07

Health management

Focus on prevention for calves that thrive

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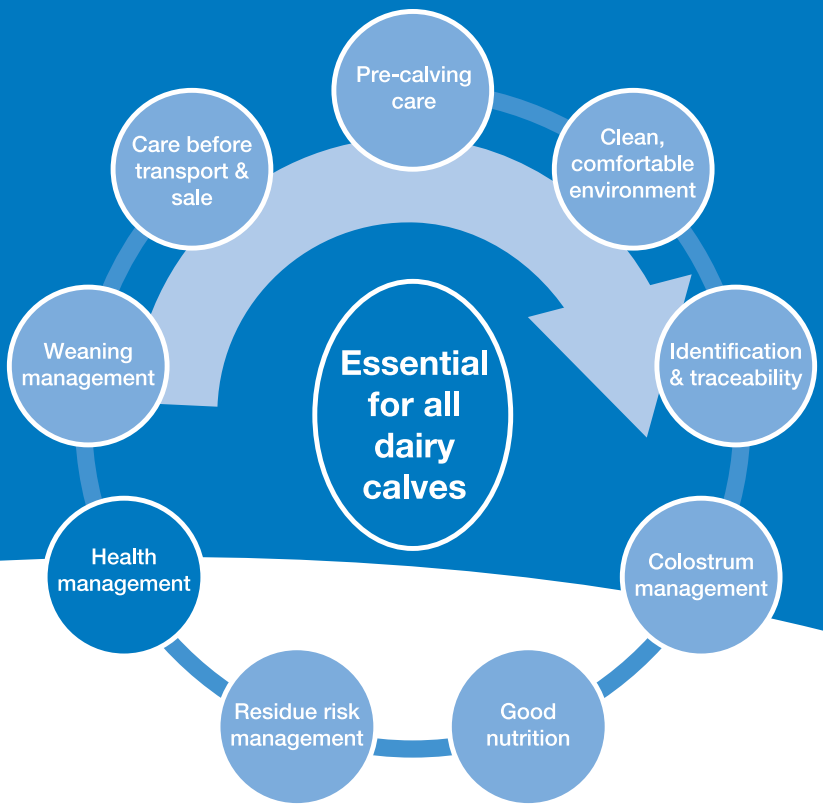
Focus on prevention for calves that thrive

- Keep the calving environment clean
- Remove calves from their dams early
- Develop a disease prevention program and treatment protocols—train your staff well
- Implement the 3 Step Calf Plan for the control of Johne's disease
- Manage manure build-up to keep pathogen numbers down
- Handle sick calves carefully to avoid contaminating healthy calves
- If necessary, use humane slaughter techniques



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Monitor calf health regularly and act quickly if problems arise. The benefits include:

- Healthier calves from birth
- Lower risk of Johne's disease and other early calf problems
- Improved growth rates
- Improved welfare and treatment outcomes

Achieve better health outcomes with attention and planning.

Focus on prevention for calves that thrive

There are five main disease prevention strategies:

- Good pre-calving care

  A comprehensive vaccination program protects the herd from disease and improves the protective capacity of a cow's colostrum.

  A balanced transition ration reduces the incidence of milk fever and other deficiencies that cause calving problems—good for the cow and good for the calf.

- Colostrum—the right quality and quantity as soon as possible

  Colostrum contains antibodies that are the main protection from infectious disease for the calf in the first 6 weeks of life. Calves need to be fed the right quantity of good quality colostrum quickly—the gut's capacity to absorb protective antibodies diminishes rapidly after birth.

- Minimise contact with manure

  Don't underestimate the problems #*&@ can cause! The more you can minimise contact with the pathogens contained in manure, the healthier your calves will be. This goes for the whole herd too. A clean and dry calving and rearing environment is critical to disease prevention.

- Care with stock handling & movement

  Taking care when handling or moving sick calves ensures that disease is not spread to healthy calves.

- Effective cleaning

  If the approach to the cleaning of equipment is meticulous, re-infection rates will be reduced.

Prevention is better than treatment and cure.

Get health basics right

You need to get some basics right if you want herd replacement calves that thrive and sale calves that are healthy and 'fit for purpose' when they leave your farm.

Provide...	Because...	Note...
Regular observation, quick action	– Allows problems to be spotted early – Quick intervention gives a sick calf the best chance of survival	– Observe calves at least twice a day – Train staff to know what's normal and what is abnormal – Have protocols in place so all staff know what action to take when sickness is observed
Quality colostrum	– Provides initial disease protection & good source of nutrients to newborn calves – Only a small window of opportunity	– Quality is at its highest in the first milking – As a minimum, at least 2 litres of good quality colostrum in the first 12 hours – Then, at least another 2 litres within the next 12 hours – Remember, more is better – High quality colostrum is defined as having an IgG concentration of greater than 50 mg per ml
Good nutrition	– Reduces nutritional deficits which make calf more vulnerable to pathogens – Provides energy to maintain steady growth rates and good rumen development	– All calves need access to fresh clean water from birth – Feed a minimum volume of 10% of a calf's body weight per day of milk or milk replacer – Feed small amounts of fibre and concentrates from about day 3 of age
Water	– Water is essential for life – Water (not milk) is required to fill the developing rumen	– Daily milk feeding may not satisfy the required daily fluid intake of a calf – Ingested milk bypasses the rumen and passes directly to the abomasum due to the action of the oesophageal groove
Comfortable environment	– More energy is available for growth and fending off disease if the rearing environment is dry and draught free – Energy is diverted to maintaining body temperature in cold and draughty conditions	– Sheds or pens need to be protected from the prevailing wind – Bedding needs to be at least 15 cm deep so calves can nestle in it with their legs covered – Get down to calf level to feel if there are any draughts or ammonia smell

Get health basics right cont'

Provide...	Because...	Note...
Minimal contact with manure	– Minimising contact with manure means less opportunities for pathogens to get into a calf	– Manage manure pathogen numbers by removing calf from dam as soon as possible – Before entering calf pens/paddocks, check clothes and equipment for manure – Ensure trailers used for transport are hosed /scraped out between each batch of calves – Choose a source of fibre/roughage that is different from bedding—if calves nibble on bedding, they will ingest more pathogens – Replace bedding between batches of calves or more frequently if possible—top up bedding regularly
Clean equipment & facilities	– Minimises the risk of spreading disease and reduces risk of contamination with antibiotic residues – Protects against future antibiotic resistance and poor drug effectiveness	– Establish cleaning and disinfection plans for facilities – Clean equipment thoroughly after every use – Use hot water and detergent to remove fat deposits contained in milk – Pay particular attention to teats and tubes—residues can get trapped and build up here
Careful stock handling	– Avoids injury to calf and reduces risk of spreading disease	– Use a calm manner from the outset – Isolate sick calves but avoid spreading the disease in the process – Deal with sick calves after feeding the healthy calves – Clean and disinfect yourself and everything you touched when treating sick calves—hands, clothes and equipment

Year round herds....

