



Coliform Mastitis Control

Coliform mastitis is caused by a wide variety of different Gram -ve bacteria, most commonly *Escherichia coli* but also, amongst others, *Klebsiella* spp and *Serratia* spp. Infection usually only results in a mild case of clinical mastitis, though on occasions, particularly in early lactation and when cows are under metabolic stress more severe disease can occur. In severe cases cows can develop 'toxic' shock, become recumbent and may die. This presentation has become classically associated with coliform mastitis; however it is important to remember that whilst a sick cow with mastitis is most likely affected by a coliform organism, most coliform cases do not result in toxic mastitis.

Whilst historically clinical coliform mastitis has been assumed to occur shortly after infection, more recent research has demonstrated that coliform intramammary infections are acquired throughout the lactation cycle. In fact, the early and late dry periods are the times of highest risk of new infection in many herds and these infections can then persist to cause clinical disease in the subsequent lactation.



A classical presentation of clinical coliform mastitis

Coliform mastitis control is a major issue on many dairy farms. Whilst winter housing can prove difficult in temperate zones, the higher temperatures and humidity in the summer months can also present their own challenges. Whilst the ambient environmental conditions will affect the level of challenge on a daily basis, in the summer months heat stress can also have a significant effect on feed intakes, energy balance and cow 'health' generally, leading to an increase in the severity as well as the incidence of disease.

Any approach to coliform mastitis control needs to take a **two pronged approach**. Firstly the producer needs to focus on minimising the risk of intramammary infection, but despite best efforts some cows will inevitably become infected and in these animals it is important to mitigate the impact and severity of clinical disease.

Minimising the risk of intramammary infection needs to focus on both reducing the challenge from the environment and enhancing the cow's own defences.

Reducing the challenge is certainly the most effective way of reducing the risk of intramammary

infection and is achieved by ensuring a dry, clean and well-ventilated environment, throughout the lactation cycle throughout the year. Bedding management, regular scraping of yards and alleys as well as adequate loafing area are all keys to success. Maintenance of the milking plant and a good pre-milking routine also play an important role by minimising the risk of challenge during the milking process.

In recent years, our approach to **enhancing the cow's own defences** has focussed on minimising the risk of infection during the dry period. Both long acting broad spectrum antibiotic dry cow therapies and internal teat sealants have proven to be efficacious in reducing the risk of both intramammary infection at calving and clinical mastitis in the subsequent lactation.

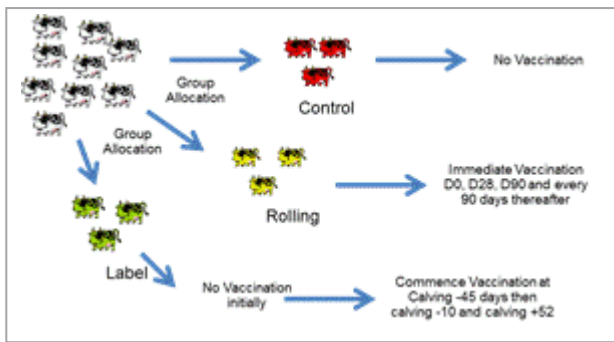
In contrast, mitigating the impact of infection needs to focus on ensuring a 'fit' and healthy cow able to respond to intramammary challenge. This can, in part, be achieved by minimising negative energy balance and ensuring adequate levels of key micro-nutrients such as vitamin E and Selenium. The potential role of vaccination is discussed in more detail overleaf.



The Role of Vaccination in Coliform Mastitis Control

Coliform mastitis vaccines have been available for over 20 years, but have only recently become available in the EU. Startvac® (HIPRA) is a polyvalent mastitis vaccine, offering protection against both coliform and *Staphylococcal* spp. Relatively small registration studies demonstrated the efficacy of the product, but a recent large UK field study has investigated use in the field using both the label and a 'rolling' vaccination regime.

