

Appendices

Disease details

Basic information on common calf diseases



Residue risk management

Rotavirus	165
Salmonellosis	165
Cryptosporidium parvum	166
Coronavirus	166
Colibacillosis—E coli	167
Coccidiosis	167
Non infectious, nutritional scours	168
Pneumonia	168
Umbilical abscess	169
Joint Ill	169
Mouth or cheek abscesses	170
Calculating electrolyte replacement amounts	171
Sample: Scouring calf treatment protocol for “Our Dairy Farm”	172

Rotavirus

What causes it?

A virus

How do calves get infected?

Infection is by ingesting virus from manure (adults and calves). Pregnant cows are known to pass high levels of the virus around the time of calving. Once ingested, clinical signs of disease are usually seen within 24 hours but it may be up to 3 days.

How long can it last in the environment?

The virus can survive in water and soil for weeks to months (years) if temperatures are mild and there is an ongoing presence of moisture.

How is it treated?

No specific drugs are available that destroy this virus. Treatment is focused on electrolyte/fluid replacement and supportive measures. Recovered calves can become re-infected.

Supportive measures include:

Anti-inflammatory medication

These prescription medications relieve inflammation, fever and pain and may prove beneficial in calves displaying these symptoms. They should be used with caution in dehydrated calves due to risks of kidney damage. These medications may also have a withholding period which must be obeyed. They should be administered as directed on the attached veterinarian's label. The dose is based on weight.

Vitamins & Mineral Supplements

Calves that are ill for more than a few days can suffer decreased milk or feed intake. This may limit intake of essential vitamins and minerals. Supplementation in these circumstances may be beneficial.

Importance of supportive care

Calves that are ill and/or dehydrated will often have body temperatures outside of the normal range. They may also experience higher levels of stress. Supplying them with an environment of controlled temperature and good bedding can significantly improve the welfare and survivability of the sick calf. Cold calves can be warmed by the use of hot water containers placed close to a calf or calf jackets. Warm calves can be cooled by ensuring they are placed in cool areas away from direct sun light. Attention to the comfort and well being of the calf may improve survivability rates.

How do I prevent it?

- Minimise calf contact with manure from adult cattle by early removal of the calf from its dam
- Ensure calves are not exposed to manure during transportation to calf rearing area or during the rearing period
- Maximise immune system response by ensuring successful passive transfer of antibodies (blood IgG levels over 10mg/L)
- Each calf should consume at least 2 litres of good quality colostrum in the first 12 hours and another 2 litres within 24 hours of birth

Salmonellosis

What causes it?

A family of bacteria (*Salmonella* sp.), many strains of which can cause disease in many species, including humans

How do calves get infected?

Infection is by ingesting the bacterium which is found in manure, soil or water. It can also be found in saliva and nasal secretions of infected animals.

Heavily pregnant cows are more at risk of shedding the bacteria in their manure. This bacterium can also be present in other animal species on a farm. Vermin and birds are common carriers of infection and can spread infection.

Clinical signs appear 24–48 hours after infection. High temperatures are common. Death can sometimes occur with no signs of scour or illness.

How long can it last in the environment?

It can survive in the environment for several years.

How is it treated?

Treatment relies on fluid and electrolyte replacement, the use of nonsteroidal anti-inflammatory drugs (to control fever and toxemia) and antibiotics. Supportive measures and treatments can also aid recovery.

How do I prevent it?

- Clean up grain to reduce bird droppings contaminating calf rearing area
- Avoid overcrowding and exposure to possible sources of infections such as contaminated water, pasture grazed by older animals and manure from other animal species
- Minimise calf contact with manure from adult cattle by early removal of the calf from its dam. Ensure calves are not exposed to manure during transportation to calf rearing area or during the rearing period
- Maximise immune system response by ensuring successful passive transfer of antibodies (blood IgG levels over 10mg/L. Each calf should at least consume 2 litres of good quality colostrum in the first 12 hours and another 2 litres within 24 hours of birth

A vaccine is available in Australia. Calves receive protection from the ingestion of colostrum from vaccinated cows. The level of antibodies in colostrum is variable and vaccination is not a guarantee of complete protection from the disease. Appropriate attention to other preventative strategies is still very important.

