

Issue	Best practice	Outcomes
<b>Vaccinations</b>	Vaccinate herd for <ul style="list-style-type: none"> <li>• Rotavirus</li> <li>• Salmonella</li> </ul>	Vaccinated cows will have higher levels of the associated antibodies which will be passed on to calves.
<b>Housing</b>	<p><b>Open vs enclosed</b> – open pens should face the sun. Enclosed pens are warmer.</p> <p><b>Ventilation</b> – above calf height, draught free, ventilation ensures good air quality.</p> <p><b>Space</b> – Min 1.5m<sup>2</sup> per calf. No more than 10 calves per pen in first few weeks.</p> <p><b>Pen separation</b> - solid easily cleaned smooth and non-porous pen partitions high enough to avoid contact are best.</p> <p><b>Bedding</b> - top up pens with clean dry bedding regularly.</p> <p><b>Drainage</b> – ensure there are no wet areas in pens.</p> <p><b>Water troughs</b> – clean readily available water from non-leaking troughs situated at front of pens. Clean regularly.</p> <p><b>Meal feeders</b> – allow 30cm head space per calf.</p> <p><b>All-in all-out</b> – adopt an all-in all-out policy for each pen.</p> <p><b>Sick calf pen</b> – maintain a separate sick calf pen away from healthy calves with separate feeding equipment. Use footbath for carers between sick and healthy calves.</p> <p><b>Limit personnel</b> – minimise contact between truck drivers, outsiders and healthy calf pens.</p> <p><b>Vermin and other animals</b> – Keep vermin under control. Do not house pigs near calves.</p>	Good pen/barn/shed design and housing management helps keep health problems to a minimum. An ideal calf pen is one where you would be comfortable hanging out, lying down, and also warm enough in your underwear.
<b>Warmth</b>	<p><b>Shelter</b> – draught free</p> <p><b>Bedding</b> – clean and dry</p> <p><b>Temperature</b> - &lt; 10°C use calf coats – feed extra colostrum. Feed warm milk. Dry wet calves.</p>	Low surface to BW ratio and low body fat % makes calves susceptible to cold stress
<b>Colostrum</b>	<p><b>Colostrum quality</b> – Measure quality using a Brix refractometer.</p> <ul style="list-style-type: none"> <li>• “Gold colostrum” = Brix test &gt; 22%. Feed to newborn calves</li> </ul> <p><b>When</b> - within first 6 hours post birth, preferably in first hour. Next feed 12 hours after at min 2litres.</p> <p><b>Quantity</b> - feed 10% of calf’s BW</p> <p><b>Storage</b> –</p> <ul style="list-style-type: none"> <li>• refrigeration will maintain antibody levels and limit bacterial growth for up to 3 days,</li> </ul>	<p>“Gold colostrum” contains antibodies against viral and bacterial infections which will be successfully transferred to calves giving lifelong benefits.</p> <p>The concentrations of antibodies are reduced by half by the second milking.</p>

	<ul style="list-style-type: none"> <li>• Add potassium sorbate as a preservative,</li> <li>• pasteurization – 59-60°C for 60 min. Kills bacterial growth for up to 7 days,</li> <li>• freezing preserves colostrum quality for 12 months.</li> </ul> <p><b>Contamination</b> – use clean harvesting and storage methods. Cool asap after harvest.</p> <p><b>Blood test</b> – testing 7 -12 calves will determine the transfer of antibodies from colostrum.</p>	<p>Any colostrum Brix tested below 22% even if it is first colostrum should be pooled and stored for feeding to older calves.</p> <p>If calves don't receive sufficient colostrum in the first day of life, and hence their blood antibody (Immunoglobulins/IgG) levels are low, they are said to have Failure of Passive Transfer of Immunity (FPT).</p>
<b>Navel care</b>	<p>Keep transport trailers clean.</p> <p>Avoid bruising navel area when handling calves.</p> <p>Spray navel area with antibacterial spray asap.</p> <p>Check for navel swelling or pain.</p>	<p>Navel infections result in liver abscesses, joint infections, eye infections and other infections around the body.</p>
<b>Hygiene</b>	<p>Keep pens, trailers, equipment, and clothing clean.</p> <p>Separate equipment for sick calves from healthy calves.</p> <p>Spray pens regularly with disinfectant.</p>	<p>Spread of infectious disease will be reduced</p>
<b>Feeding programme</b>	<p>Choose a feeding programme –</p> <ul style="list-style-type: none"> <li>• conventional restricted whole milk + concentrates,</li> <li>• accelerated milk feeding programme,</li> <li>• intermediate milk feeding programme,</li> <li>• fortified milk feeding programme,</li> <li>• CMR programme,</li> <li>• combination early whole milk progressing to CMR feeding,</li> <li>• fully automated feeding system</li> </ul>	<p>Careful consideration at the start of the season to the feeding programme avoids sudden changes in the diet causing problems.</p>
<b>Disease identification</b>	<p>Determine calf's condition –</p> <ul style="list-style-type: none"> <li>• use symptoms to determine a calf's condition,</li> <li>• use skin tent test to determine degree of dehydration,</li> <li>• check temperature,</li> <li>• take faecal sample for lab testing before treatment.</li> </ul>	
<b>Sick pen management</b>	<p>Use separate feeding equipment for sick calves.</p> <p>Disinfect equipment after each feed.</p> <p>Spray pens with virucide every day.</p> <p>Either feed sick calves last or use a dedicated carer for sick pen.</p> <p>Clean boots in footbath of disinfectant and use clean overalls when treating sick calves.</p>	<p>The spread of disease will be minimised from sick calves to healthy calves and carers.</p>