STUDY DESIGN: A total of 3,130 cows were recruited from seven herds in the southwest of the UK. Herd sizes varied between 190 and 581 cows and 305 day milk yields were between 8,500 and 10,500 litres. Prior to the study calculated bulk milk SCCs were between 190 and 350 x10³ cells/mL and clinical mastitis incidences were between 36 and 149 cases of clinical mastitis / 100 cows / year. Within each herd cows were allocated to either receive no vaccinations (control group), vaccination following the label regime (label group) or vaccination every 90 days following an initial vaccination course (rolling group).

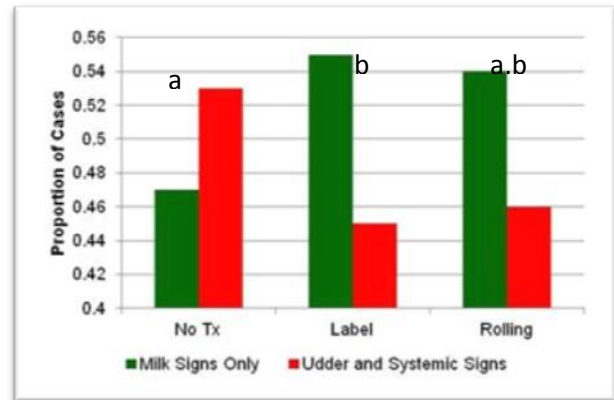


An illustration of within herd randomisation

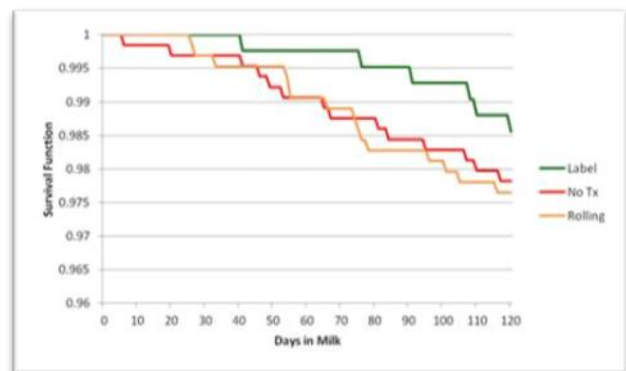
For the purposes of analysis of vaccine efficacy, clinical mastitis incidence, clinical mastitis severity and cow production was assessed in the first 120 days of lactation.

THE IMPACT OF VACCINATION: Whilst overall the rate of clinical mastitis was lowest in the label vaccinated group there was no significant difference in the rates of mastitis between the treatment groups. No cows in either of the vaccinated groups left the herd as a result of toxic mastitis and whilst fewer cows were culled for mastitis in the label vaccinated group the difference was not significant.

However, analysis of clinical mastitis severity clearly demonstrated that clinical mastitis was significantly less severe in cows in the label group (OR 0.58 (95% CI 0.35-0.98)) compared to unvaccinated cows, whilst each additional vaccination was also associated with a decreased odds of a severe clinical signs (OR 0.87 (95% CI 0.77-0.98)).

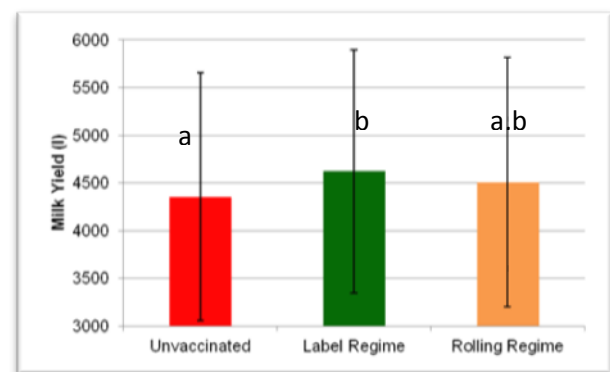


Vaccination resulted in a decrease in mastitis severity



There was a trend for less culling in vaccinated cows

Analysis of production in the 120 days of lactation revealed that cows in the label group gave 231 (95% CI 104 - 357) litres more milk than unvaccinated cows. Similarly the production of milk solids was higher in the cows in the label group.



Vaccination resulted in an increase in production

CONCLUSIONS: The approach to coliform mastitis is necessarily complex. Vaccination has a role to play in mitigating the impact of coliform mastitis and based on UK research is also likely to have significant beneficial effects on cow productivity in early lactation.