Take care! Humans can get salmonella too!

Cryptosporidium parvum

What causes it?

A protozoan

How do calves get infected?

Infection is by ingesting the organism which is found in manure, soil or water. It invades the wall of the intestine and undergoes a multiplication phase.

Eggs (oocysts) are produced and either re-infect the calf or are shed into the environment. This organism can also be present in other animal species on a farm.

Clinical signs appear 3 to 5 days after infection. Following an infection, a calf can shed the eggs for 2 weeks or longer.

How long can it last in the environment?

The eggs can survive for months to years in water and soil in cool conditions. Unsuitable climatic conditions such as dry and warmth can significantly reduce its viability and infectivity.

How is it treated?

No specific drugs are available that destroy this protozoan. Treatment is focused on fluid replacement and supportive measures.

How do I prevent it?

- Avoid overcrowding and exposure to possible sources of infections such as contaminated water, pasture grazed by older cattle or manure from other animal species
- Minimise calf contact with manure from adult cattle by early removal of the calf from its dam. Ensure calves are not exposed to manure during transportation to calf rearing area or during the rearing period
- Maximise immune system response by ensuring successful passive transfer of antibodies (blood IgG levels over 10mg/L. Each calf should at least consume 2 litres of good quality colostrum in the first 12 hours and another 2 litres within 24 hours of birth)

In Australia, the drug halofuginone (Halocur®) is registered for the control and prevention of Cryptosporidium parvum infections in calves. It has shown variable results at reducing the severity of scouring in infected calves. This drug appears to be most effective at decreasing oocyst production and this effect is only seen while it is being administered.

Coronavirus

What causes it?

A virus

How do calves get infected?

Infection is by ingesting virus from manure (adults and calves). Pregnant cows are known to pass high levels of the virus around the time of calving. Infection from inhaling the virus is also suspected. Once ingested, clinical signs of disease are usually seen within 48 hours but can be up to 6 days.

How long can it last in the environment?

The virus can survive in water and soil for weeks to months (years) if temperatures are mild and there is an ongoing presence of moisture but generally considered a bit more fragile than, and not as persistent as, Rotavirus.

How is it treated?

No specific drugs are available that destroy this virus. Treatment is focused on fluid replacement and supportive measures. Commonly causes more damage to the intestinal lining than Rotavirus and so length of illness is generally longer. Recovered calves can become re-infected.

How do I prevent it?

- Minimise calf contact with manure from adult cattle by early removal of the calf from its dam
- Ensure calves are not exposed to manure during transportation to calf rearing area or during the rearing period
- Maximise immune system response by ensuring successful passive transfer of antibodies (blood IgG levels over 10mg/L)
- Each calf should consume at least 2 litres of good quality colostrum in the first 12 hours and another 2 litres within 24 hours of birth
- Maintain good calf rearing hygiene at all times

Colibacillosis—E coli

What causes it?

A bacterium (E coli)

How do calves get infected?

E coli bacteria are normal inhabitants of the gut of cattle. There are many different strains of E coli and not all cause disease. *E coli* (K99/F5) is the most common cause of scours in calves in Australia.

Calves are only susceptible to infection for the first 2 weeks of life but most infections are seen within the first 4 days after birth. Infection occurs by ingestion of faecal material during the early period of life.

How long can it last in the environment?

These bacteria can survive in moist environments for 3–6 months.

How is it treated?

Treatment relies on fluid and electrolyte replacement, the use of non-steroidal anti-inflammatory drugs (to control fever and toxæmia) and antibiotics.

Supportive measures and treatments can also aid recovery.

How do I prevent it?

- Minimise calf contact with manure by early removal from its dam
- Ensure calves are not exposed to manure during transportation to calf rearing area or during the rearing period
- Maximise immune system response by ensuring successful passive transfer of antibodies (blood IgG levels over 10mg/L)
- Each calf should at least consume 2 litres of good quality colostrum in the first 12 hours and another 2 litres within 24 hours of birth. Calves receive protection from the ingestion of colostrum from vaccinated cows. The level of antibodies in colostrum is adequate and vaccination in conjunction with good colostrum management can effectively minimise the impact of this disease

A vaccine is now available in Australia for a dam prior to calving to increase antibodies in the colostrum.