	<p>Maintain a high standard of hygiene and cleanliness in the calf sheds. Avoid visitors to the calf shed.</p>	
<p><b>Scour treatment and prevention</b></p>	<p><b>Nutritional scours</b> – normally liquid and white,</p> <ul style="list-style-type: none"> <li>• treat promptly with electrolytes.</li> </ul> <p><b>Rotavirus</b> – Virus. Pale yellow to brown and watery with rancid smell,</p> <ul style="list-style-type: none"> <li>• separate from healthy calves asap,</li> <li>• treat with large volumes of electrolytes promptly,</li> <li>• continue feeding milk,</li> <li>• add Rotagen Combo to milk as treatment and preventative,</li> <li>• source calves from vaccinated herds,</li> <li>• feed high quality colostrum from vaccinated cows up to 14 days of age,</li> <li>• maintain a high standard of cleanliness and hygiene,</li> <li>• disinfect equipment thoroughly</li> </ul> <p><b>Salmonella</b> – Bacteria. Watery to mucoid scour containing intermixed fibrin and blood with foul odour. Calf has high temperature. Can be confused with rotavirus, cryptosporidium and E. coli. Effects calves from 2 – 12 weeks old.</p> <ul style="list-style-type: none"> <li>• Separate from healthy calves asap,</li> <li>• treat with large volumes of electrolytes promptly and administer antibiotics,</li> <li>• continue feeding milk,</li> <li>• add Rotagen Combo to milk as treatment and preventative,</li> <li>• source calves from vaccinated herds,</li> <li>• feed high quality colostrum from vaccinated cows up to 14 days of age,</li> <li>• maintain a high standard of cleanliness and hygiene,</li> <li>• disinfect equipment thoroughly,</li> <li>• feed acidified or pasteurised milk,</li> <li>• once outbreak occurs vaccinate all calves,</li> <li>• minimise stress especially during transport, avoiding overcrowding during transport and in calf sheds,</li> <li>• treated early good outcomes can be achieved.</li> </ul> <p><b>Cryptosporidiosis (Crypto)</b> – Single cell protozoa parasite. Very watery scour typically 5-6 days but can last up to 12 days. Difficult to distinguish from rotavirus and salmonella and is often present with other infections.</p> <ul style="list-style-type: none"> <li>• Identify with faecal test from a minimum of 4 scouring calves,</li> </ul>	<p>Affected calves will recover without long-lasting effects. Rotavirus is the biggest animal health issue facing calf rearers. Death rates can be as high as 30%. The key to managing an outbreak and minimising losses is early identification, separating affected calves and treating with electrolytes. Vaccination of the herd and feeding quality colostrum is the best preventative.</p> <p>Salmonella. Death rates in effected calves can be up to 100%. Calves recovering shed large numbers of bacteria in their faeces and commonly grow slowly. Treated early good outcomes can be achieved.</p> <p>Cryptosporidiosis. Up to 30% of calves in an outbreak can be affected with around 10% mortality. Prevention is the key to managing or eliminating Crypto.</p>

- separate from healthy calves asap,
- remove from milk for 24 hours and treat with large volumes of electrolytes,
- continue feeding milk after 24hours,
- add Rotagen Combo to milk as treatment and preventative,
- administer the drug Halocur orally daily for 7 days,
- once confirmed in calf shed treat all calves with Halocur for 7 days including new calves,
- maintain a high standard of cleanliness and hygiene especially carers to avoid transmission,
- disinfect equipment thoroughly,
- thoroughly spray shed daily with Vetsan disinfectant,
- either have a different set of overalls and boots or disinfect items between infected and non-infected pens,
- increase frequency of bedding change,
- consider starting a new shed for newborns to reduce the spread,
- steam clean all surfaces followed by saturating all surfaces with Vetsan at the end of the season,
- respray with Vetsan prior to start of new season once bedding is in place,
- increased milk intake improves prevention and recovery,
- receiving adequate high-quality colostrum immediately after birth helps prevent invasion of pathogens which can worsen or compound the severity of crypto.

**Coccidiosis** – Protozoan parasite. Infects calves from 3 – 8 months. In heavily contaminated environments calves may show clinical symptoms signs as early as four weeks of age.

- Sudden onset of diarrhoea with blood and mucus stained faeces
- Infected calves go on to exhibit severe unproductive straining while defecating.
- Temperature is mildly elevated (39.0 - 39.5°C)
- Dehydration and lack of appetite are common.
- Acute phase of the disease lasts 5 to 6 days and if the animal survives, recovery begins at 7 to 10 days.

	<ul style="list-style-type: none"><li>• Affected calves lose weight rapidly, and due to gut damage, regaining condition takes a long time.</li><li>• Severely affected calves typically undergo a convalescence of many weeks, during which feed intake and weight gains are reduced.</li><li>• An accurate definitive diagnosis can be made at post-mortem examination.</li><li>• Laboratory tests for coccidia oocysts are of limited use.</li><li>• Prevention of infection can be achieved by feeding calves meal containing drugs that slow the growth of coccidia, called coccidiostats. However, this needs to be at the correct rate and for long enough after weaning to provide effective prevention.</li><li>• Affected calves should be separated from calves not showing signs of infection and provided with treatment for diarrhoea.</li><li>• Treatment with toltrazuril should be given to all calves in the group, even those showing no clinical signs.</li><li>• All calves should also be moved to an uncontaminated area, stocking rates should be reduced, and any stressful procedures minimised.</li></ul>	
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