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Beef cattle vaccines

Dr Sarah Robson

Regional Animal Health Leader, Animal & Plant Biosecurity, Wagga Wagga

Introduction

There is a multitude of vaccines for cattle on the market. What should you be vaccinating your herd for? When should you vaccinate? Should you vaccinate every animal?

This Primefact will categorise the various vaccines available for beef cattle and explain the situations where use is recommended.

Clostridial vaccines

Clostridial diseases are caused by bacteria of the genus *Clostridium*. Clostridia are widespread in the environment and are normally found in soil and faeces. They form highly resistant spores that can survive in the environment for very long periods. They are also present in the gastrointestinal tract of healthy animals and as spores in their tissues. Not all species of clostridia cause disease, but those that do are usually fatal. They include:

Clostridium	Disease caused
C. tetani	Tetanus
C. septicum	Malignant oedema
C. chauvoei	Blackleg
C. perfringens type D (pulpy kidney)	Enterotoxaemia
C. novyi	Black disease
C. botulinum	Botulism

Disease occurs when these bacteria enter the body (via cuts, abrasions or ingestion) and conditions in the body allow multiplication of the bacteria and/or toxin production.

All animals are at risk of clostridial disease, but younger animals are at a higher risk than adults because marking, castration and dehorning procedures create an opportunity for clostridial invasion. Enterotoxaemia (pulpy kidney) and blackleg tend to be diseases of young, rapidly growing animals and rarely affect animals over 2 years of age. Breeding females are also at a higher risk of clostridial disease if they sustain calving injuries.

Black disease is thought to occur when there is damage to the liver, such as occurs with migrating liver fluke. Therefore, in liver fluke areas all cattle are considered at risk.

Botulism is a different story. Stock are at risk of botulism when they suffer from protein and phosphorus deficiency, as this results in the chewing of bones and decaying material, which may carry *Clostridium botulinum*. Correct nutritional management is the key to prevention of botulism. Accidental cases can occur when feed contaminated with rodent, bird or reptile carcasses is fed out. If you notice this contamination do not use the feed. In situations where it is impossible to supply an adequate diet or suitable fodder, vaccination is a way of preventing botulism.

All animals should be vaccinated for the five common clostridial diseases (tetanus, malignant oedema, enterotoxaemia, black disease and blackleg) with a '5-in-1' vaccine. A separate vaccine is available for protection against botulism if required.

Vaccination program for the five common clostridial diseases (all animals)

Vaccinate calves from 6 weeks of age. Two doses are required, 4 to 6 weeks apart. Give the first dose 4 to 6 weeks before marking and a booster at marking.

Previously unvaccinated adult stock should receive two doses 4 to 6 weeks apart.

A booster 12 months after the initial two shots should confer lifelong immunity against tetanus and blackleg.

To maintain immunity against black disease annual boosters are required.

Immunity against enterotoxaemia (pulpy kidney) lasts approximately 3 months. Therefore, boosters may be needed for young stock (up to 2 years old) at appropriate intervals, depending on local and seasonal conditions. If there are likely to be digestive disturbances from a change in diet (such as commencement of grain feeding) a booster is recommended.

Vaccinating against botulism

There are two types of vaccine available to prevent botulism: a conventional vaccine that requires a booster 4 to 6 weeks after the first dose, and a single-dose type that does not require the initial booster. However, both types require an annual booster, as protection lasts about 12 months.

The time taken to achieve maximum immunity varies (4 weeks to 6 months), so read the label to calculate when to vaccinate to achieve maximum protection at times of high risk.

For more information on the clostridial diseases and vaccination, see Primefact 440, *Clostridial diseases in cattle*.

Vaccinating for diseases that cause infertility and abortion

Leptospirosis, vibriosis and pestivirus are three diseases that cause infertility and abortion.

Leptospirosis

Leptospirosis is a bacterial infection. In cattle it is caused by *Leptospira hardjo* and *Leptospira pomona.* Leptospira survive in cool, moist conditions, so this disease is common in cooler areas where there is surface moisture, such as in the hill country of southern NSW.

