection*

Having a coherent biosecurity plan is the key to preventing the introduction and spread of BVD.

- Prior to purchase try to ensure animals are virus-negative.
- Do not mix or house animals in the same airspace with animals whose BVD status is unknown.
- Quarantine and test all animals coming onto the farm.
- Maintain stock-proof boundaries on the farm (3m gap from neighbouring farms).
- Avoid co-grazing land with other farms and/or other animal species.
- Have well maintained footbaths and ensure all visitors use them.
- Clean and disinfect trailers and all veterinary equipment.

3. *Managing immunity/vaccination*

Aim to buy calves from dairy farmers whose cows were vaccinated for BVD, or whose BVD status is known to be clear/negative.

4 **Clostridial (bacterial) diseases.**

Clostridial diseases are a significant cause of mortality in Irish cattle, with a disease rate of between five and 10% recorded in animals sent for post mortem examination.

Clostridial organisms cause a variety of diseases, including blackleg, pulpy kidney, black's disease, tetanus, bacterial redwater, malignant oedema and enterotoxaemia. These organisms are commonly found in the soil where they are able to survive for long periods.

Unfortunately, the most common sign of these diseases is sudden death.

What is blackleg?

Blackleg is one of the most common clostridial conditions and is mainly a disease of grazing animals. It can also occur in housed animals that have grazed infected pastures. Although it mostly affects cattle from six months to two years of age, it can occur in calves a few months old.

Spores produced by the bacteria are eaten by the animal. After ingestion these spores can be found in the muscle, liver and spleen. If the area of muscle where the spores are located is damaged, the spores germinate and produce a fatal toxæmia. Usually, the animal is found dead. On rare occasions the animal may still be alive. If the muscle in a limb is damaged, the animal will be severely lame. As the disease progresses, there will be a build-up of gas in the area of the lesion. The lesion will be spongy to the touch and you can hear gas crackling when you press on the lesion.



Treatment for clostridial diseases

A post mortem examination should be carried out on suspect deaths to determine the specific clostridial bacteria responsible. This allows an appropriate vaccination programme to be put in place on farm. Where this information is absent, farmers can use a multivalent clostridial vaccine.

On the rare occasions that the animal is still alive, contact your vet immediately. They will prescribe the necessary antibiotic.

5 Internal parasites.

Parasitic infections are a potential problem in dairy born calves upon turnout to grass for their first grazing season. The most important parasites to combat are the three main groups of helminths:

- Stomach and intestinal worms ('gutworms').
- Lungworms.
- Liver fluke and rumen fluke.

Treatment of cattle for internal parasites can be delivered by three methods:

- Orally e.g. bolus or drench.
- Injection.
- Pour-on.

The most important thing to remember about any dose is to give the recommended rate for the weight of the animal.

I. *Gutworms*

Gutworms are present on every farm and in all ages of grazing cattle. If uncontrolled, they can cause clinical disease in first grazing season animals and loss of performance in older animals.

Control measures include:

- Turning first grazing season calves out onto clean pasture i.e. pasture not grazed by young cattle since mid-summer/autumn the previous year.
- Regular monitoring of parasite egg excretion (faecal sampling).
- Strategic treatment with appropriate anthelmintic.
- Weighing animals regularly.

II. *Lungworms*

Lungworm infections are less predictable than gutworm infections. Their main impact is made through clinical disease, such as hoose or husk.

Affected calves can exhibit clinical signs ranging from a slight cough after exercise to severe coughing and respiratory distress, often leading to secondary viral and bacterial infections.

Close monitoring for early clinical signs of respiratory disease, particularly coughing, is the best approach for management of lungworm infection.

III. *Fluke*

The two types of fluke that are problematic for calves are:

- 1) Liver fluke
- 2) Rumen fluke

Fluke challenge can vary from year to year. Therefore, close monitoring of the DAFM fluke forecast can help prevent infection.

Treatment of parasitic worm infections

Tactical management incorporating targeted selective treatment (TST) approaches are now recommended for the control and treatment of worm infections. These are based on good grazing practices, frequent monitoring of animals and only treating animals when necessary.

If performance is lacking in the first 6-8 weeks, gutworms and lungworms are the main parasitic 'suspects', as the lifecycle of liver fluke typically means that calves will not be affected until after eight weeks of grazing (i.e. first possible exposure).

a) *Grazing management*

Calves should be turned onto clean pasture, i.e. pasture not grazed by young cattle since mid-summer/autumn the previous year.

Other Common Conditions



Calves will not require a worm drench before mid-summer if turned out on to clean fields.

