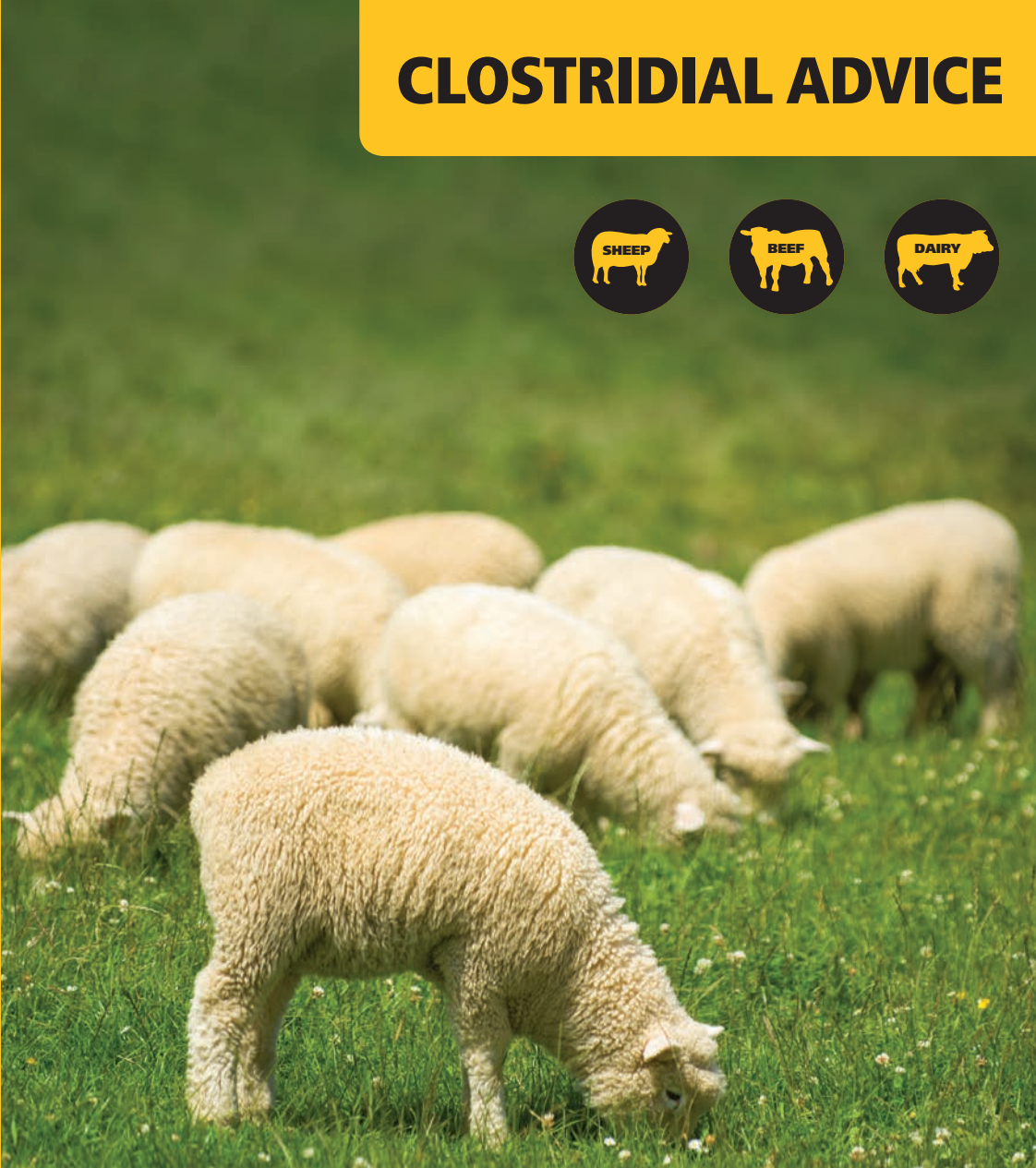


# CLOSTRIDIAL ADVICE



**COOPERS**  
THERE FOR YOU • ALL YEAR ROUND  
**SEASONS**

A farmer's guide to clostridial protection  
for sheep and cattle.



**COOPERS**<sup>®</sup> Proven. Trusted.



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# The significance of clostridial diseases

Livestock deaths due to clostridial diseases have always been a part of farming. Widespread preventative vaccination over the past 30 years has dramatically reduced losses; nevertheless clostridial diseases remain a major threat to animal health, welfare and farm profitability, especially with demands for increased farm productivity.