Leptospirosis in the beef cattle herd may present as:

- infertility or increased returns to service
- abortions
- fever, jaundice and ‘red water’ in young calves.

Leptospirosis causes severe, often fatal illness in young calves. Older animals may also show obvious signs of sickness, such as loss of appetite, immobility, fever and depression. However, affected adult animals may not show any signs of sickness.

Leptospirosis can be transmitted to humans, causing a dangerous and debilitating flu-like illness. The most common way for people to become infected is through contact with leptospira-laden urine or birth fluid from affected cattle. Leptospirosis represents a real occupational hazard to veterinarians, abattoir workers and farmers.

Vaccination for leptospirosis is highly recommended for all breeder herds in areas where the disease is common (seek information from your Rural Lands Protection Board district veterinarian). However, nonbreeding enterprises should seriously consider vaccinating stock because of the risk of transmission of disease to humans.

Leptospirosis vaccine is available as a bivalent vaccine that protects against *L. hardjo* and *L. pomona,* or in combination with clostridial disease vaccine (7-in-1 vaccine).

Vaccinating for leptospirosis

Calves require two doses 4 to 6 weeks apart. Check the label directions carefully, because the recommended age of first vaccination varies between products. Some are effective in the presence of maternal antibodies and some are not. Those that are effective in the presence of maternal antibodies can be given at 4 weeks of age with a booster 4 to 6 weeks later and (if the second dose was given before 12 weeks of age) a third dose at 6 months of age. However, it is often more practical to give these vaccines at 6 weeks of age with the second dose at 12 weeks of age, negating the need for the third dose.

The vaccines that are not effective in the presence of maternal antibody should be given at 6 months of age, with a second dose given 4 to 6 weeks later. It is possible to use these vaccines earlier than 6 months of age, but the two shots need to be repeated at 6 months of age. Annual boosters are required for both types.

Previously unvaccinated cattle (including bulls) require two doses 4 to 6 weeks apart, then an annual booster.

Cows and heifers should receive an annual booster 1 month before calving.

Vibriosis

Vibriosis is a venereal disease of cattle caused by the bacterium *Campylobacter fetus venerealis.* The first indication of vibriosis in a herd is cows returning to service and low conception rates (as low as 40 to 50 per cent). Abortions may occur around mid-pregnancy.

Affected bulls do not show any signs of disease but carry the disease and spread it to females. Vaccination of bulls is a simple and effective means of prevention.

Vaccinating for vibriosis

Bulls should receive two doses of the vaccine Vibrovax™ (Pfizer), 4 weeks apart, then an annual booster.

For more information on vibriosis refer to the Primefact 451 *Vibriosis of cattle*.

Pestivirus

Reproductive losses as a result of pestivirus infection include return to service, abortion, stillbirths, birth of live calves with severe birth defects, and birth of ill-thrifty, persistently infected carrier animals that often die before 2 years of age.

In the adult animal, infection with the virus is rarely noticed. It is only when pregnant females are exposed to the virus for the first time that reproductive loss occurs. To prevent disease, females should be exposed to the virus before joining, to allow them to develop immunity. Before the development of a vaccine this was done by identifying persistently infected carrier animals and running them with heifers before joining. With the development of a vaccine there is now a reliable way to provide immunity to the herd.

Vaccinating for pestivirus

Heifers and previously unvaccinated cows should be vaccinated 6 to 8 weeks before joining and a second dose given 2 to 4 weeks before joining. An annual booster should be given 2 to 4 weeks before joining.

Bulls should be vaccinated at the same time as cows.

Vaccination needs to be continued, because the use of vaccine will eliminate carrier animals from the herd, creating a naïve herd that will be susceptible to major reproductive loss if the virus is introduced. For more information see the Primefact 435 *Bovine pestivirus infection*.

Vaccinating for respiratory disease (feedlot cattle)

In feedlot situations, animals from many different sources are mixed together and held in close contact. This situation results in all sorts of pathogens circulating amongst potentially travel-stressed animals. Respiratory disease is the biggest problem in feedlot cattle, and there are vaccines available to help prevent disease.