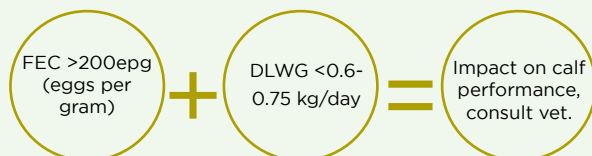
b) Monitor daily liveweight gain

The daily liveweight gain (DLWG) of calves 6-8 weeks after turnout is correlated with their level of exposure to parasitic worms and predicts growth performance up to housing. Therefore careful monitoring of DLWG is important for parasitic worm detection. Use weighbands or a weighing scale.

c) Faecal sampling and Faecal Egg Counts (FEC)

Faecal egg counts should be monitored closely.

- Fresh dung samples (from 10-15 calves) should be collected, approximately eight weeks after turnout, and sent to a laboratory.
- Dung samples should be as fresh as possible i.e. not picked off the ground.
- The lab should receive the samples as soon as possible (within 48 hours) after collection.



d) Relocate to fresh grass

Prior to treatment, calves should be moved onto the new pasture for four to seven days. During this period, they should be monitored closely to select the TST animals, i.e. those that would benefit the most from treatment.

This can be done on the basis of DLWG, body condition factor or carrying out FECs on calves that have loose faeces. If there is evidence of lungworm infection then all the calves may have to be treated. Animals are held on this pasture for 48 hours after dosing before being moved to 'clean' pasture. Ideally, treat only calves with high FEC and/or low DLWG.

e) Treatment of worm infection

If clean grazing is not available, a group treatment with an anthelmintic should be carried out with further monitoring approximately eight weeks later (depending on the level of worm challenge and how long the product protects animals from re-infection). This practice is less favoured because it increases the risk of anthelmintic resistance.

6 Cerebral cortical necrosis (CCN).

CCN or Polioencephalomalacia (polio) is a non-infectious neurological disease of cattle. There are two basic forms of the disease:

1. The **acute** form, sporadically seen in feedlot cattle where affected animals are frequently found in a coma.
2. The **mild or sub-acute** form sporadically seen in animals on pasture.

Cause

Pathologically, CCN is characterised by brain swelling and necrosis of the cerebral cortex, resulting from interference with brain metabolism. This is associated with a deficiency of thiamine (Vitamin B1) at cellular level. This deficiency is due either to thiamine destruction or inadequate production in the rumen.

KEY POINT:

Most cases of CCN in calves occur when young animals are placed onto lush, fast growing grass containing high levels of starch and sugars. The fast build-up of sugars causes a sudden pH change which can alter or kill the rumen microflora.

In cattle, CCN is rare; it mostly affects calves from six to 18 months of age.

Symptoms

Affected calves show signs of meningitis due to brain cells being destroyed by the lack of B1. They will often be found away from the group with a staggering gait.

Characteristic signs include dullness, head pressing, blindness, opisthotonos (head pushed back and up), nystagmus (involuntary eye movement) and paddling movements of the limbs.

Animals will go off their food and, if left untreated, will start having convulsions and die.

Treatment

The animal should be isolated in a quiet, well bedded pen, with feed and water readily available, and monitored closely. Ensure that the animal takes in fluid to help prevent dehydration.

Affected calves should be given vitamin B1 intravenously, followed by muscle injections every three hours for one to two days. If the animal is found late other treatments such as a drip may be required.

HOW TO:

Prevent CCN in calves

- Minimise sudden dietary changes.
- Closely monitor calves and act quickly when symptoms are seen.
- Avoid feeds and water with a high sulphur content or introduce these slowly.
- Be aware of risks associated with animals starting grazing after a long period without grass.
- Where an animal has had the condition, give the entire group an injection of B1 to help prevent further cases.

7 Lice.

Lice infestation is common in young housed calves in the winter months. Heavy infestation may cause weakness and anaemia, especially if calves are underfed. Lice spend their entire lives on cattle and spread occurs via direct contact.

Symptoms

- Loss of hair around the neck and tail and the coat becomes rough and shaggy.
- The lice cause considerable irritation resulting in persistent scratching, rubbing and licking.
- Examining the coat may reveal large numbers of small pale or blue coloured lice, just visible to the naked eye.
- Eggs may be found attached to the roots of the hair.

Treatment

Insecticides are available as pour-ons, sprays and dusts for the treatment of lice.

Lice develop resistance to insecticide quite rapidly and some resistant strains are widespread. Always follow the manufacturer's recommendations carefully.

8 Calf diphtheria.

There are two forms of calf diphtheria. The most common is an acute oral (mouth) infection. It occurs sporadically and is usually seen in calves less than three months old (typically 2-4 weeks of age). The second form is usually seen in older calves and affects the larynx (or voice-box).