Clostridial diseases are caused by clostridial bacteria. Clostridial spores are found almost everywhere - some exist as spores in soil for decades; others survive for an animal's lifetime in the muscles, gut or liver of otherwise healthy stock. Some clostridia are an important part of the normal intestinal (gut) flora. Clostridial disease develops in oxygen-free and energy-rich conditions. Under the right conditions, bacteria rapidly multiply and produce toxins. These toxins are released locally and into the blood stream (toxaemia) and are extremely potent - so dead animals are often the first sign of clostridial disease.

The five common clostridial diseases are Pulpy Kidney, Tetanus, Blackleg, Malignant Oedema and Black Disease (the last three also cause blood poisoning or navel ill). Other less common clostridial diseases are also found in New Zealand.

## Prevention by vaccination is the only answer

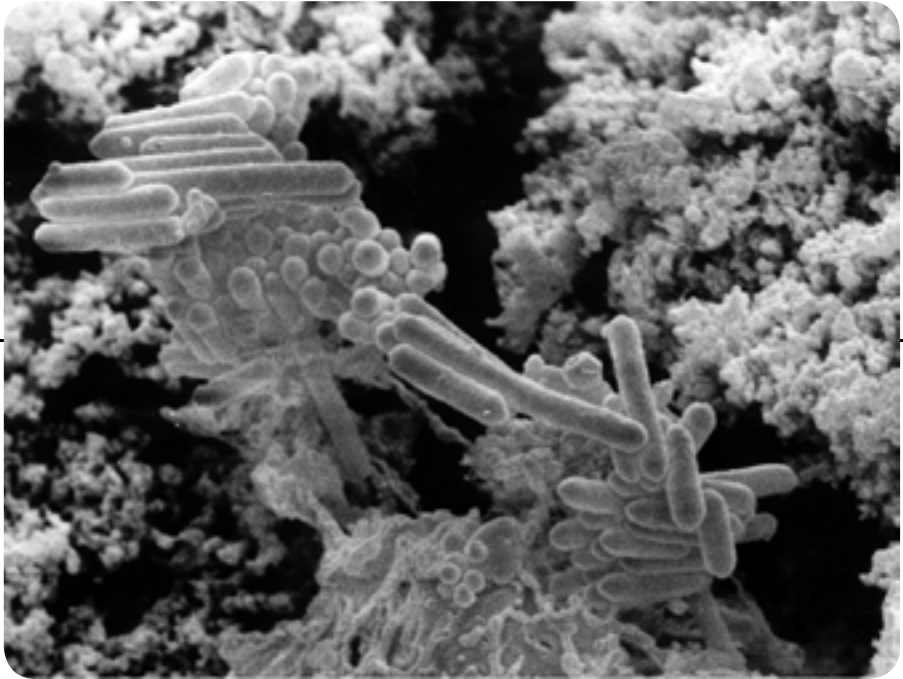
As clostridia are found almost everywhere, eradication is impossible. Vaccination is the only viable method of control. Most clostridial vaccines contain inactivated clostridial toxins (toxoids). Vaccination induces the immune system to produce antibodies (also called antitoxins) against these toxoids. Each type of clostridial toxin requires a specific antibody to neutralise it, hence vaccines contain multiple types of clostridial bacteria toxoids.

Prevention of disease by vaccination is the only viable method of control.



# Spread of clostridial bacteria

Bacterial spores are spread between animals in faeces and soil, either by being eaten or contaminating wounds. Ingested bacterial spores can either remain in the gut or enter the blood and lymph and spread to muscles, liver and spleen. In susceptible (at-risk) animals, certain events can trigger these spores to germinate and cause disease (see risk factors page 6). For example Pulpy Kidney bacteria live normally in the gut; however, given a change in diet or a diet rich in carbohydrates, they grow rapidly and release toxins into the blood stream to cause disease.



# Risk factors for clostridial disease

## Why are animals at risk?

Because clostridial bacteria are everywhere - in soil, sewage, decaying animal and vegetable material and in the gut and other organs of animals including humans - all stock are exposed. Risk factors are anything that makes an animal more likely to develop disease. For clostridia these include a mixture of animal and environmental factors.

