Victorian Farmers Federation Livestock Group

Livestock Factsheet

➢ General Cattle Vaccines

Understanding vaccination and immunity

Protecting your herd from production-limiting diseases involves a coordinated herd health program. A key component of most health programs is a strategic vaccination plan. In order to achieve the maximum level of protection a vaccine can offer, it is important to have a basic understanding of how vaccines function and how the immune system responds to a vaccine.

When an animal from a herd that has not been exposed to a specific pathogen (disease-causing agent) or a 'naïve herd' first comes into contact with a pathogen, and cannot generate an immune response quick enough, it will be susceptible to the disease. If conditions in the animal are suitable, the immune system will suppress the disease and over time will recover from infection. If an animal recovers from disease, specific cells in the immune system are programed to remember and recognise parts of that specific pathogen known as antigens. An antigen is anything the body identifies as foreign or not part of itself such as a bacteria or virus. The body recognises these antigens as a threat, stimulating the development of antibodies which work to protect the body from the bacteria or virus.

How vaccines work

Vaccines expose an animal to a specific pathogen, misleading the body into thinking it has encountered the actual bacteria or virus creating memory cells for the antigens belonging to that specific pathogen. The body is then able to recognise when it is under attack from the same pathogen and will generate a quick response before the pathogen can cause disease and will therefore develop immunity.

Vaccines generally fall into two categories, live or killed vaccines.

Live vaccines

Live vaccines include a small amount of bacteria or virus that has been modified so it does not cause clinical disease. The virus or bacteria in the vaccine can sometimes replicate in the body, supplying the vaccinated animal with a mild form of the disease to stimulate life-long immunity. Live vaccines usually require a single dose providing longer lasting immunity than killed vaccines. However, their potency is short lived and must be used soon after being mixed on-farm. Some live vaccines, if not used specifically as directed, can be harmful to pregnant cows and may cause abortions.

Live vaccines should only be considered on properties where the disease is an issue. If animals from an uninfected property are vaccinated, this will introduce the virus on to the property. This may then require the establishment of a vaccination program to protect future stock, resulting in unnecessary costs to the producer.

Killed vaccines

Killed vaccines are the most common form and do not require on-farm mixing and have minimal risk to pregnant animals. The vaccines described in this fact sheet are killed vaccines with most vaccines of this type requiring two doses. The first dose stimulates the antibodies however, the level produced is often small and protection generally only lasts a few weeks before immunity declines, hence a second vaccination is require to boost immunity (Figure 1). An annual booster every 12 months following is generally recommended to 'top-up' the immunity levels against a specific pathogen or disease.

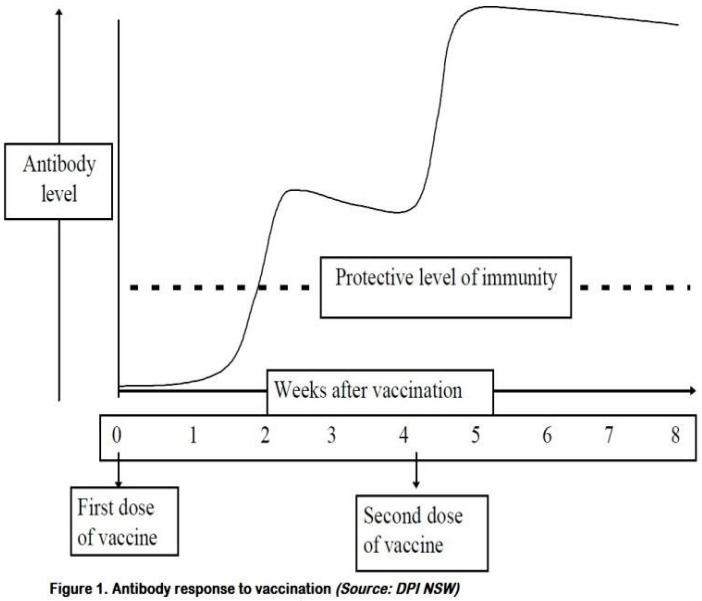

Figure 1. Antibody response to vaccination ***(Source: DPI NSW)***

Why vaccinate?