Rhinogard™ (Qvax Pty Ltd) is a live intranasal vaccine for use in feedlot cattle. It protects against infectious bovine rhinotracheitis. One dose is given on arrival.

Pestivirus, as well as causing reproductive losses, will also lower an animal's immunity and predispose to infection with other viruses and bacteria. In the intensive environment of a feedlot, it may also cause respiratory disease in its own right. Therefore Pestigard™ (Pfizer) vaccine is used for added protection against respiratory disease in feedlot cattle. Ideally, at least the first dose of vaccine should be given 4 weeks before feedlot entry.

Vaccines for the pneumonia-causing bacteria *Mannheima haemolytica* and *Pasteurella multocida* types A and D are currently under development and are used by restricted permit in specified feedlots only.

Vaccinating for specific diseases

Neonatal scours

Escherichia coli (E. coli) and salmonella are bacteria that may cause serious diarrhoea in young calves, especially dairy calves. Disease is associated with close contact between animals and poor feeding or watering hygiene. Vaccines are available for *E.coli* and salmonella but their use is case specific: they are not recommended for general use.

E. coli is a disease of neonates. Bovac™ *E.coli* vaccine for cattle (Intervet Australia) can provide protection for calves in the first weeks of life via vaccination of their dams. The dam produces antibodies that are transferred to the calf in the colostrum. Heifers and previously unvaccinated cows are given two doses, the first 6 to 8 weeks before calving, and the second 2 to 3 weeks before calving. An annual booster is required and should be given 2 to 3 weeks before calving.

Salmonella tends to be a problem after the first week of life. Bovilis S™ (Intervet Australia) is an inactivated vaccine that protects against *S. dublin* and *S. typhimurium.* Heifers and previously unvaccinated cows require two doses 3 to 4 weeks apart, with the second dose given 3 to 8 weeks before calving. An annual booster is necessary and should be given 3 to 8 weeks before calving. Calves from vaccinated mothers will be provided with colostral protection. Calves should be vaccinated from 8 weeks of age if they are from vaccinated dams, otherwise at any age. They need two doses 3 to 4 weeks apart.

Bovine ephemeral fever

Bovine ephemeral fever is a viral disease that is spread by insects. The disease occurs only when the virus-transmitting insects are present. In NSW the disease tends to be limited to the North Coast and Hunter Valley; disease is much less common in inland and southern NSW. January to April is the time when transmission usually occurs, although disease can occur from December to early June.

The virus causes a debilitating fever. Affected cattle stop eating, are weak, and may exhibit joint swelling and lameness. Severely affected animals may go down and remain down for many weeks.

Bulls and heavy females tend to be the most severely affected.

A live vaccine is available. The vaccine is obtained on a veterinary prescription and provides 12 months' protection. Cattle can be vaccinated from 6 months of age. Two doses 4 weeks apart are required initially, then annual boosters. For more information on bovine ephemeral fever and vaccination see the Primefact 434 *Bovine ephemeral fever: Three day sickness*.

Anthrax

Anthrax is a notifiable disease under the *Stock Diseases Act*. Thanks to the use of a highly effective vaccine the incidence of anthrax in NSW is declining, with outbreaks largely being confined to the 'anthrax belt', which runs through the centre of NSW. The greatest risk period is summer.

When anthrax occurs on a property, the property is quarantined and all animals at risk of disease must be vaccinated. Carcasses are burnt and decontamination is carried out. Vaccination is recommended for at least 3 years following a case of anthrax. Many producers elect to continue annual vaccination. Neighbours to properties where anthrax has occurred are encouraged to vaccinate their cattle and sheep.

If a case of anthrax has occurred on a travelling stock route, animals to be moved along that stock route must be vaccinated before entry.

Vaccine can only be used with authorisation from the Chief Veterinary officer of NSW or his/her delegate. To obtain authorisation an 'Application and Authority to use Anthrax Vaccine (Living Spore Stern Strain) in NSW' form must be completed. This form is available through NSW DPI, Rural Lands Protection Boards or veterinary practitioners. One dose is given, with a booster every 12 months.