## Animal factors

Reduced or no immunity:

- Insufficient protection from colostrum; not enough colostrum or no pre-lamb or precalving vaccination of the dam
- Insufficient time to develop immunity (especially young animals)
- Animals that are not vaccinated or not vaccinated properly
- Undernourished or unhealthy animals where the immune response is compromised

Injury and wound infection:

- Trauma from fighting, mustering, yarding
- Castration, tailing/docking, ear marking, surgical wounds
- Calving or lambing
- Teething, gum damage from crops

Damage to the liver:

- Toxins from the diet (facial eczema fungal toxins)
- Migration of liver fluke
- Physical trauma to the liver from fighting, yarding
- Inflammation of the rumen (rumenitis)



## Environmental factors

### Dietary factors:

- Multiplication of bacteria in the gut, especially in fast-growing younger animals on a high level of nutrition
- Diets rich in carbohydrates or protein (cereal feeding)
- High intakes, or changes in the diet (spring growth, new pasture)
- Crop feeding



### Increased exposure to bacteria or spores:

- From decomposing animals, soils rich in organic matter
- Increased intake of spores from soil and mud, flooded pastures, yarding
- Intensive grazing, especially winter and spring
- Faecal contamination of feed

Because all farm animals, especially those intensively farmed, are exposed to some or most of these risks, the likelihood of disease in unvaccinated animals is high.

The issue is not exposure but risk factors that lead to actual disease.

# Clostridial diseases

Disease	Pulpy Kidney (enterotoxaemia)	Tetanus	Blackleg/Oed
Causal bacteria	<i>Clostridium perfringens</i> Type D	<i>C. tetani</i>	<i>C. sep</i> <i>C. cha</i>
Source of infection	Normal gut inhabitant that enters mainly by ingestion of bacteria or spores from faecal-contaminated udder, pasture or soil.	Contamination of deep wounds with bacteria or spores.	Wound infection suitable.
Occurrence	NZ-wide and common. The most important cause of death in lambs from docking/tailing until after weaning. Up to 20% of animals can die in an outbreak.	NZ-wide and common. Up to 10% deaths recorded.	NZ-wide and common on high
Age	All ages. Mostly in lambs from 3 weeks of age until after weaning. Calves less than 12 months of age. Goats of all ages.	All ages. Mostly in lambs after docking/tailing. Sporadically in other age groups.	All ages. Navel Blackleg in cattle
Risk factors	Lush feed, change in diet, crop or grain feeding. Cultivation or flooding of land, high growth rates. Single lambs. High milk-producing dam.	Calving, lambing, castration, docking, vaccination, dipping, dog bites, dirty conditions, fly strike. Cultiv	
Diagnosis	Classic clinical signs	Classic clinical signs	Difficult as clinical signs in all animals affected
Clinical signs	Usually found dead. If within a few hours of death, straw coloured fluid is found in the heart sac, the lungs are congested, the kidneys and liver are soft and pulpy. The contents of the small intestine may be cream coloured. If alive: diarrhoea, incoordination, blindness, an arched back or convulsions may be seen. Abdominal pain is seen in adult goats.	Rigid muscles, exaggerated responses, stiffness, prolapse of the third eyelid, spasms and death usually after a few days. Lockjaw.	Found dead, usually discolouration. In sheep, the wool



Malignant ema	Blood Poisoning	Black Disease (infectious necrotic hepatitis)	Sudden Death Syndrome
<i>C. septicum</i> , <i>C. uvoei</i>	<i>C. septicum</i> , <i>C. chauvoei</i> , <i>C. novyi</i>	<i>C. novyi</i>	<i>C. perfringens</i> Type A, <i>C. sordellii</i>

or ingestion and spread of spores to muscle, liver and other tissues. Spores lie dormant in tissues until conditions are

Common. Up to 10% deaths recorded in cattle. More -producing land.	Regional. Uncommon. Up to 10% deaths recorded.	Cattle on improved pastures.
Ill in young animals. 6 to 24 months of age.	Ewes	Cattle 6-24 months of age. Rarely sheep.
Drenching, dehorning, shearing, ear tagging, rotation or flooding of land; grazing root crops.	Liver damage, in particular due to migrating liver fluke.	Lush feed, change in diet, crop or grain feeding. Cultivation or flooding of land. High growth rates.

clinical signs and post mortem changes can be very similar for all these bacteria. Furthermore, some of these bacteria are found  
after death.

Usually with blood-stained froth from the nose and mouth, a rapidly distended gas-filled bloated carcass, areas of skin  
Areas of dark red to black gas-filled muscle may be seen on postmortem.  
plucks easily. If alive, lameness, depression and recumbency may be seen.

