

## Vaccinating lambs

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With increased emphasis on lamb, mutton and live exports as part of the sheep enterprise, farmers are giving more thought to vaccinating their lambs. However while much of the vaccination is done in “good faith” through established vaccination routines it is important to fully understand what is being done and to set an objective for the program.

### Understanding how a vaccine works

Immunity comes from antibodies circulating in the blood. These may be introduced from outside the animal (called passive immunity) or alternatively antibodies can be produced within an animal by its own immune system (called acquired immunity).

Passive immunity is only temporary as these antibodies are filtered out after two to three months so that there is no residual evidence or history of their earlier presence. Colostrum or the ewe’s first milk is the usual source of this although in the past commercially available injectable antisera for a number of sheep diseases, have been marketed.

Acquired immunity is produced as a direct response by the animal to a challenge from a foreign agent or antigen that is introduced into the animal. Antigens can be many and varied ranging from disease causing bacteria or viruses, derivatives thereof such as vaccines, parasites or a range of other agents or foreign materials. For the purposes of this Farmnote vaccines are the antigen we are considering.

When the animal first detects the antigen there is a reaction by the white cells in the blood producing a “blueprint”, from which they manufacture antibodies. It takes about 14 days for this primary response to produce significant levels of antibody. With killed vaccines such as enterotoxaemia (pulpy kidney) this antibody response is relatively small and levels of antibody fall below those needed for protection after several months but the animal has been sensitized so that a follow up vaccination 4-6 weeks after the first vaccination will produce a strong and immediate response (secondary or vaccinating response). Hence the lamb is vaccinated. Thereafter an annual booster will maintain the required level of immunity for adult sheep.

It is usually practical to give lambs the secondary or vaccinating dose at weaning. Delaying for longer periods of time after the sensitizing dose may lead to the sheep losing the blueprint and ability to respond quickly to a secondary or booster vaccination.

Note:

- Some vaccines are live vaccines that give a low virulence or modified form of the disease. These usually require only one dose of vaccine i.e. the scabby mouth vaccine, Scabgard®
- Not all vaccines target infectious disease. Vaccine technology has been used to boost ovulation rates in ewes i.e. Ovastim®

- Some vaccines form a sustained action depot of vaccine stimulating the immune system over a long period of time so that only one dose is required i.e. Gudair®. the ovine John’e disease (OJD) vaccine.

### Therefore a comprehensive vaccination program entails:

- The primary or sensitising dose of vaccine for the lamb is usually given at marking. Single dose vaccines (eg for scabby mouth) can be given at this time for convenience. Note that the OJD vaccine Gudair®. is for lambs 4 weeks of age or older.
- The secondary booster or vaccinating dose given 4-6 weeks after the first vaccination, but often delayed slightly until weaning.



Figure 1 - Vaccination for scabby mouth underpins the live sheep export trade

### Important Disclaimer

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- An annual booster vaccination for adult sheep given each year. For breeding ewes this annual booster vaccination can be given a month or so before lambing. This will boost the ewe's immunity and will also give maximum colostral antibody (passive immunity) to the newborn lamb.

**Important points to note:**

- Each vaccine component is a separate entity. For example if you use a vaccine with enterotoxaemia (*Clostridium perfringens* type D), tetanus (*Cl tetani*) and cheesy gland (*Corynebacterium pseudotuberculosis*) for the primary vaccination you should use the same components in the secondary vaccination.
- Injectable vitamin and mineral additives such as vitamin B12 and selenium may be included with the vaccine but these are not vaccines and may or may not be used with subsequent vaccinations.
- Some vaccines come combined with anthelmintics. The decision whether to use these should be based on the vaccination required and the drench group currently being used, based on the farm's drench resistance history. These decisions should not be compromised by the convenience of using a product.