Calf diphtheria is caused by the organism *Fusiformis necrophorum*. This organism also causes foul-in-the foot (foot rot) and liver abscesses in older cattle. It can be found in contaminated bedding, dirty pens and contaminated feeding equipment.

Symptoms

The condition is characterised by severe inflammation of the mucous membranes of the cheeks, tongue, lips and throat. The condition is very painful and the calf will have difficulty swallowing.

At first, the calf may have a swollen jaw and dribble. The inside of the mouth will show a foul-smelling ulceration. Temperature may be normal at the start and calves may appear bright and active.



Other Common Conditions

However, if untreated, more signs develop which include:

- High temperature.
- Coughing.
- Loss of appetite and depression.
- Difficulty breathing, chewing and swallowing.
- Swollen pharyngeal region.
- Deep ulcers on the tongue, palate, and inside of cheeks.
- Pneumonia.

Treatment and Control

Strict attention to hygiene and the use of clean equipment and adequate clean bedding will help to prevent outbreaks.

KEY POINT:

Immediate treatment of the calf with antibiotics leads to complete recovery.

9 Ringworm.

Ringworm is caused by a fungus which survives from year to year on building walls and partitions. Spread from calf to calf is rapid, especially if animals are in poor condition, but recovered cases are solidly immune. Humans, particularly children, are readily infected by contact with diseased animals.

Symptoms

Initially there is hair loss, followed some weeks later by the formation of a dry grey crust. Circular lesions are commonly found around the eyes and on the head and neck.

Treatment

The condition is self-limiting. Spontaneous recovery without treatment occurs three to four months after infection, particularly when calves are turned out in the spring.

Treatment is most useful early in an outbreak to limit contamination of the environment by infected animals. As lesions do not become apparent for several weeks, treat in-contact animals as well as affected animals.

Prevention

Anti-fungal preparations include an in-feed additive given daily for seven days and liquids which can be applied as a wash or spray.

Thorough cleaning and disinfection of calf houses will limit the carry-over of infection.

10 Bloat.

Bloat is an over expansion of the abomasum or rumen due to the build-up of gas which is unable to escape. Organisms, and not necessarily pathogenic ones, produce the gas that causes bloat. The susceptibility of animals to bloat varies, and genetics can play a part.

Classification of bloat

There are two types of bloat:

- 1) Abomasal bloat. If milk is delayed from emptying out of the abomasum, bacteria can ferment the sugars leading to excessive production of gas. This usually occurs in calves less than three weeks of age. Clostridial bacteria are the suspected cause of abomasal bloat, although other organisms may be involved.
- 2) Ruminal bloat. If milk continuously flows into the rumen, the bacteria can ferment the sugars and produce large amounts of gas. When this happens, normal rumen contractions decrease and belching becomes impossible, meaning the gas cannot be released.

KEY POINT:

Do not attempt to insert a stomach tube to remove.

Management factors that contribute to bloat

Bloat is caused by a number of contributing factors. Their management and correction are crucial to preventing calf bloat. Factors include:

- **Poor colostrum management.** Ensuring a newborn calf receives an adequate supply of high quality colostrum is the most important factor in preparing the animal to withstand disease challenges during the first few weeks of life.
- **Closure of the oesophageal groove.** This directs milk to the abomasum. External stimuli and regular feeding times help to

- close the groove and prevent milk going into the rumen.
- **Cold weather.** During cold weather animals become stressed and are more susceptible to disease.
 - **Milk feeding temperature.** Under normal circumstances, milk and milk replacer should be fed at body temperature.
 - Poor hygiene. Dirty, contaminated equipment will introduce and spread unwanted microbes to calves. Teats should be at the correct height (66-70cm) and in good condition.
 - **Water intake.** The amount and quality of water provided has a significant effect on rumen development and function. Management practices that slow down or impede rumen development can set the stage for bloat and other digestive problems.
 - **Feeding time.** Feed at the same time each day. Variable feeding times can cause calves to become very hungry. Hungry calves eat and drink quickly and often over-eat, leading to changes in digestion.
 - **Abrupt diet changes.** Feed volume and feed types should be consistent. Any changes must be made gradually.

- **Mixing of milk powder.** The correct concentration of milk helps to ensure optimal abomasal emptying time.
- **Health status.** A calf that has repeated scours or respiratory problems is more likely to develop the digestive conditions leading to bloat.
- **Dry feed.** Calf starter is essential for rumen development and should be provided from day three.

By evaluating and adjusting management practices on farm, many of the above factors can be eliminated. This should reduce the occurrence of bloat on your farm.

KEY TIPS:



The most important factor to control bloat is a consistent feeding program. Work with your vet to establish treatment programs so that cases of bloat get managed quickly and effectively.



Excellent hygiene is essential to help prevent bloat.