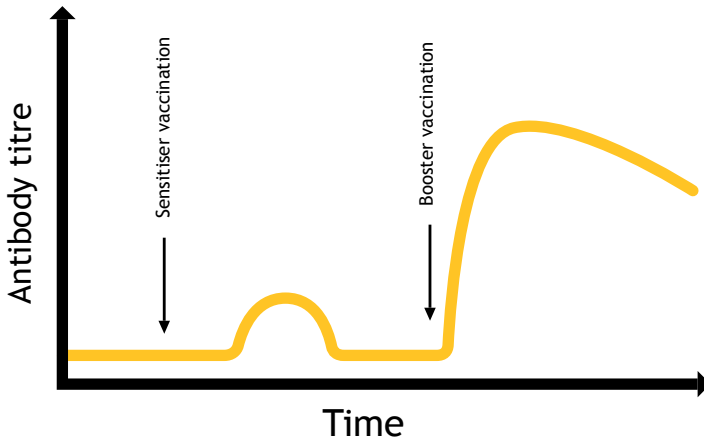
# Immune response to vaccination

Vaccination induces the immune system to produce antibodies (antitoxins) against clostridial toxins.

The antibodies work by 'neutralising' these toxins in the blood before they can damage organs such as the liver or kidneys.

All clostridial vaccines require a primary vaccination programme of two vaccinations (a sensitiser and a booster), followed by an annual booster vaccination. The sensitiser simulates the first encounter with the disease(s), and produces a primary immune response. This primary response occurs up to 14 days after vaccination. It provides short-lived, relatively low-level protection, as a moderate level of antibodies are made. 'Memory cells' are also produced, and these play a key role in the response to the booster vaccination, where the booster simulates a second encounter with the disease(s). This produces a much faster and larger secondary immune response, providing immediate, highly protective and long-lasting immunity.

Animals are not fully protected until after their booster vaccination. If the booster vaccination is given too long after the sensitiser, it will not give an adequate response.



The effectiveness of vaccination depends on many factors, such as the individual animal's response to vaccination, correct vaccine storage and handling, and correct vaccination technique. An individual may not respond satisfactorily to vaccination if the immune system is suppressed or under pressure from other diseases. In some cases, extreme disease challenge may overwhelm an individual despite a good response to vaccination. For these reasons, vaccination cannot be guaranteed to be 100% effective, but should be thought of as a means of greatly reducing risk.

# Sheep vaccination programmes

## Newborns

Newborn lambs, kids and calves rely on antibodies in colostrum for protection against numerous diseases, including those caused by clostridial bacteria. This is known as passive protection because it does not involve the animal itself developing an immune response. Colostrum must be ingested within the first 12-24 hours of life to be effective.

Vaccinating the pregnant dam before giving birth significantly boosts the quantity of antibodies in her blood, which pass into the colostrum just at the time colostrum is being formed. Provided her offspring suckle adequately, these antibodies give passive protection for up to 12 weeks or more. This vaccination also boosts her immunity prior to a period of high risk due to lambing. If dams are not vaccinated they are at greater risk of blood poisoning after lambing, and their offspring are at greater risk of navel ill, Tetanus and Pulpy Kidney.

All clostridial vaccines require a primary vaccination programme of two vaccinations (a sensitiser and a booster) followed by an annual booster vaccination.

### *Primary programme*

This should generally begin with the first (sensitiser) vaccination at weaning (or around 12 weeks of age) when the passive protection from the dam will have waned and animals are at risk of clostridial disease. Ideally the second (booster) vaccination is given 4-6 weeks later. This interval between sensitiser and booster vaccinations can be extended a few weeks. Delaying the second vaccination for too long (>4-5 months) will decrease its effectiveness.

### *Annual booster programme*

After the primary sensitiser and booster are complete, animals should be given an annual booster to maintain robust immunity. For females, the annual booster is given 2-4 weeks before lambing, calving or kidding, to also provide protection to offspring via colostrum. For males the annual booster is given before periods of high risk, for example, before mating or increased feed levels.

On some farms where disease risk is very high or less common clostridial diseases are suspected, consult a veterinarian for advice on a farm-specific programme.