Take care in cleaning pens when calves are in them. High pressure hosing may wet calves and create aerosols containing pathogens.

Maximising the time the rearing environment is empty between batches of calves reduces disease risk

- In seasonal or batch calving herds, clean out rearing areas as soon as the last calf leaves
- All bedding and organic material should be removed—bugs persist longer in the environment if materials such as manure, saliva and bedding are present
- Rails, gates, partitions, walls and feeders should be cleaned of any obvious manure or other organic material
- Disinfection works best if the dirt and manure are removed—pressure cleaning is suitable for this purpose
- Hot water and soap may be a necessary first step when cleaning milk residues as it aids removal of the fat
- Use a broad spectrum disinfectant for best results
- A minimum of 10 minutes contact time is required (30 minutes preferred) for effective disinfection

Maximise the periods the calf rearing areas are empty—a simple but effective strategy

Discuss with your vet when antibiotic use is appropriate and when it is not.

Careful use of antibiotics

Antibiotics are useful in the treatment of a number of common health problems but a cautious approach in their use is warranted for a number of reasons:

1. Antibiotics are only useful for treating bacterial infections—they don't work on infections caused by viruses
2. Bacteria can develop resistance to antibiotics and they should only be used when they are needed. Avoid blanket use across a herd if possible
3. Every time antibiotics are used with replacement calves, there is a risk that sale calves will be contaminated with residues of the drug. In simple terms, the less you use, the lower the risk

In the case of scours, it is more important to focus on reducing dehydration through the use of fluids and electrolytes rather than rushing to use antibiotics.

Remember, the most common causes of scours are rotovirus (a virus) and cryptosporidia (a protozoan). Antibiotics have no effect on viruses or protozoa.

Preventing Johne's disease with the 3 Step Calf Plan

Bovine Johne's disease or BJD is a chronic, incurable disease of adult cattle caused by a hardy, slow-growing bacterium called Mycobacterium paratuberculosis.

- Calves less than 12 months of age are very susceptible to infection
- Generally no symptoms of Johne's disease are seen until the animals are at least four years old
- When clinical signs do occur they include weight loss, persistent diarrhoea that is unresponsive to treatment and a drop in milk production

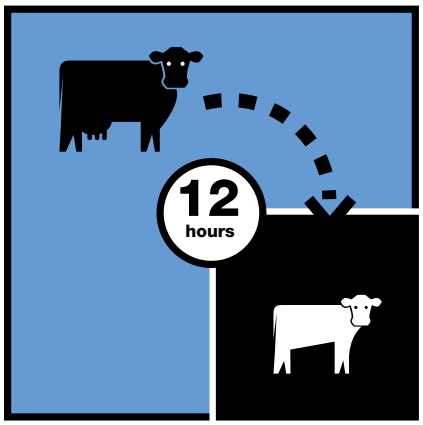
If the animal is not removed from the herd it will waste away over weeks shedding billions of bacteria in its manure until it eventually becomes too weak to stand.

Dairy Australia on behalf of the dairy industry has developed a comprehensive approach called the 3 Step Calf Plan which is aimed at minimising the spread of Johne's disease to calves.

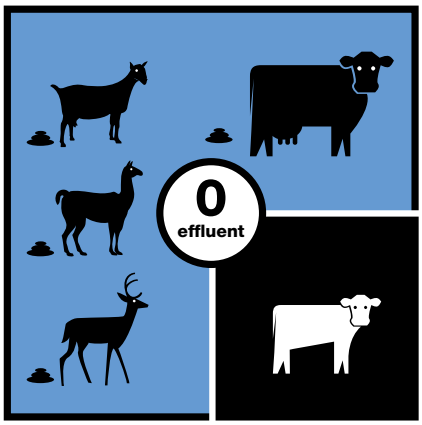
The plan focuses on stopping the spread of the disease by minimising calf contact with manure. Other strategies are aimed at avoiding introducing the disease to the herd in the first place and the early removal of cattle suspected of being infected with Johne's disease.

The good thing about this plan is that it also helps to minimise diseases like scours in newborn and young calves. Minimising calf contact with manure from adult cattle is critical.

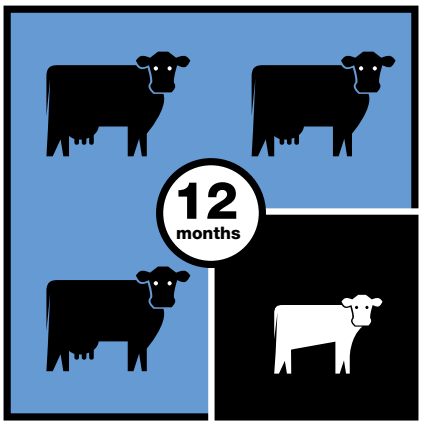
3 Step Calf Plan for the control of bovine Johne's disease (BJD)



Calves should be taken off the cow within 12 hours of birth



Management of the calf rearing area should ensure that no effluent from animals of susceptible species comes into contact with the calf



Calves up to 12 months old should not be reared on pastures that have had adult stock or stock that are known to carry BJD on them during the past 12 months.

For further information see
http://www.dairyaustralia.com.au

Monitoring problems—calving difficulty and death rates

Monitoring rates of calving difficulty (dystocia) can help you track improvement in your prevention strategies.

Calving difficulty—heifers

A = Total number of heifers which required assistance to calve

B = Total number of heifers that have calved

(A/B) x 100 = % Calving difficulties in heifers

Example:

A = 15 heifers needed calving assistance

B = 80 heifers calved

(15/80) x100 = 18.75 %

Calving difficulty—heifers
Aim for less than 15%

Calving difficulty—cows

A = Total number of cows which required assistance to calve

B = Total number of cows that have calved

(A/B) x 100% = Calving difficulties in cows

Example:

A = 5 cows needed calving assistance

B = 200 cows calved

(5/200) x 100 = 2.5 %

Calving difficulty—cows
Aim for less than 8%

Mortality rates

Measuring rates of pre-weaning calf deaths can be useful in determining if disease prevention regimes are working:

A = Total number of calves that died before weaning

B = Total number of calves born during calf rearing period

(Don't count calves which died prior to birth or during birth)

Calf mortality rate (%) = (A/B) x 100

Example:
A = 17 calves that died or were humanely slaughtered before weaning

B = 280 calves born during calf rearing period

(17/280) x 100 = 6 %

Calving mortality
Aim for less than 3%

Congenital birth defects do occasionally occur...