There are numerous cattle vaccines commercially available. Common diseases of cattle such as clostridial and reproductive diseases can cause significant economic losses and animal welfare issues. However, some of these common diseases can be prevented by vaccinating. Points to consider before introducing a vaccination program include:

- Herd health history and the frequency of a particular disease in your herd.
- Disease occurrence in your area
- Management practices increasing risk of disease such as supplementary feeding, castration, dehorning.
- Cattle handling and vaccine storage facilities
- Personal capability of correctly administering vaccines

It is strongly recommended you consult with your local vet or animal health advisor before carrying out a vaccination program.

General vaccination principles

- Ensure you have safe cattle handing facilities such as a cattle crush or race where the animal can be restrained or allowed limited movement during the vaccination process.
- Handle and store vaccine according to label specifications.
- Ensure that vaccination equipment is clean and in good working order.
- Ensure needles are clean and sharp. Replace frequently.
- Blunt needles can lead to incorrect application of vaccine, impacting on the efficacy of the vaccine and increasing costs due to product wastage.
- Be sure to dispose of blunt needles correctly and with caution. Blunt needles should be placed in a container before disposing to prevent handling injuries.
- Needles and the vaccination site should be clean, free from mud, manure or blood to prevent infection and abscesses forming at the injection site.
- Ensure vaccination equipment is calibrated to the correct dosage according to label specifications.
- Most vaccination programs require two doses for the vaccine to be effective and establish immunity.
- Vaccination can be achieved via subcutaneous injection (under the skin), intramuscular injection (into the muscle) or by intravenous injection (into the vein).
- Vaccination technique will vary depending on the vaccine you are using.
- Subcutaneous injection is the most common method of vaccination.

Subcutaneous injection (under the skin)

- This is a common delivery method for most vaccines.
- Ensure the injection site is clean before injecting.
- Disinfectants should not be used with live vaccines as they can inactivate the vaccine.
- A 16 gauge, $^1/_2$ inch needle is recommended.
- Ensure needles are clean and sharp.
- It is always best to discard the used needle after each vaccination session.
- The recommended injection site is high on the neck (Figure 2).
- To inject, lift a fold of loose skin with your free hand, and inject into the 'tented' skin (Figure 3).
- The needle should not pass through the fold of skin.
- If you are unsure if an animal has received the full dose, inject again.

Figure 2 Subcutaneous injection should be given high on the neck (*Photo: DPI New South Wales*).

Figure 3 Inject into the 'tented' skin without the needle passing through the fold of skin (*Photo: DPI New South Wales*).

Vaccinating against clostridial diseases

Clostridial diseases are a group of diseases caused by the bacteria, *Clostridium,* which is highly resistant being able to live in the environment for long periods of time. Vaccinating for clostridial diseases is recommended for **all herds**.

Clostridial diseases consist of the diseases known as blackleg, black disease, malignant oedema, tetanus, pulpy kidney and botulism. It is important to have an effective prevention strategy in place to protect your herd as treatment is generally not viable. These diseases, apart from botulism, can be prevented by using a 5 in 1 vaccine.

Things to consider when vaccinating against clostridial diseases include:

- Vaccination is to be given subcutaneously.
- Calves should be vaccinated from 6 weeks of age and given a booster 4-6 weeks later to ensure sufficient immunity.
- Stock that have not been vaccinated previously or vaccination history is unknown should be given two doses 4 to 6 weeks apart.
- An annual booster should be given to animals to ensure continued immunity.
- Annual boosters should be administered 4 weeks prior to calving to ensure that immunity is passed onto the new born calf via colostrum.
- Immunity against pulpy kidney only lasts up to 3 months. Under times of high risk, animals may need to be re-vaccinated more frequently (e.g. after 3 months).
- The requirement of boosters for pulpy kidney can depend on seasonal conditions and if there is likely to be a change in diet such as a grain feeding. Boosters should be given before feed lotting lambs.