For more information on anthrax see Primefact 114 *Anthrax* and Primefact 401 *Anthrax Vaccination in NSW*.

Tick fever

Tick fever is a notifiable disease in NSW. It is transmitted by cattle ticks and therefore is endemic or common in areas where cattle ticks regularly occur. These areas are the coastal areas of Queensland and the wet tropics of the Northern Territory and Western Australia.

It is recommended that cattle sold or moved into cattle tick areas be vaccinated before sale or movement. In NSW the approval of the Senior Regional Animal Health Manager or Regional Animal Health Leader employed by NSW DPI is required to vaccinate cattle and for the Tick Fever Centre to supply the vaccine. Your veterinarian can organise approval permits for you. The recommended age for vaccination is weaner age, as these animals are less susceptible to untoward vaccine reactions. Vaccination can be approved if there is an intention to export the stock from the state at some future time.

The Tick Fever Centre maintains a web site at www.dpi.qld.gov.au/tickfever that provides further information on the vaccine and its applications.

For more information on tick fever see Primefact 80 *Tick fever* and Primefact 219 *Tick fever vaccination in NSW*.

Correct vaccination technique

Vaccines are given by subcutaneous injection (i.e. the vaccine is injected under the skin and not into muscle) in the area outlined by the triangle in the figure 1.

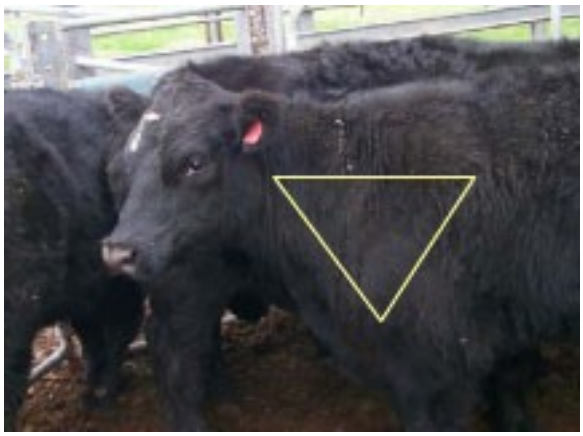

Figure 1. Vaccines are given under the skin in the area outlined by the triangle.

Select an area of clean skin to inject through. Alcohol or other disinfectants can inactivate vaccine and therefore should not be used when vaccinating. When using a multi-dose inoculator gun, only use a clean, sharp needle (Figure 2). Needles must be changed regularly.

Figure 2. Use a clean, sharp needle.

Lift a fold of loose skin with your free hand and inject at the base of the ‘tented’ skin, ensuring that the needle does not pass straight through the fold of skin (Figure 3).

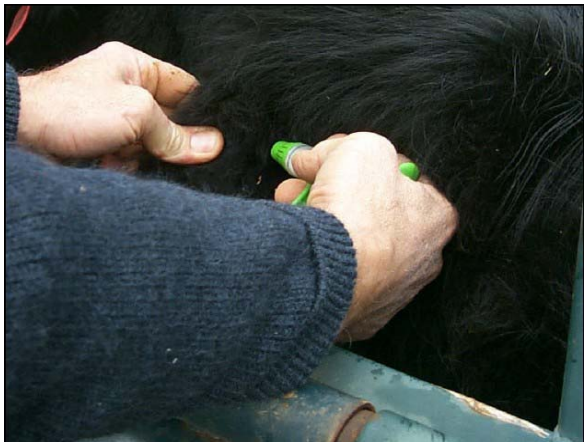

Figure 3. Lift a fold of loose skin with your free hand and inject at the base of the ‘tented’ skin.

Further information

For further information contact your local NSW DPI veterinary officer or your Rural Lands Protection Board district veterinarian.

Publications available

For a complete list of NSW DPI publications, Primefacts please see www.dpi.nsw.gov.au/primefacts

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