A congenital defect is a defect that is present from the time of birth. A decision must be made as to whether the calf is viable and will be 'fit for purpose'. The calf should be humanely killed if it is deemed to be suffering or non viable.

Lots of calves with defects? Seek advice from your vet.

Vaccination and parasite control

There are three main reasons why vaccination and parasite control programs are so important for the on-going health of calves.

1. At weaning exposure to disease pathogens and parasites increases dramatically as calves go out to paddocks
2. Immunity from maternal antibodies contained in colostrum declines over time
3. Calves are not able to produce antibodies themselves until week 4 and their own immunity takes time to build up

Develop vaccination and parasite control programs as part of your animal health program—make sure to involve your vet. Also, keep good disease records as this helps monitor the effectiveness of your program.

Vaccination basics

Calves are born without immunity to disease and this is the reason that consuming sufficient high quality colostrum shortly after birth is so protective.

There is a bit of a catch though!

- High levels of circulating maternal antibodies may interfere with the calf's ability to respond to vaccination
- Until high levels of maternal antibodies have reduced, long lasting immunity from vaccines cannot be achieved

This makes the timing of vaccination critical.

The best time to administer vaccines to calves is when their maternal antibody levels are low enough for an active response from the calf to occur.

- It takes at least 16–28 days for the maternal antibody levels to drop by 50%
- Vaccinations given at 6 weeks of age are generally considered temporary due to this underdeveloped immune response and the circulating maternal antibodies
- Vaccines given at or near 10–12 weeks provide better responses as maternal antibodies are on average lower and the immune system is more mature and active

Vaccine timing is about estimating when the maternal antibody levels are low enough for an active response from the calf. This can vary from calf to calf and vaccine to vaccine—always read the label.

Vaccination plans

Protection against many diseases can be achieved with a well thought out vaccination plan.

Keep in mind	Note
Choice of vaccine	– Some diseases offer the choice of more than one vaccine – This is the case with the Clostridial diseases
Dairy versus beef vaccines	– Some products designed for cattle often assume that calves will not be handled as very young animals so the age recommended may be significantly higher (i.e. 6 months) – If in doubt of the suitability of a product for dairy calves then seek advice from your vet
Storage	– Always read the label – Vaccines normally need to be refrigerated before use and during storage but read the label for individual product recommendations
Discard at a set time	– Check the label. Vaccines have a recommended discarding time period after opening—often it is only 24 hour. For example, CSL vaccines now have a discard claim of 30 days – The trick is to buy only enough vaccine for the job at hand – Discuss with your vet and discard at a set time after opening regardless of storage procedure used
Hygiene	– Administer in a clean and hygienic manner to minimise the spread of blood borne disease such as Enzootic bovine leucosis (EBL) – Occasional swelling/abscesses may form at the injection site—this is not uncommon – Get vet advice if swellings are numerous or if the calf becomes ill
Training	– Some vaccines can be dangerous. Make sure staff are trained and take care with administering and storing these products

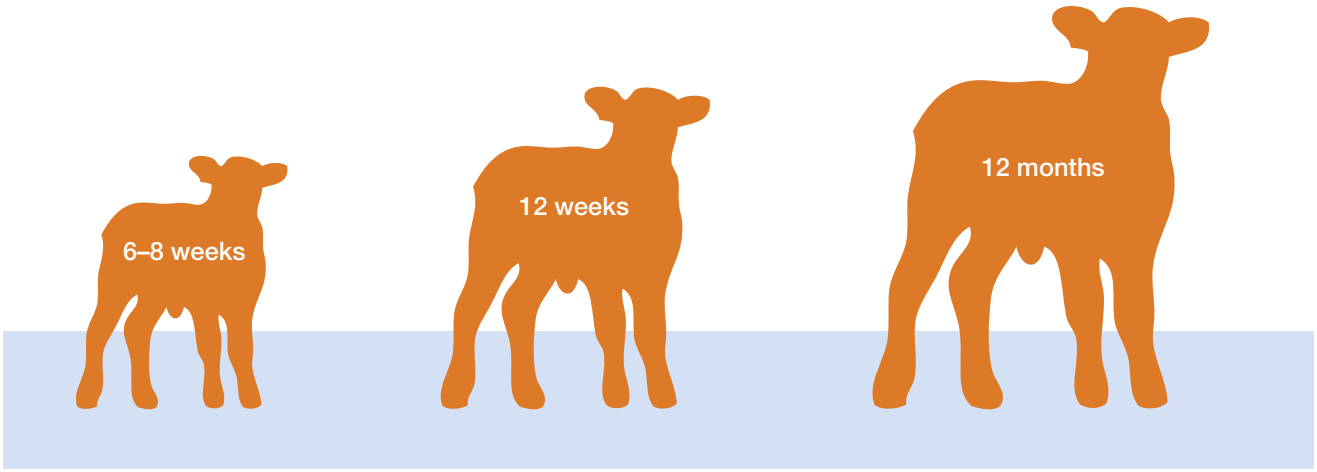
Vaccinating for Clostridial diseases

This group of diseases are caused by the bacteria Clostridium spp and include black leg, pulpy kidney and tetanus. These bacteria are very common in the environment and no calf should be considered immune to exposure. Many of the diseases are fatal, making effective treatment impossible.

- Vaccination to prevent the occurrence of these diseases is considered best management practice
- Management practices associated with dehorning, housing, extra teat removal and castration place calves at a greater risk than similarly aged beef calves

Always use products designed for dairy calves—always read the label.

Typical vaccine schedule for clostridial disease (note schedules may vary with the different products on the market)



Clostridial and Leptospirosis vaccines can be used:

- Clostridial vaccines are available as 5 in 1 or 8 in 1 products. These protect against 5 or 8 clostridial diseases, respectively, using the one vaccine.
- Leptospirosis can be protected against using a leptospirosis vaccine or a 7 in 1 vaccine (which also contains 5 clostridial antigens). Both of these vaccine types provide immunity against 2 strains of leptospirosis.