## Recommended clostridial vaccination flock programme (sheep)

	Mating	Pre-lamb	Weaning
Lambs			Sensitiser, followed by booster 4-6 weeks later
Hoggets		If lambing, booster	
2-tooths		Annual booster	
Ewes		Annual booster	
Rams	Annual booster		

### **Hogget vaccination**

If vaccinated twice as lambs:

- Non-pregnant hoggets do not require further vaccination until pre-lamb 2-tooths; in-lamb hoggets require a single pre-lamb vaccination.

If not vaccinated as lambs:

- All hoggets should receive a primary vaccination programme. The first (sensitising) vaccination is given just before, or 4-6 weeks after mating. The second (booster) vaccination is given 2-4 weeks pre-lamb.

### **2-tooth vaccination**

If vaccinated twice as lambs or hoggets, 2-tooths require a single pre-lamb booster vaccination.

Non-vaccinated 2-tooths or those that received a single vaccination as a lamb or hogget require a primary vaccination programme. The first sensitising vaccination is given just prior to, or 4 - 6 weeks after mating. The second vaccination is given 2 - 4 weeks pre-lamb. If the pre-tup (pre-mating) sensitiser is missed, then ewes must be sensitised at least 4 weeks before the pre-lamb booster.

### **Brought-in stock**

The vaccination history of purchased animals (including rams) may be unknown. If so, begin with a two-shot primary programme after purchase followed by an annual vaccination.

### **Docking/tailing vaccination**

If ewes are properly vaccinated pre-lambing, vaccination of lambs at tailing is not normally required. However, if ewes have not received a primary programme and/or a pre-lamb vaccination, or the ewe vaccination history is not known, lambs should be vaccinated at docking/tailing. Use LAMB VACCINE to give immediate short-term passive protection of lambs against Tetanus. This vaccination also provides some protection against Pulpy Kidney. Lambs will still however require a full 2-dose primary vaccination programme starting at weaning.

# Cattle vaccination programme

## *Dairy or beef herd*

The same principles for sheep apply to cattle - a 2-dose primary vaccination programme followed by an annual booster. All replacements and animals retained for finishing should be vaccinated at weaning and again 4-6 weeks later. Breeding females require an annual booster 2-4 weeks before calving. Maternal transfer provides protection of calves against tetanus at high-risk times such as castration, ear tagging or dehorning.



## *Beef finishing*

When purchasing stock with unknown vaccination history, give a sensitising vaccination on arrival followed by a booster 4-6 weeks later.

# Clostridial products

COOPERS and MSD Animal Health offer a range of clostridial vaccines.

## NILVAX®

A combined clostridial vaccine and levamisole for the enhanced active stimulation of immunity in hoggets, ewes and rams. NILVAX provides protection against all five common clostridial diseases in New Zealand.

- Gold-standard pre-lamb vaccine for a superior immune response
- Can be used 2-6 weeks pre-lamb
- NILVAX provides passive protection to suckled offspring via colostrum for up to 16 weeks
- Contains levamisole, broad-spectrum (clear) drench
- Meat withholding period 21 days

Do not use in sheep less than 20kg due to the risk of levamisole toxicity. Do not exceed stated dose volume or frequency.

## *NILVAX: Superior immune response*

NILVAX's combination of a clostridial vaccine with levamisole increases the immune response in sheep compared with other clostridial vaccines. The practical significance of this is to provide more antibodies available for transfer in colostrum, which will result in longer protection for lambs born to those ewes (up to 16 weeks) and a greater quantity for dividing among multiple lambs.

The enhanced immune response with NILVAX means the number of poorly responding sheep within a flock is reduced. Ewes vary in their ability to respond to vaccination and lambs from poor or non-responding ewes have a greater risk of death.

With NILVAX, ewes can be vaccinated earlier than with conventional clostridial vaccines and still transfer significant protection to lambs via colostrum. This can reduce the risk of sleepy sickness (pregnancy toxemia) associated with mustering ewes just before lambing.



NILVAX Selenised is available in a 500mL pack

## MULTINE® 5-in-1

A clostridial vaccine for the active stimulation of immunity in sheep, goats and cattle against all five common clostridial diseases in New Zealand.

- New Zealand's trusted 5-in-1 vaccine for all routine vaccination programmes
- Administration to females 2-4 weeks before giving birth also provides passive protection via colostrum to suckling offspring for up to 12 weeks
- Nil meat withholding period

Because there is a risk of selenium toxicity, do not use MULTINE 5-in-1 Selenised in lambs before weaning.