To aid in the efficacy of the vaccine, hygienic practices should be used when castrating and dehorning. Ensure equipment used is clean and yard conditions prevent mud or faecal material contaminating the fresh wounds. Wound dressings such as antiseptic sprays will help prevent infection. For more information, see the **VFF clostridial diseases resource** (further links).

Clostridial 5 in 1 vaccines registered for use include:

- Ultravac® 5in1 (Zoetis Animal Health)
- Websters® LV 5 in 1 (Virbac Australia)
- Websters® 5 in 1 with Vitamin B12 (Virbac Australia)
- Tasvax 5 in 1® (Coopers Animal Health)

Vaccinating against botulism

Botulism is part of the group of clostridial diseases. It occurs when an animal ingests toxins from decaying material from infected animal carcases or plant material. Animal feed contaminated with dead animals such as rodents and birds or phosphorus deficient cattle chewing on bones are common sources of disease. For more information, see the **VFF clostridial diseases resource** (further links).

Things to consider when vaccinating against botulism include:

- Vaccination should be subcutaneously injected high on the neck. It is common for localised swelling to occur at the injection site.
- There are two types of botulism vaccines available. There is a single-dose vaccine and a vaccine that requires a booster 4-6 weeks after the initial vaccination to ensure adequate immunity.

Producers should note that cattle should not have access to contaminated feed. If you think feed is contaminated, do not feed it.

Registered vaccines for botulism:

- Ultravac® Botulinum Vaccine (Zoetis Animal Health)
- Longrange® Botulinum vaccine (Zoetis Animal Health)
- Singvac 1 Year® (Virbac Australia)
- Singvac 3 year Single Shot Bivalent Botulinum Vaccine for Cattle® (Virbac Australia)
- Websters Low Volume Bivalent Botulinum Vaccine for Sheep and Cattle® (Virbac Australia)

Vaccinating against reproductive diseases

Leptospirosis

Leptospirosis is an infectious disease affecting cattle, causing economic losses through increased abortions and calf deaths. Leptospirosis is also a zoonotic disease (transmittable to humans) posing a risk to human health when working with infected stock. Vaccinating for leptospirosis is recommended for **all breeding herds**. For more information, see the **VFF Leptospirosis resource** (further links).

There are a few vaccines that incorporate a combined 7 in 1 protection against leptospirosis as well as the major clostridial diseases. General principles to consider when implementing a vaccination program for leptospirosis include:

- Handle and store the vaccine according to label recommendations.
- Vaccine should always be administered sub-cutaneously (under the skin).
- When treating an unvaccinated herd, two doses of vaccine should be given, 4-6 weeks apart.
- All vaccinated cattle should receive an annual booster to sustain a high level of immunity.
- All breeding stock should be vaccinated during early pregnancy. This provides the best protection during late pregnancy and for calves that are born from vaccinated cows.
- Calves should be vaccinated before contracting the disease.

- Calves can be vaccinated from one month of age and should receive two doses of vaccine 4-6 weeks apart. This should be followed by an annual booster at 6-9 months of age if retaining stock for breeding purposes.
- New cattle purchased should be vaccinated on arrival if previously unvaccinated or if vaccination history is unknown. Stock should receive two doses of vaccine, 4-6 weeks apart, followed by an annual booster.

Registered vaccines for leptospirosis:

- Ultravac® 7in1 (Zoetis Animal Health)
- Leptoshield® (Zoetis Animal Health)
- Websters® Clepto-7 (Virbac Australia)
- Cattlevax LC 7 in 1® (Coopers Animal Health)

Pestivirus

Pestivirus is a virus that reduces the reproductive performance of cattle herds. The virus, also known as Bovine Viral Diarrhoea Virus or BVDV can cause a range of symptoms such as abortions, deformed calves and ill-thrift or infected stock may not display any symptoms at all.