While leptospirosis is considered more of a risk to adult cows, it also poses a threat to humans. It is strongly recommended to vaccinate dairy calves against leptospirosis. The use of leptospirosis vaccines will reduce the risk of you, your family, staff, vets or AI technicians being exposed to this disease.

Vaccinating for other diseases

Always seek veterinary advice for the most appropriate vaccinations for your farm.

Pinkeye

Pinkeye or bovine keratoconjunctivitis is an infectious disease of the eye. The bacterium Moraxella bovis, is the most commonly recognised cause of the condition. The condition is spread between calves by flies.

- Timing vaccination in relation to expected emergence of flies is critical
- Manufacturer advice is to vaccinate with a single injection three to six weeks prior to the onset of each pinkeye season

Bovine viral diarrhoea—BVD

Seek advice from your vet prior to vaccinating for BVD as every farm will have different requirements.

This viral infection of cattle is also known as Bovine Pestivirus.

- The risk of significant disease for calves is low
- Currently little indication for vaccination of weaned calves

Salmonellosis

This disease is caused by a bacterium. The strain of salmonella on your farm will determine the specific vaccine used—veterinary advice is essential.

- The manufacturer's current recommendation is not to vaccinate calves until 8 weeks of age if they have consumed colostrum from previously vaccinated cows
- If they have not received such colostrum it is recommended that they are vaccinated at any age, with a booster given three to four weeks later

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 including hygiene is still very important.

Treatment and control of parasites

Due to the increased risk of exposure to parasites that occurs at first exposure to pasture, it is important to have a comprehensive plan for the treatment and control of internal and external parasites.

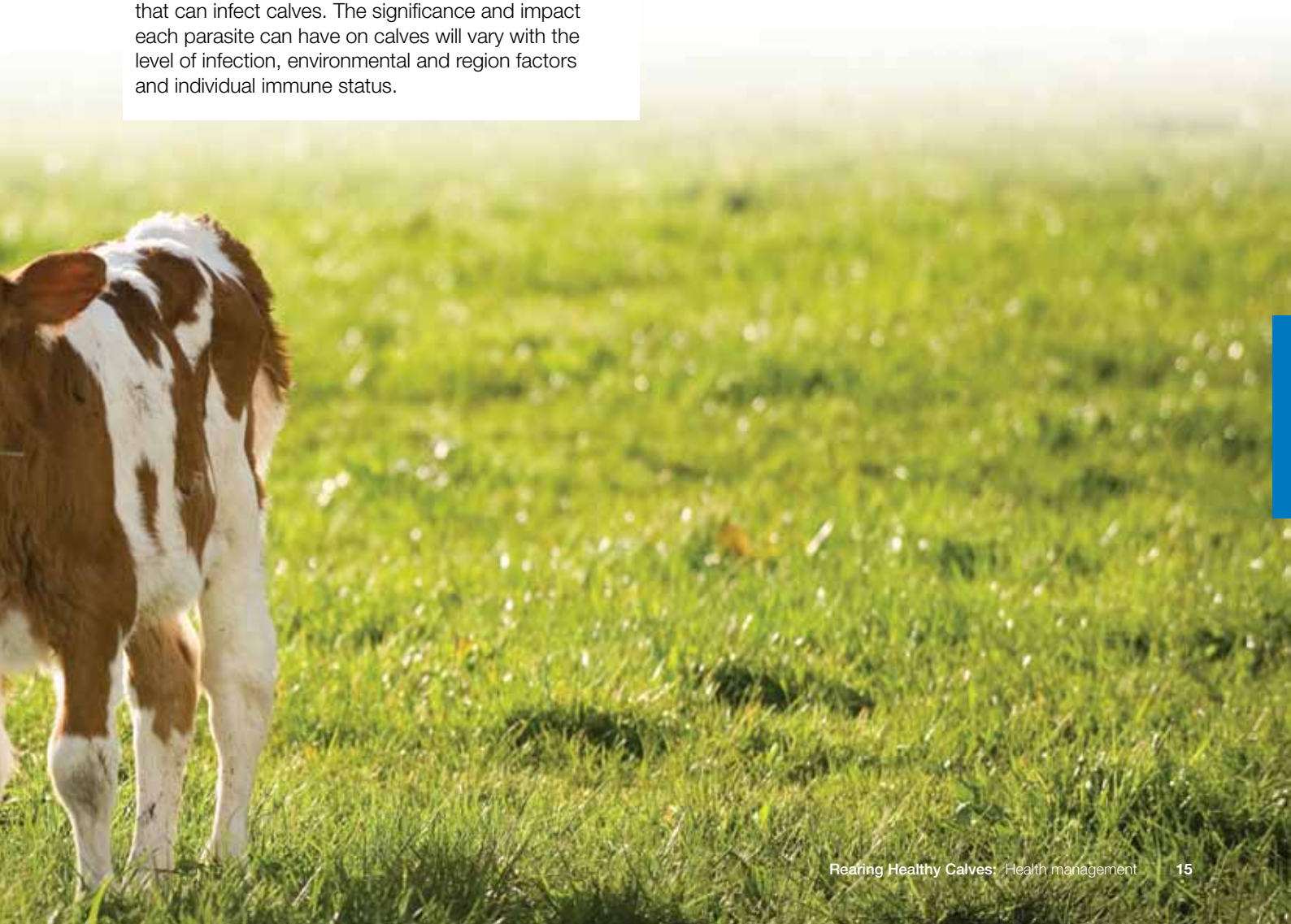
- Once a calf is weaned it becomes more difficult to control the calf rearing environment
- Pastures used for freshly weaned calves should be free from manure and not grazed by adult cattle for 12 months to minimise exposure to Johne's disease

Remember, permanent calf paddocks can become highly contaminated by worm larvae...

Wet, moist environmental conditions mean that young calves are inevitably exposed to parasites. Pastures contaminated with adult effluent also increase the risk of infection with Johne's disease.

Do what you can to minimise contact with calf and adult cow manure—it is worth the effort.

There is a variety of internal and external parasites that can infect calves. The significance and impact each parasite can have on calves will vary with the level of infection, environmental and region factors and individual immune status.



The following organisms should be considered in any parasite control program. Further region specific advice can be obtained from local vets or animal health professionals.