**Commonly used vaccines**

**Enterotoxaemia**

Enterotoxaemia or pulpy kidney is caused by a toxin produced by the bacteria (*Clostridium perfringens* type D). The organism is resident in the gut of sheep and goats and can proliferate when fed high sugar and starch diets or following dietary changes. Particularly susceptible are fast growing lambs from ewes on good lactation feed and sheep in feedlots or on high grain diets. Mostly affected animals are found dead as the disease generally progresses rapidly over a few hours or less through convulsions, frothing at the mouth and sometimes terminal diarrhoea. Generally the better conditioned animals are affected and post mortem decomposition is rapid. Under circumstances where there is a partial or incomplete vaccination history the animals may develop degenerative lesions in the brain and show nervous signs lingering over several days before dying.

As lambs of several weeks of age up to marking are one of the prime at risk groups it is important the ewes have a full vaccination cover and get their booster vaccination before lambing so that the lambs get colostral antibodies to protect them before marking. Thereafter lambs should receive the full vaccination routine described above.

**Tetanus and clostridial wound infections**

Tetanus and the other clostridial wound infections (malignant oedema, blackleg and swelled head in rams) have similarities in that each is caused by a member of a family of toxin producing bacteria that proliferate in wounds. Affected animals have a high mortality rate and cause huge amounts of spores that may contaminate the environment after death and decomposition. Consequently the farm or district history may be important when making a decision on the type of vaccination cover required.

Tetanus with its distinct rigid tetanic convulsions generally appears about a week to 10 days or more after an injury but has been seen as early as 3 days.

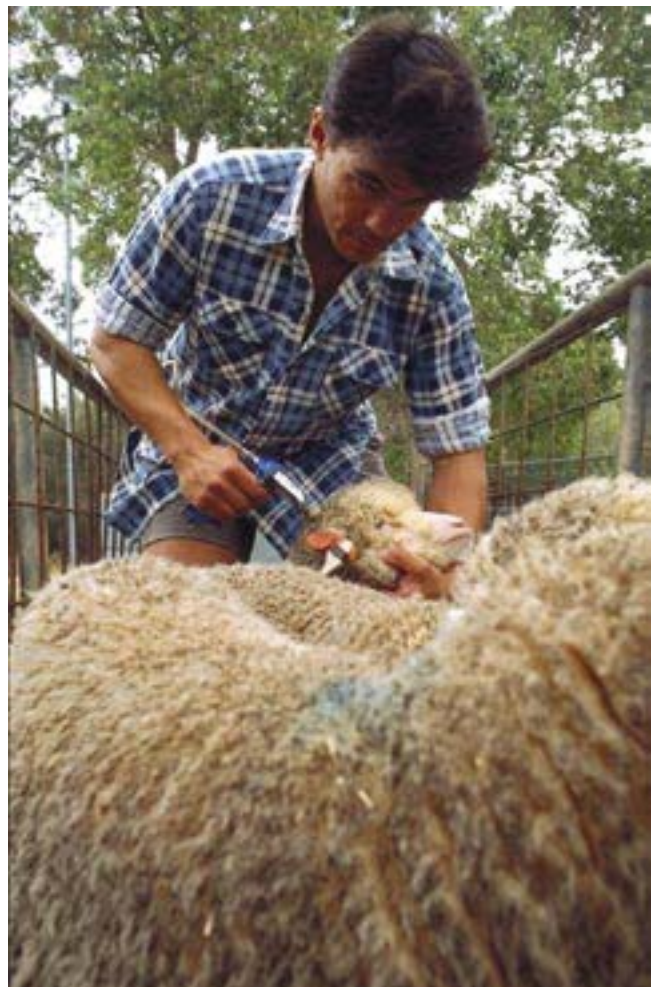
The other clostridial infections tend to show much earlier at one to two days after the injury with affected animals taking 1 to 2 days from onset to die but generally with losses decreasing after 4 to 5 days. These infections are usually associated with swelling and sometimes gas formation at the wound site.

Any injury such as marking, shearing or even minor injury such as injecting or tagging may lead to outbreaks. As marking is a major risk time and the primary response to the first vaccination will not produce significant antibody until about 14 days after the vaccination, the pre lambing ewe vaccination and colostral antibody for the lambs is very important. When properly planned and carried out, vaccination is highly effective in preventing these diseases.