Coccidiosis

What causes it?

A protozoan

How do calves get infected?

Infection is by ingesting the organism which is found in manure, soil or water.

The organism invades the wall of the intestine and undergoes a multiplication phase. Eggs (oocysts) are produced and either reinfects the calf or is shed into the environment.

The period from infection to clinical signs is commonly 15–20 days so this disease is unlikely to be seen in calves less than 14 days of age.

How long can it last in the environment?

The organism can survive in water and soil for weeks to months (years) if temperatures are mild and there is an ongoing presence of moisture.

Unsuitable climatic conditions such as dry and warmth can significantly reduce its viability and infectivity.

How is it treated?

Treatment options include using medications such as sulphonamides (sulpha based antibiotics) and more recently toltrazuril (Baycox®), a single dose treatment as it attacks all stages of this parasite's lifecycle in the calf and prevents infection for up to 6 weeks.

How do I prevent it?

- Coccidiostats such as monesin and lasalocid can be added to feed supplements and prevent the parasite from developing inside the calf
- Due to the period of time coccidia take to cause disease in calves, the need for these products in newborn calves less than 2–3 weeks of age is questionable. There is certainly no value in using feeds with these supplements for calves destined for sale or slaughter at less than 2 weeks of age
- Avoiding overcrowding and minimise exposure to manure and contaminated pastures

Non infectious, nutritional scours Pneumonia

What causes it?

Scouring with no identifiable infectious agent present

How do calves get infected?

It has been the belief that feeding large amounts of milk causes scouring just due to the overflow of unclotted milk into the small intestine. This is unlikely to be correct.

Calves have been found to have an enormous digestive capacity. The use of non clotting (whey based) milk replacers has to some degree discredited this overflow idea as their use has not been associated with scouring.

The actual true cause is unknown but an overly large feed may just cause a digestive upset or a simple indigestion resulting in a disruption to normal manure production.

It may also provide an environment for pathogens to proliferate, developing an infectious scour described previously. This effect could be exaggerated if poor quality milk or milk replacer is used.

Anecdotal evidence suggests some calves are more prone to nutritional scours than others. Varying the amount of milk available (i.e. less amounts more often) to these calves per feed can reduce their risk of scouring episodes.

With electrolyte fluid therapy, calves will generally overcome nutritional scours themselves but without it, they can develop infectious scours due to build up of causative agents in the intestine.

How is it treated?

Treatment is focused on fluid replacement and supportive measures.

Reduction in volumes of milk fed per feed and increasing feeding frequency may also be of value.

How do I prevent it?

- Feed milk at consistent temperatures
- Feed good quality milk or milk replacer—don't change milk replacer type quickly
- Identify calves that are prone to nutritional scours and regulate feeding volumes to minimise scouring episodes

How does it present?

Pneumonia is a bacterial or viral infection of the lungs. Clinical signs may include fever, coughing, increased respiratory rate, drooling and wet chin and decreased appetite.

Increased sitting or standing with head and neck extended and possibly sunken eyes may be seen in more severe cases.

How is it caused?

It is most commonly caused by bacterial invasion of lung tissue following a viral infection, commonly with abscess formation.

Accidental ingestion of liquid feeds onto lungs can be an initiating factor.

Similarly, poor ventilation resulting in high levels of irritants in the inhaled air (i.e. ammonia from urine, soiled bedding, lime) can cause inflammation in the lung tissue and allow bacteria to invade. Lungworm can also precipitate pneumonia.

Viruses can also play a major role as an initial cause of lung inflammation. Poor ventilation and humid conditions allow viruses to survive.

How is it treated?

Treatment with appropriate antibiotics is usually indicated. Supportive treatment with non steroidal anti-inflammatory drugs can be useful. Fluid therapy may be warranted if dehydration or toxæmia is present. Consult your vet.