Parasite	Note...
Protozoa	– *Eimeria sp* (coccidiosis) is a common parasite affecting newly weaned calves – In Australia, toltrazuril is registered as a single use treatment for calves with coccidiosis – Other products known as coccidiostats inhibit the lifecycle of the organism—they need to be continuously supplied to calves as part of a ration or prepared feed – Commonly available coccidiostats are monensin (Rumensin), lasalocid (Bovatec), decoquinate and amprolium – Reduce the contact of calves with manure and effluent
Roundworm	– Majority of roundworms or nematodes are found in the gastro-intestinal tract of infected animals – Dictyocaulus viviparous or lungworm is an exception—found in lungs – Brown stomach worm Ostertagia ostertagi—biggest problem, others include Trichostrongylus sp, Cooperia sp, Nematodirus sp and Haemonchus sp. – Anthelmintics like macrocyclic lactone anthelmintics (i.e. ivermectin, moxidectin etc) very effective but over or inappropriate use may lead to resistance – Worm control strategy should incorporate faecal egg count monitoring, the use of clean pasture through paddock rotation and controlled grazing and strategic and rotational use of anthelmintics
Liver fluke	– Most common liver fluke is *Fasciola hepatica* – Some treatments are combined with roundworm anthelmintics – Note that some products are only effective against the adult forms of the fluke while others treat the juvenile stages as well – Environmental management is also critical—if possible avoid wet and moist pastures known to be infected with the snail that is a necessary factor in the lifecycle of this parasite – Fluke can only occur when the snail is present—no snail, no fluke regardless of the wetness of paddocks – Fluke is mainly an issue in the irrigated dairy regions or low lying, poorly drained pasture
Tapeworm	– Tapeworm infections are considered to be of little significance in calves – Most of the commonly used oral white drenches (non-macrocyclic lactone anthelmintics like Fenbendazole) are effective in removing tapeworm
Lice & mites	– The most common skin parasite seen on calves in Australia is the biting louse *Bovicola bovis* – Insecticides applied topically are normally effective – Products may contain synthetic pyrethroid compounds or organophosphates – Injectable macrocyclic lactones (i.e. ivermectin) are not effective against biting lice but do remove the less common sucking lice and other common mites – Pour on applications are likely to reduce the number of biting lice only if the lice come in direct contact with the active ingredient
Ticks	– Boophillus microplus—in northern Australia control through strategic use of pasture rotation and acarcide use

Managing sick calves

Isolate sick calves

Ideally, calf rearing environments should provide areas where sick calves can be held in isolation to minimise the risk of the disease spreading.

Cross infection can occur from:

- Direct contact—an infected calf transmits the disease to healthy calves
- Indirect contact—exposure to material such as bedding, boots, hands, clothing or feeding equipment which has been in contact with a sick calf

Be aware of the risks in moving sick and infectious calves:

- If illness is detected late and the sick calf is in contact with others then it is highly likely that they are already infected—quarantine the whole group from other calves
- Move the whole group away or alternatively leave neighbouring pens empty
- Erect solid barriers to reduce the likelihood of calf to calf contact

If you are moving sick calves to an isolation area plan the process and ensure that you do all you can to minimise the risk of disease spread to other calves.

High standards of cleanliness and disinfection are required after handling sick calves as staff can transmit the disease to susceptible calves.

- It is good practice to attend to sick calves after dealing with healthy calves—i.e. feed them last as this limits the spread of disease
- Overalls, clothes and boots worn during contact with sick calves should be disinfected afterwards—don't wear the same gear next time you attend to the healthy calves
- Use separate feeding equipment for sick calves

Any calf treated with antibiotics should be segregated from healthy, non treated calves

This minimises the potential for the incorrect calf being directly treated due to misidentification.

- It also prevents the opportunity for calves to ingest residues of oral antibiotic treatments from the muzzle or mouth of the treated calf or from residues excreted in the urine of treated calves.
- Feeding utensils that are used to administer the antibiotics can also be unknowingly suckled by other calves in the pen.

Sending calves with antibiotic residues to slaughter puts the whole dairy industry at risk.

Develop treatment protocols

Treatment protocols for common calf diseases can be a real life saver, particularly if you and your staff are busy and under pressure. They can be prepared for the common problems like scours, pneumonia and umbilical abscess.

- Treatment protocols are the documented steps you will take to treat the disease
- Treatment protocols ensure consistency and are invaluable for training and induction of staff
- They serve as a record of treatment should problems arise
- They should be developed in consultation with your vet

While there is no set format, avoid making them too long—a single page makes for easy viewing.

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 'Calftreat'—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

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Humane killing

Humane killing should be considered for any calf that is found to be in pain or to be suffering. It should also be considered where calves (including sale calves) develop health problems and treatment is either not practical or economically feasible.

Remember that if you treat a calf and then wish to sell it, you need to continue to rear the calf until withholding periods for slaughter are met.

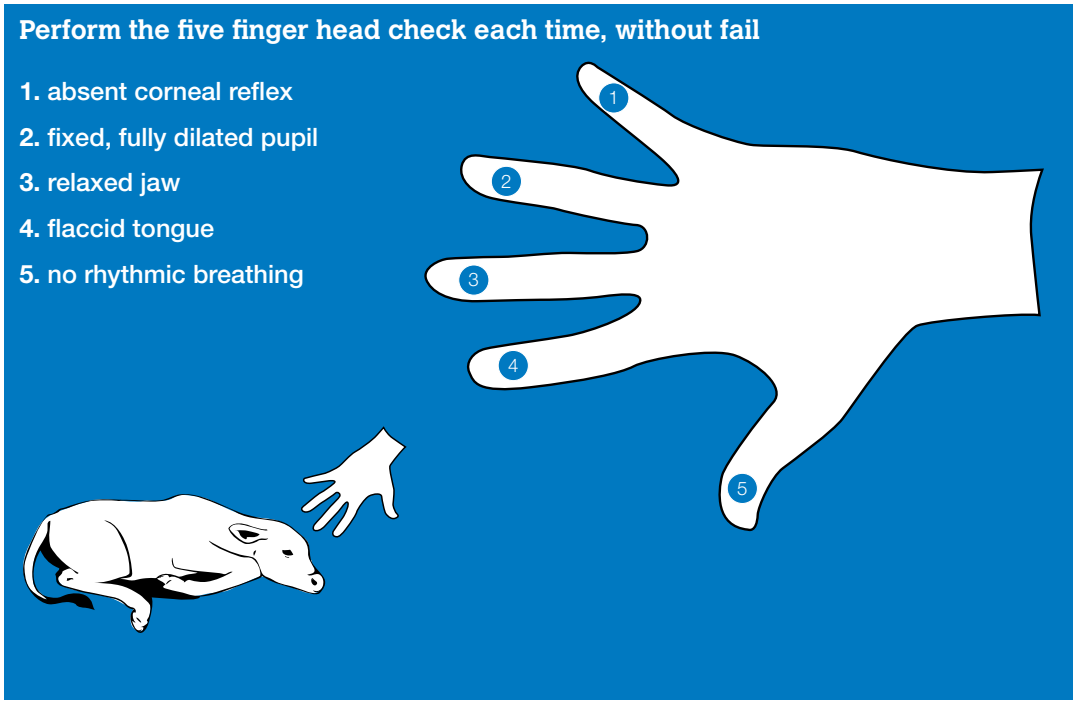
If undertaking humane killing you must:

- Ensure humane killing is managed by a competent operator
- Ensure that immediate loss of consciousness followed by death while unconscious is the result—whichever humane killing method is used
- Undertake the humane killing without delay
- Confirm death in every calf, every time by observing for the presence of specific signs outlined below

Five or more signs should be observed to determine whether humane killing has caused death.