Available in Plain and Selenised, 250mL & 500mL packs

## COVEXIN® 10

A 10 strain clostridial vaccine for superior protection against 10 clostridial diseases, COVEXIN 10 is the premium clostridial vaccine for farmers who look for the best from their stock, and want the best protection.

- A superior clostridial vaccine for the active stimulation of immunity in sheep and cattle
- Broad-spectrum protection against 10 clostridial diseases including those causing Sudden Death Syndrome
- For use in calves and lambs from 2 weeks of age
- Low dose volume (1mL for sheep, 2mL for cattle)
- Effective in the presence of maternally derived antibodies



COVEXIN 10 is available in a 100mL pack

AVAILABLE ONLY UNDER VETERINARY AUTHORISATION.

## LAMB VACCINE

A specialised vaccine for lambs at docking/tailing that provides immediate, short-term (2-3 weeks), passive protection against Tetanus and active stimulation of immunity against Pulpy Kidney.

- Provides immediate tetanus protection for lambs born to unvaccinated ewes
- Nil meat withholding period



Available in Plain and Selenised 500mL & 250mL packs

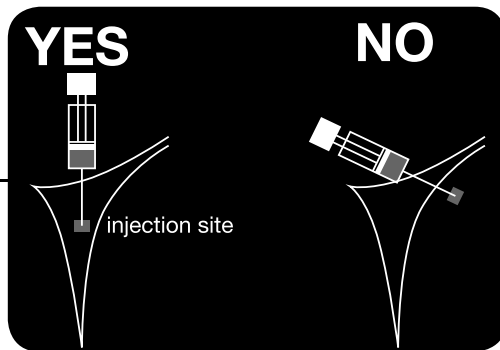




# Vaccination technique

To minimise carcass damage and subsequent down-grading, to prevent infection and to ensure effective vaccination, give careful attention to vaccination technique, dose, volume and hygiene.

- Check the expiry date and only use vaccine within its expiry date
- Read the label and leaflet carefully
- If using a reusable vaccinating gun ensure it has been stored correctly
- Check the gun and calibrate the dose volume by delivering, say five x 2mL doses into a graduated measuring cylinder and checking that 10mL has been delivered (Discard the vaccine)
- Use only sterilised, short (12-16mm), sharp 18-gauge needles
- Sterilise needles by boiling in water and store in meths. Note needles in multi-packs are not sterile and must be boiled before use
- Have a plentiful supply of needles and change frequently - *at least* between packs of vaccine. Change if needle becomes dirty, blunt or damaged
- Tent skin on the side of the neck just behind the ear. Insert the needle at a 45° angle and inject the vaccine subcutaneously, i.e. between the skin and muscle
- Resistance to injection should be minimal. Resistance to injection is usually caused by attempting to inject into the skin or underlying muscle
- Work in clean, dust-free yards
- Do not vaccinate wet or dirty sheep as this increases the risk of injection site infection
- Keep vaccine cool and out of the sun as much as possible



## Vaccine gun storage

If using a reusable vaccinating gun\*, after the last use, clean and disinfect (usually by boiling) following the manufacturer's recommendations. If a disinfectant is used during cleaning, wash all remnants of the disinfectant away with boiled water. Unless not recommended, prevent the seals from drying out by storing with boiled water in the barrel.

\* Note some brands of plastic vaccinating guns are designed for single use and the manufacturers recommend disposal after use.

# Vaccine storage

Store all vaccines away from light (i.e. in their carton) in a fridge at 2° to 8°C. DO NOT FREEZE.

Check label for storage conditions. The COOPERS and MSD clostridial vaccines mentioned in this brochure can be kept for up to 6 weeks after broaching the pack, if the following steps are taken:

1. Carefully remove the draw-off tube from the stopper
2. Empty the draw-off tube and vaccinator by depressing the plunger several times
3. Remove the draw-off tube from the vaccinator
4. Disinfect the stopper
5. Store vaccine upright in the refrigerator. DO NOT FREEZE



While every attempt has been made to ensure the information in this publication is accurate and up to date at the time of writing (April 2013) omissions or errors are possible and advances in knowledge occur. The author/publisher assumes no responsibility or makes any warranty for results obtained based on the contents of this publication. The onus is on users to keep up with the latest recommendations and to read the label before using any product.

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CLOVAC-321-2012

COVEXIN 10 is AVAILABLE ONLY UNDER VETERINARY AUTHORISATION.



**For more information visit**  
**[www.coopersonline.co.nz](http://www.coopersonline.co.nz)**

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