How do I prevent it?

- Provide calf rearing facilities with adequate ventilation and good air quality
- Minimise ammonia levels by maintaining clean bedding
- Do not apply lime—use a product like Virkon™. Avoid overcrowding of calf pens
- Ensure high levels of staff competency in skills related to tube feeding calves their colostrum, milk or other liquids
- Keep older calves free from internal parasites, including lungworm

Umbilical abscess

How does it present?

Common signs in addition to a painful swelling at umbilicus include fever, decreased appetite and sunken eyes in severe cases.

Pus may discharge from the umbilicus. Swelling is often hard in early stages but softens as condition progresses.

How is it caused?

Bacteria can enter an open umbilical cord shortly after birth and set up infection. The practice of navel sucking can contribute to the problem.

How is it treated?

Treatment with appropriate antibiotics is usually indicated. Surgical drainage may be appropriate. Consult your vet.

Supportive treatment with non steroidal anti-inflammatory drugs can be useful.

Need to differentiate from an umbilical hernia which is generally soft, non painful. Hernias can often be reduced in size by rolling calf on back and applying gentle pressure to the swelling. This is not the case for abscess.

How do I prevent it?

- Provide and maintain a clean calving and rearing environment
- Spraying of umbilical cords with an effective disinfectant shortly after birth and repeated as necessary is considered best practice
- Regular monitoring of umbilical cords for swelling, heat or pain should be carried out
- Identify navel sucking calves and restrict behaviour
- Be careful not to confuse umbilical abscesses with an umbilical hernia

Joint Ill

How does it present?

Signs include swollen, painful joint(s) with limping progressing to complete non-weight bearing lameness. Additional signs seen are fever, decreased appetite and sunken eyes in severe cases.

How is it caused?

Bacteria enter the blood stream and lodge in joints. Common belief is that bacteria enter the blood supply via the umbilical cord. It is now also understood that bacteria can also cross from intestinal tract into blood system particularly in severe or long standing causes of scouring.

How is it treated?

Treatment with appropriate antibiotics as soon as possible is usually indicated. Surgical drainage and flushing of the affected joint may be appropriate.

Supportive treatment with non steroidal anti-inflammatory drugs can be useful.

Euthanasia should be considered where severe non-weight bearing lameness is present or multiple joints are affected.

How do I prevent it?

- Spraying of umbilical cords with an effective disinfectant shortly after birth and repeated as necessary is considered best practice
- Consider the judicious use of antibiotics in cases of severe scours where blood is present or which are chronic in nature

Mouth or cheek abscesses

How does it present?

The most common presentation is as a swelling in the cheek region. Often hard in early stages but softens as condition progresses. Pus may be present discharging from swelling.

How is it caused?

It is usually initiated by a penetrating mouth wound which becomes infected with bacteria. Often seen in conjunction with feeding grain, coarse roughage (particularly unrolled oat grain) or when using rice hulls as bedding.

How is it treated?

Antibiotics are only indicated in severe cases. Most will resolve with drainage and flushing of wound. Many burst spontaneously and no treatment is necessary.

How do I prevent it?

- Early detection and treatment is necessary to minimise severity of infection
- Having water a long way from the concentrate feeder may mean calves don't drink enough water to wash the concentrate down. This may cause food impaction beside the gums, leading to lumps and abscesses.

Calculating electrolyte replacement amounts

Maintenance

Calves need to drink a maintenance amount of fluid daily just to keep their body functioning. It can be roughly calculated as 6–7.5% of the weight of the calf.

i.e. a 60kg calf needs between 4 and 4.5 litres of fluid per day

Correction of dehydration

Dehydration refers to the situation where the body tissues have less fluid than normal. This can mean cells are affected and the body does not function well. Dehydration occurs when the loss of fluid from the body is greater than the amount of fluid coming into the body. As a scouring calf becomes sick it will drink less despite continuing to lose fluid through the diarrhoea. This results in a rapid acceleration in the level of dehydration.