Signs of death...

- Loss of consciousness
- No signs of deliberate movement
- Absence of corneal 'blink' reflex when the eyeball is touched
- Dilated pupils that are unresponsive to light
- Absence of rhythmic respiratory movements
- Flaccid tongue and jaw



Target the correct spot

To ensure that calves are killed humanely it is very important to target the correct positions on the head.

Check that you and your staff understand the current recommendations.

Every farm should have access to personnel who are competent and readily available to undertake humane killing. Suitable equipment should be readily on hand and be maintained in good working condition.

- A 0.22 calibre rifle is a suitable firearm for humane slaughter in calves
- A captive bolt is a stunning device that does not discharge a free projectile—it is potentially safer to use than a firearm

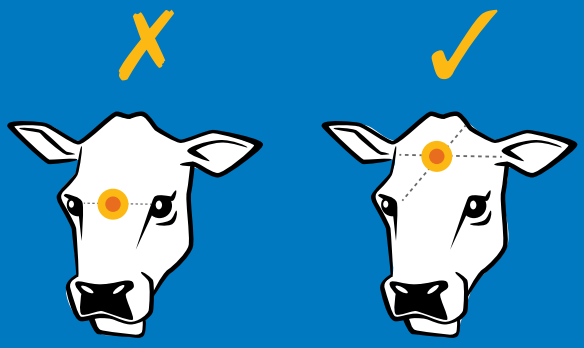
Take great care with firearms and captive bolts. Keep this equipment securely locked away from children.

Target position for humane killing

Note the target for the frontal shot with captive bolt or firearm. The point of entry is where a line drawn from the inside of the eye to the base of the horn bud crosses the midline. The direction of aim should be along the centre of the neck.

This is also the target for blunt trauma. Do not hit on the crown of skull between the horn buds—it has too much bone.

Note: Blunt trauma is only suitable for calves less than 24 hours old.



Don't shoot between the eyes!

Shoot between the ears!

Carcass disposal

It is very important that any calf carcasses be disposed of appropriately.

- The law prohibits leaving carcasses to rot or dumping them in waterways
- It is illegal in most states to allow anyone other than a licensed knackery to remove meat from a farm

Chemical euthanasia is a very humane method of slaughter but be extremely careful with the carcass...

Chemical euthanasia involves the administration of a drug by injection to the calf which causes a sudden and painless death.

Note that carcasses slaughtered in this way are not suitable for consumption for any species due to the ongoing presence of the drug in the tissues.

Chemical euthanasia must only be carried out under direct veterinary supervision.

The carcass of a chemically euthanased animal is not fit for consumption by any species—it must be buried, burnt or composted

Disposal method	Note...
Knackery	– Collection sites should be confined to the farm to minimise the potential for disease spread – Not suitable for chemically euthanased carcasses – Avoid communal collection sites in public areas
Burning	– Not a preferred method unless the animal has died from an emergency disease and must be burnt to destroy pathogens – Significant air pollution is created – High temperatures are needed and are hard to attain—tyres are not permitted
Burial	– Must not impact on the land, ground or surface water or the air – Carcasses must be buried deeply enough to prevent access by other livestock and scavengers – Access information from state environmental protection agencies regarding depth of hole, distance from water, exclusion of stock and scavengers
Composting	– Advantages include the production of soil conditioner and the avoidance of digging holes – Disadvantages include time required and skill to do well – An important consideration when composting is the need to protect against scavengers

It all starts with calving

If the pre-calving care of your cows has been excellent, then chances are you will be rewarded with an uncomplicated delivery of a healthy calf that is ready to thrive.

The majority of cows will calve without any assistance but occasionally, some do need help. Heifers commonly require greater supervision as they have a higher risk of calving problems.

Paying attention to heifer growth rates, mating weights and selecting "ease of calving" sires can minimise the risk and lessens the need for intervention at calving.

The three stages of calving

The process of calving can be divided into three stages, each with its own physiological characteristics but it is important to remember that every calving will be slightly different. Cows are all individuals!

Remember, assisted calvings can result in significant trauma for calves and cows. Ensure those assisting in the delivery have lots of experience and know what they are doing—otherwise, call the vet.

Stage 1: Pre-calving

The cow prepares to give birth

- Cervix begins to open & tissues are relaxing and softening
- Milk production begins and is let down into udder
- Cows often agitated, heifers may stand & sit repeatedly
- Animal seeks safe & private area

Stage 2: Calving

The calf is born

- Cervix and vagina should be completely dilated
- Membranes or hooves appear from the vulva—calf normally delivered up to 3 hours after this
- Blood/oxygen flow from cord ceases and this triggers the calf's breathing

Stage 3: Post calving

Expulsion of the afterbirth

- Contractions of the uterus continue after the calf's birth to expel the afterbirth (placenta)
- Afterbirth membranes normally delivered 30–60 min after birth
- Generally best practice to wait for the membrane to be delivered without intervening

Watch for progress

Biological processes like calving vary from animal to animal. Often, time estimates are given to aid understanding of the birth process but the key to success is to monitor progress not just the clock.

For example, it may be expected that once the membranes or hooves have appeared, the calf should be delivered within 1 to 2 hours and ideally no longer than 3 hours.

What is most important is the ongoing appearance of more of the calf. A period of 15–30 minutes without any progress is an indicator of the need for attention and possibly, intervention.

The key message is to look for evidence that the cow is progressing with the calving process.

Stage 1: Pre-calving

Watch for...