*Note: Black disease caused by this family of bacteria is unlikely to be seen since liver fluke are not endemic in Western Australia.*

**Cheesy gland**

Australia wide abattoir studies have shown a cheesy gland prevalence of well over 20 % in mutton sheep with very little reduction following haphazard or incomplete vaccination programs. Alternatively, where complete



*Figure 2 - To be fully vaccinated lambs need a secondary booster vaccination*

vaccination programs are in place the prevalence is reduced to 3%. Consequently to achieve cheesy gland control it is necessary to maintain an ongoing full vaccination cover. Planning may be needed for timing the booster vaccination to restrict a compromise between

- achieving maximum colostral antibody in the ewe's milk
- enterotoxaemia protection on stubbles or feedlots
- achieving maximum protection at shearing from the spread of cheesy gland.

Cheesy gland vaccine generally comes combined with pulpy kidney and in various other multi component vaccines. However not all multi component vaccines have the cheesy gland component included in them and so it is advised to check the vaccine label to see that this is included.

### **Scabby mouth**

Although not a mandatory requirement, WA farmers have been advised to vaccinate all potential export lambs with a scabby mouth vaccine at marking. This is because Western Australia is the major supplier of sheep to the Middle Eastern live export markets and these markets may be put at risk through unacceptable levels of scabby mouth in shipped sheep.

The most widely used vaccine is Scabigard®. which comes with a purpose built applicator designed to allow a measured dose of vaccine to be scratched onto the bare area of the brisket.

Operators using the vaccine should follow manufacturer's instructions for storage, disposal and personal safety. Being a live vaccine there is an occupational health and safety risk for operators developing short term skin lesions associated with using the vaccine.

### **Arthritis**

The decision on whether the cost of an arthritis vaccination program is worthwhile will depend on sheep prices, the flock history and the farmer's attitude to risk offset against the likely losses from arthritis. The vaccine does not come combined with the other vaccines so there are added labour costs.

A key issue is the need for the ewe mothers to be fully vaccinated to give colostral immunity to the lambs as a major risk periods for the lambs is immediately after birth through direct infection from their mothers.

Most infectious arthritis in lambs is caused by a bacterium called *Erysipelothrix rhusiopathae*. However there may be a proportion of arthritis cases caused by other organisms for which this vaccine will not be effective.

Mulesing and shearing lambs are significant risk factors. Abattoir survey work has shown lambs that have been shorn are 4 times, and mulesed 7 times more likely to be affected than untreated lambs. Crutching, especially if the sheep are dirty, may also result in an arthritis outbreak.

Surveys have also shown the time-honoured recommendation of using portable or temporary yards at mulesing had no significant benefit over the main farm yard in reducing arthritis although other diseases such as tetanus may be a reason for using temporary yards.

### **Ovine Johne's Disease**

Most farmers will not need to vaccinate against OJD. However those with OJD or at risk from OJD, or those wanting to enhance their trading opportunities through increasing their OJD Assurance Based Credit (ABC) points, may elect to do so. In order to get the increased ABC points for lambs as an "approved vaccinate" or for flocks to have a "whole flock approved vaccinate" status the sheep need to have been vaccinated between 4 and 16 weeks of age. Preferably vaccination should be done at as young an age as possible, as infection is spread through grazing infected pastures. Animals that have been vaccinated need to have an identifying tag. This is with a "V" added to the standard NLIS (Sheep) year colour tag that will become mandatory from Jan 1<sup>st</sup> 2006

Gudair®. OJD vaccine is available only from veterinarians as there is a significant occupational health and safety risk from using this product. As a killed vaccine, it will not cause infection but needle stick injuries can still be serious leading to abscess formation and prolonged healing times.

### **Biosecurity**

Livestock, machinery, fodder and people can introduce animal and plant diseases, weed seeds and pests. Develop a biosecurity plan for your farm to reduce the risk of these problems.

For sheep purchases, ask the vendor for an Animal Health Statement which covers OJD, footrot, lice, brucellosis, drenching and the vaccination history.

Mention of product names does not imply endorsement and omission of any names is not intentional.

### **Other recommended reading**

- Farmnote 17/2005 Scabby mouth
- Farmnote 46/2005 Cheesy gland in sheep and goats
- Farmnote 24/2005 Sheep arthritis
- Ovine Johne's disease information pack