Dehydration is normally spoken about in degrees of dehydration. This is the percentage of the body weight that needs to be returned to correct the dehydration.

i.e. a 50kg calf that is 5% dehydrated needs 2.5 litres of fluid to rehydrate the body back to normal

There are different ways to calculate the degree of dehydration on farm.

Degree of dehydration	Demeanour	Eyeball Recession	Skin Tenting
Less than 5%	Normal	None	Less than 1 second
6–8%	Slightly depressed	2–4mm	1–2 seconds
8–10%*	Depressed	4–6mm	2–5 seconds
10–12%*	Comatose	6–8mm	5–10 seconds
Greater than 12%*	Comatose/Near death	8–12mm	Greater than 10 seconds

*Calves over 8% dehydrated require veterinary attention to replenish the required fluid due to the large amounts

If unsure of degree of dehydration an estimate of between 5% for mild cases and 8% for serious cases can be used.

Overdosing with electrolytes is not going to have adverse effects on the health of the calf.

Ongoing Losses

As the scour continues, the loss of fluid will be ongoing. This loss needs to be considered when calculating electrolyte levels. A guide to the amounts is shown below:

Type of Scour	Description of loss	Estimate of daily loss for 50kg calf
Mild	Small or minimal amount Resolving	1 Litre
Moderate	Ongoing mild case, semi formed, non profuse	2 Litre
Severe	Explosive & profuse ongoing cases	3 Litre

If unsure of type of scour use the following calculation - Bodyweight (kg) ÷ 25 = amount in litres

i.e. 60 kg calf ÷ 25 = 2.4 litres

Administering the amount

The total amount of fluid is a daily amount and should be broken down in feeds of 2 litres and spaced out over the day.

Sample: Scouring calf treatment protocol for “Our Dairy Farm”

Identify the calf

Identify the scouring calf by its ear tag number. Record the event on the computer.

Assessment & record the following details of the calf on the computer

- Rectal temperature of the calf—if it is above 39.5?
- Can it stand?
- Does it have a strong, weak or absent suckling reflex?
- Is there blood/mucus in the calf's manure?
- What is the consistency of the diarrhoea—semi formed, sloppy or watery?
- What amount of diarrhoea—small, medium or large?
- How many seconds the skin tents when tested over the neck region?
- What depth has the eyeball sunken—estimated in millimetres

Isolate the calf

On this farm scouring calves are moved to the designated hospital pen. Ensure that this area has suitable bedding and fresh water is available.

Give electrolytes

The amount of electrolyte needed is calculated by assessing:

- The degree of dehydration (skin tent result or degree of sunken eyeball)
- Weight of calf
- Amount of diarrhoea being passed

The amount of electrolyte required each day can be determined using the spreadsheet tool on the computer.

- Split the amount of electrolyte required into at least 3 separate feeds. Aim to give a maximum drink of 2 litres electrolyte per feed
- The electrolyte used on this farm is ‘Stop Scour’. It is made by adding 100gm (1 scoop) to 1 litre of clean water
- Use the calf feeder bottle marked as Electrolyte Treatment Only—rinse with warm water before use. Wash thoroughly with hot water and detergent after use

Milk Feeding

Day 1—stop milk feeding

Day 2—feed ½ normal amount

Day 3—normal amount onwards

Consider antibiotics

Sale calves must not be treated with antibiotics. If the calf is failing to respond to electrolyte treatment then contact the farm manager

Antibiotics may be considered for use on calves if there is:

- Decreased suckle ability
- Significant blood & mucus in the calf's manure
- Documented failure of passive transfer

Antibiotic to use is ‘Calf-treat’—use at 1ml per 10kg bodyweight. Injection is given under the skin over the rib cage once daily. Record treatment on computer.

- Mark calf with red paint circle on forehead to identify it has been treated with antibiotics
- Meat withholding period is 14 days after last injection is given
- If unsure whether antibiotics are required then contact the Farm Manager mobile 000 111 222

Call the vet (phone number mobile 111 222 333) if:

- Calf is unable to stand
- Calf has no suckle reflex
- Skin tent is greater than 2 seconds/eye sunken more than 3mm
- Other calves have died