- Monitor closely for the presence of membranes but with no evidence of a calf
- This can suggest a posterior/ breech presentation or a dead calf
- May need an internal examination if cow is repeatedly lying down, or shows excessive rising & sitting behaviour
- May be a problem like a twisted uterus—if in doubt, call the vet

Stage 2: Calving

Take care...

- Perform internal examinations very carefully to avoid doing damage
- Keep things as clean as possible—wash the vulva of the cow, hands, arms & chains with warm soapy water
- Use lots of lubricant
- Perform basic checks to see if calf is alive
- Only use calf pullers, pulleys or traction devices if you are skilled and experienced
- If after 15 min you have not helped the cow make progress, call the vet

Stage 3: Post calving

Take care...

- In some cases delivery of the membrane can be delayed by hours or even days
- Seek vet advice if cow has high temperature or shows signs of illness
- Some trimming of the membrane may be required to reduce the risk of it tearing from being stood on
- If you suspect some of the membrane has been retained, seek veterinary advice

Care in the first few days

Keeping a close eye on calves in the first few days makes it easier to spot problems and take action early.

Pay particular attention to the following:

- Navel cord—spray with disinfectant early and check that it doesn't become infected
- Colostrum intake—make sure all calves receive colostrum, pay particular attention to injured or sick newborn calves
- Signs of dehydration—monitor for sunken eyes or skin tenting which may indicate dehydration or serious bacterial infection
- Signs of ill health—reluctance to rise or drink, signs of dehydration

Decisions about sick calves

If a calf is sick you have two choices—treat or euthanize.

- Treat the sick calf

  Treat the calf and clearly identify it as treated. Record the treatment and any withholding period. You are responsible for ensuring that calves are not sold before the withhold period has been completed.

- Euthanize the sick calf

  Always use humane slaughter techniques. Remember, you are responsible for the proper disposal of the carcass.

If any of your calves get sick, regardless of whether they are replacements or sale calves, you must either treat them or euthanize them.

Spray the navel cord

One of the most critical tasks to complete in the early stages of a calf's life is to disinfect its navel. This helps ensure bacteria do not enter the body via the umbilical cord and cause joint ill, navel abscesses and other internal infections.

- Navel cords should be checked regularly over the first week of life for evidence of shrinking
- Any abnormalities in the navel area or swellings, pain or discharge should be checked by a vet
- Calves may need on-going antibiotic treatment if an umbilical cord infection occurs

Timely disinfection is particularly important if the calving area was muddy or contained lots of manure.

Important

- Keep navel area clean
- Dip or spray umbilical cords to disinfect with an iodine or alcohol/methylated spirits spray
- Disinfect as soon as possible after birth and again 24 hrs later
- If using a 5% iodine solution, make up a new batch every 2 days
- Commercially available iodine solutions are readily available which are more stable and do not need to be discarded
- Don't use teat spray as it contains unnecessary emollients

Technique

- Spray hair/skin at top of cord initially and move down to completely cover cord
- Ensure cord is completely covered
- You should be able to pinch cord with 2 fingers and get disinfectant on both

Colostrum for injured or ill calves

Lack of immunity transfer can occur when insufficient colostrum is consumed in the critical period just after birth. At this time, the calf's gut is able to absorb the antibodies but if a calf is too sick to drink much, then their immunity will be compromised.

- Make it a priority to feed these calves individually as soon as possible after birth—possibly by using an oesophageal feeder
- Provide at least 2 litres of high quality colostrum in the first 12 hours of life
- Provide an additional 2 litres before calves are 24 hours old
- Herds experiencing high levels of calf deaths (i.e. over 5%) should revise their colostrum management system including testing for immunity transfer

Make sure injured or weak calves get colostrum immediately after birth—they are in particular need of its benefits!

Dehydration & ill health: spot the signs

A dehydrated calf has less fluid in its body than it should. Scours is the most common cause of dehydration in calves. Signs of dehydration include:

- Sunken eyes due to the loss of fluid in the tissue behind the eye
- Skin tenting—when pinched the skin sticks up or 'tents'

The length of time the skin sticks up or the distance the eyes have sunken can be used as indicators of the level of dehydration

Calves that are dehydrated and ill will generally be less active than healthy calves. Look out for these signs:

- Reluctance to rise
- Failure to drink normal amount of liquid feed
- Lying flat out and panting
- Low temperature i.e. below 36°C or an elevated temperature i.e. over 39.5°C

If you have significant numbers of calves showing signs of ill health or they are failing to respond to normal treatments then seek veterinary advice immediately.

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

Calf scours

The most common health problem likely to affect new calves is calf scours.

"The causes of scours in calves under 21 days of age are difficult to determine.....There is usually not one single cause, but an interaction between calf management, diet, the environment, poor immunity.....viruses and bacteria..."

Dr John Moran—Senior scientist & dairy adviser

Common causes

Sometimes scours have dietary causes such as:

- Overfeeding
- Sudden change in feed
- Incorrect mixing of feed
- Inappropriate milk replacer

Contact with manure often leads to scours in calves less than 1 week of age.

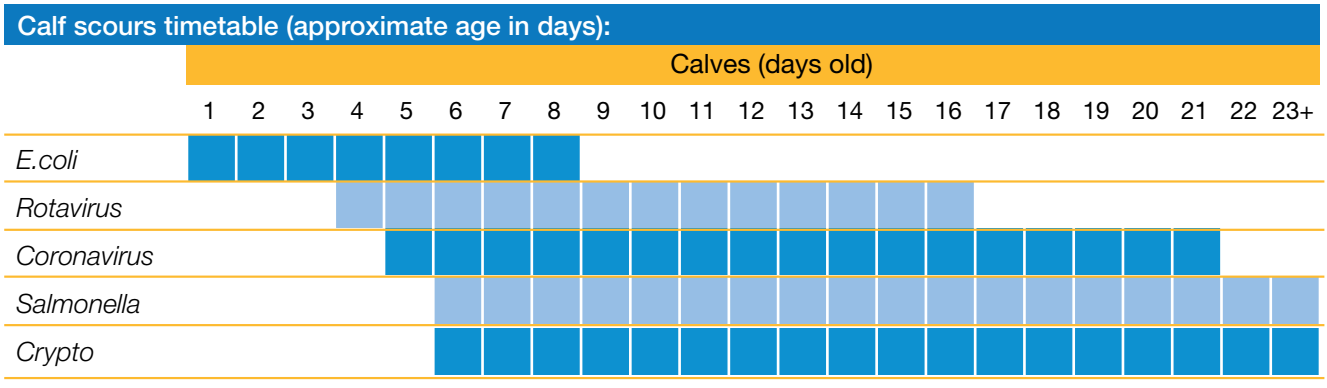
- *Rotavirus*—a virus, infection caused by eating or drinking something contaminated by manure
- *Coronavirus*—a virus, infection caused by eating or drinking something contaminated by manure
- *Cryptosporidium parvum*—a disease organism called a protozoan, infection caused by ingesting manure, soil or contaminated water
- *Salmonella sp*—a bacterium, infection caused by ingesting manure, soil or contaminated water. Can also be found in saliva and nasal secretions of infected animals
- *E coli* K99/f5—a strain of the E coli bacterium, infection caused by eating or drinking something contaminated by manure

Testing the manure of affected calves is the best detection strategy particularly if considering using antibiotic treatments.