Owners of valuable at-risk stud stock may consider a vaccination program for pestivirus as a means of insurance. Due to the complex nature of the disease, **consultation with your local vet** or animal health advisor is highly recommended before implementing a pestivirus vaccination program. For more information, see the **VFF Pestivirus resource** (further links).

General principles for pestivirus vaccination include:

- Handle and store the vaccine according to label recommendations.
- Vaccine is for subcutaneous use only.
- Cows must be given 2 doses, 6 weeks - 6 months apart depending on management practices.
- Second dose should be given 2 to 4 weeks prior to joining.
- Immunity does not develop until at least 14 days after the second dose.
- A booster each year, 2-4 weeks prior to joining is required to sustain immunity.

The only registered product available for pestivirus is Pestigard® (Zoetis Animal Health).

Vibriosis

Vibriosis is a venereal disease causing low calving rates, abortions and extended breeding seasons. It is spread by mating infected bulls to susceptible cows or vice versa. **All bulls** in herds affected with vibriosis or at high-risk should be vaccinated. Consultation with your local vet is recommended before carrying out a vaccination program for vibriosis.

Vaccination principles for vibriosis include:

- Handle and store the vaccine according to label recommendations.
- Vaccine is for subcutaneous use only.
- Breeding stock should be given 2 doses, 4 to 6 weeks apart.
- The second dose should be given 6 weeks prior to joining.
- A booster every 12 months is required to sustain protection.

The only registered product available for vibriosis is Vibrovax® (Zoetis Animal Health).

Additional management

To get the most out of your vaccination program, most programs should be accompanied by strategic management practices depending on the disease you are vaccinating against. Management practices may include grazing strategies, nutrition management, animal husbandry procedures and biosecurity practices. For more information on biosecurity practices refer to the **VFF biosecurity resource.**

For further information, please contact the VFF Livestock Group on 1300 882 833 or by email to Jacinta Pretty at jpretty@vff.org.au

Further Links

VFF Clostridial Diseases Resource
http://www.vff.org.au/newsite/common_php/get_file.php?id=2682

VFF Reproductive Diseases Resource
http://www.vff.org.au/policy_issues/reproductive_diseases.php

VFF Leptospirosis Resource
http://www.vff.org.au/newsite/common_php/get_file.php?id=2479

VFF Pestivirus Resource
http://www.vff.org.au/policy_issues/pestivirus.php

VFF Biosecurity Resource
http://www.vff.org.au/newsite/common_php/get_file.php?id=2683

Zoetis Animal Health
http://www.zoetis.com.au

Virbac Australia
http://www.virbac.com.au

Cooper's Animal Health
http://www.coopersanimalhealth.com.au

Department of Primary Industries Victoria
http://www.dpi.vic.gov.au/agriculture/pests-diseases-and-weeds/animal-diseases/beef-and-dairy-cows/clostridial-diseases-of-livestock

Department of Primary Industries New South Wales
http://www.coopersanimalhealth.com.au/default.asp?V_DOC_ID=756&function=SearchResults&CompanyID=67332&StartIndex=1&MaxReturn=9998&PestGenie=N&MasterTypeID=0&SearchType=All&SelectedList=&ListingType=&AdvSearch=&GroupBy=Type

Original Author, Jacinta Pretty (VFF Livestock Project Officer), Original Version Published in April 2013.

Take Home Messages:

- There are numerous cattle vaccines commercially available which can help prevent significant economic losses.
- To achieve the maximum benefit out of your vaccination program, most programs should be accompanied by strategic management practices such as biosecurity, grazing and nutrition.
- It is strongly recommended you consult with your local vet or animal health advisor before carrying out a vaccination program.

Victorian Farmers Federation

Victoria Farmers Federation
Farrer House, Level 5, 24 Collins St
Melbourne, Victoria, 3000
Telephone: 1300 882 833
Fax: 03 9207 5500
VFF@VFF.org.au
www.VFF.org.au