Calf side test kits are available that permit rapid results on farm but laboratory analysis may still be necessary depending on the organism involved. Seek advice from your vet.

Minimise calves contact with manure!

The timeline below shows the typical age at which calves may be affected by these pathogens^:



^ Other infectious organisms, such as Coccidia, BVDV, *Clostridium perfringens* and other *E.coli,* may also affect calves, often after 3–4 weeks of age.

Treating scours—electrolytes

The main priority in treating scours is to replenish lost fluid and minerals—dehydration and electrolyte imbalance are the greatest risks to the calf. The use of electrolytes to replenish these fluids is critical for calf survival.

- Electrolytes contain a mixture of different salts, sugars and other non-antibiotic ingredients
- They are used to replenish water and salts lost as a result of scouring
- Electrolyte products are not antibiotics
- Electrolytes are not prescription items and can be purchased 'over the counter'
- They do not require a specific veterinary drug label and do not have withholding periods

Remember, electrolytes do not work if they are mixed incorrectly. Take care to get it right.

Essential components of an electrolyte solution

Effective electrolyte solutions must contain key core ingredients to ensure that they can be adequately absorbed by the gut to rehydrate the calf.

- The core ingredients are sodium, glucose and an alkalising agent
- Electrolyte products often contain many other ingredients as well

Other ingredients are less important in the rehydration of the calf but may contribute to the overall recovery.

Calves with scours?
Manage dehydration as your first treatment priority.

Essential components of electrolyte products	Other components
Sodium—usually from sodium chloride or sodium bicarbonate	**Chloride** usually from sodium or potassium chloride **Potassium** usually from potassium chloride **Binding** agents such as rice flour or starch
Alkalising Agent—Bicarbonate, acetate, citrate or propionate usually combined with sodium	**Vitamins** which may include A, B1, B2, B3, B5,B6, B9, B12 C, D3, E, H **Glycine**—may aid in the absorption of sodium and water **Lactose**—sugar in milk may provide additional glucose and its presence may maintain enzyme activity (lactase) for milk digestion
Glucose—either as glucose or dextrose	**Mucopolysaccharides**—may help to bind up faeces by creating a gel **Flavouring**—Calves tend to prefer a familiar taste

The amount of each of the essential ingredients in the final solution is also very important.

- Select products designed specifically for calves
- These tend to have the most appropriate concentrations of ingredients
- Electrolytes not specifically designed for calves can often have low levels of essential ingredients particularly bicarbonate—this is critical for severely dehydrated calves
- Do not mix electrolytes and milk together
- Check labels carefully

The presence of an alkalising agent is critical!

Scouring calves develop high levels of acid in their body tissues. An alkalising agent neutralises this acid and restores normality.

There is much on-going debate about which is the best alkalising agent. Bicarbonate is favoured by some as it is very direct in its action though it may interfere with milk clotting which means it is not recommended to give with milk.

Citrate, acetate and propionate based products can be given with milk so are preferred by others

Some feel that acetate and propionate are the agents of choice as they don't alkalinise the small intestine, minimising the risk of pathogens surviving to cause clinical disease, while also acting as a source of energy.

Don't get hung up on which alkalising agent is best—just ensure that your product has one and you give adequate amounts to correct the dehydration and on-going fluid losses.

Electrolytes: how much?

The amount of fluid required to rehydrate a calf can be calculated quite precisely. What is generally surprising is the amount of fluid required to get the calf back on its feet.

The fluid required by a dehydrated calf can come as:

- Electrolytes—the best choice as they provide fluid, lost salts and corrects acidosis
- Milk—provides fluid and energy
- Water—provides fluid only

Electrolytes should make up the majority of fluid used to rehydrate the calf in the first 24 hours as at this time calves are dehydrated and acidotic. After the critical 24 hour period, you need to ensure that the scouring calf gets their normal daily fluid requirements and additional fluid to replace that lost due to scouring. This strategy will keep hydration at status quo.

Once rehydrated, milk can become a greater proportion of the total fluid offered. Remember that milk is not formulated to correct for the electrolyte loss and acidosis seen with dehydrated calves. This strategy will maintain normal hydration.

The best strategy for the first 24 hours is to:

1. Replace the fluids that have been lost
2. Meet the daily fluid requirements, and
3. Cover what is still being lost out of the back end!

Many scouring calves do not suckle a great deal of milk but if they do, the volume of milk can be subtracted off the total daily fluid requirement.

Use the following rough rule for calculating fluid required—it may over estimate what is needed but more is better than less.

For the first 24 hours divide weight by 10 then multiple it by 1.5 to get amount in litres.

Then calculate ongoing daily requirements (once rehydration has occurred) by dividing weight by 10 to get amount in litres

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.

See Calculating electrolyte replacement amounts

For example

A 50kg calf with a mild-moderate scour and minimal signs of dehydration requires:

50 ÷ 10 = 5

5 x 1.5 = 7.5 litres

Provide around 7.5 litres in the first 24 hours.

To work out daily requirement, divide weight by 10

50 ÷ 10 = 5

Provide around 5 litres per day until recovered.

Health management

Summary of recommendations

To rear calves that thrive, planning for disease prevention is the key.

Monitor calf health regularly and act quickly if problems arise.

- Use products as intended and avoid contaminating sale calves.
- Minimise exposure to infection—remove calves from their dams early and keep the rearing environment clean.
- Adopt a preventative disease program and implement the 3 Step Calf Plan for the control of bovine Johne's disease (BJD).
- Manage the manure build up to keep pathogen numbers down.
- Handle sick calves carefully to minimise the risks of infecting healthy calves.
- Develop treatment protocols for the common calf diseases and training on how to implement them—this helps busy staff and encourages consistency.
- Use humane slaughter techniques.