


Principles and practice of vaccine use

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Abstract



Animal health products fall into two camps - those which have been trivialised and which are sold on price, and those which offer serious solutions to on-farm problems. Veterinarians who want to practise their skills above the shoulder should concentrate on the latter.

“Yersiniavax” vaccine is not a golden bullet bringing an end to yersiniosis in weaner deer. Instead, it's an adjunct to good farm and herd management. The principles and practice of successful vaccine use cannot be separated from the technology that underpins and surrounds the vaccine. If this is missing, if veterinarians are not adding value to the vaccine they sell, then the economic future for all of us involved is bleak.

Vaccines

Vaccines are sophisticated products that embody a lot of technology into a 1 or 2 ml dose. However, what's inside the vaccine pack is only part of the story. If a vaccine is to deliver good results it must be used properly in conjunction with good farm and animal management. This is the Technology Surround, the know-how and technology which is not in the packet, but which is essential to success.

Your author suspects that for some vaccines what's inside the packet is, perhaps, only 20% of what's needed for consistently excellent results. The remaining 80% lies in the Technology Surround. If this is true, then we all need to give much greater attention to it. Using ““Yersiniavax”” vaccine as an example, this paper will examine how AgVax and veterinarians can together seize and take advantage of the challenge.

“Yersiniavax” Vaccine

Some quick background first. “Yersiniavax” vaccine is a conventional, killed vaccine containing three field-derived strains of *Yersinia pseudotuberculosis*. It was jointly developed by AgResearch at Wallaceville and Invermay (Drs Bryce Buddle and Colin Mackintosh), and the Deer Research Laboratory at Otago University (Dr Frank Griffin), in response to strong market demand for a solution to high death losses in young deer. Research in the late 1980s and early 1990s was focused and highly outcome oriented, and rapid progress was made. Adequate efficacy and toxicity data was gathered to support regulatory approval of the vaccine in 1992, with the Animal Remedies Board both being willing and able, under then current legislation, to help meet farmers' need for a vaccine.

AgVax and Veterinarians

“Yersiniavax” vaccine was commercialised by AgVax Developments Ltd. Established in 1993, AgVax is a specialist technology development and commercialisation company wholly owned by AgResearch. AgVax is, however, autonomous and strongly market focused and enjoys neither favours nor subsidies. It operates in two related areas, one very visible, and the other less so. The visible dimension is the manufacture, sales, marketing and distribution of animal remedies and productivity aids. The less visible is the funding of r&D by research providers. Note that r&D is not a typo. AgVax concentrates on Development, aiming to commercialise new technologies arising out of fundamental biological research performed by others. In so doing, it is capitalising on some 100 years of plant and animal research in New Zealand which underpins the nation's economic and social welfare.

In its product commercialisation role AgVax provides an interface between science and market. This has proved to be extremely valuable for the introduction of new technology through veterinarians, and for the operation of a technology feedback loop, which drives ongoing r&D and continuous product improvement. **The role of veterinarians is key to success** and has very materially aided technology transfer and adoption of AgVax products. The process also supports farmer's understanding of the

technologies involved, hence the principles and practice of vaccine use, while it offers veterinarians a golden opportunity to practice their veterinary skills 'above the shoulder'

Vaccine Issues

Since "Yersiniavax" vaccine was first sold in 1993, several issues have arisen which have necessitated veterinarians involvement. These issues and their solution are summarised.

Issue 1: Bright Deer Farmers

Deer farmers are a subset of farmers who auto selected themselves from the sheep, cattle and dairy industries. They are often very intelligent, seek leading edge information and contacts, but don't accept information at face value, are happy to fund targeted research, individualistic and need to be convinced on their own farm.

No solution is needed to this issue, there is no need to change anything. We can be grateful for the calibre of the people we work with. They make the job challenging, fun and worthwhile.

Issue 2: "All Manufacturers Lie"

This is said 'tongue in cheek', but it is true that farmers can have a negative perception of manufacturers and their motives. In some cases, this natural and understandable suspicion may also extend to others in the product and information supply chain. Even veterinarians are not immune. Examples with "Yersiniavax" vaccine include some farmers suspecting that one dose may suffice instead of two, or that a 1.5 ml dose is adequate instead of 2.0 ml. Reading and following product instructions closely is sometimes not a priority.

AgVax believes that the only solution is to tell the truth, however unpalatable, to admit ignorance when we don't know (but promise to find the answer), and to admit fault when at fault. An example is given by the issue of "Yersiniavax" vaccine contamination, which occurred a few years ago. The contamination arose during manufacture by a third party and was not evident on product inspection. However, tiny crystals blocked farmer's vaccinating guns, causing understandable annoyance. AgVax recalled all unsold product, filtered the crystals out and returned it. AgVax also developed a 'quick fix' for vaccine which was already in use on farms, but could not be returned (repeatedly syringe the vaccine through a fine gauge needle to break up the crystals).

Most importantly, as soon as AgVax knew it had a problem, it told veterinarians and farmers about it, and told them what was being done to resolve it. Veterinarians were outstanding in their positive response and together with AgVax the issue was quickly put to bed. "Yersiniavax" vaccine sales that year did not suffer. Less transparency and a willingness to communicate honestly and fully could have led to a very different outcome.

Issue 3: Injection Site Lesions

During the research trials which led to "Yersiniavax" vaccine, it was noticed that the vaccine sometimes gave rise to hard nodule-like reactions at the injection site. These did not weep and were not a cause for concern, provided the vaccine was administered at the correct site, thus avoiding any carcass damage. However, some farmers expressed concern about the site reactions that could, on occasion, be quite large and obvious.

In response, AgVax commissioned research trials to examine the cause of the site reactions and ways to minimise them. A significant improvement proved possible by lowering the amount of the adjuvant in the vaccine, but without lowering vaccine effectiveness. This work led to registration of the reformulated vaccine and the conclusion that the issue had been resolved.

However, smaller or no site reactions lead some farmers to suspect that the vaccine was no good. In retrospect, AgVax made a mistake - it remedied the injection site lesion issue and thought it had done well, but it failed to tell farmers what it had done. Accordingly, the absence or diminution of site reactions was seen negatively, rather than positively. This was your author's mistake and one that he

has ruled since' It also highlights the need for ongoing communication and partnership between AgVax, veterinarians and farmers. It's a living and continual process, not one that we can take up and put down as specific issues may dictate.

Issue 4: Timing of Use

Farmer and veterinarian feedback to AgVax during the last four years have highlighted vaccination timing issues. From a narrow manufacturer's perspective it is easy - the vaccine should be administered in two doses, three to six weeks apart, and the latter in sufficient time before a field challenge is likely. However, a little thought about on-farm realities shows that vaccination timing is much more complicated, particularly in relation to weaner age, the date of weaning and winter and other stresses.

In response, AgVax worked closely with Colin Mackintosh at Invermay and a number of field veterinarians to develop an improved farm management package for "Yersiniavax" vaccine. This could and did not give a simplistic recipe, but instead canvassed the options and provided a methodological approach for working out the best vaccination option for any particular farm. This approach was then widely published in vaccine instructions, magazine articles, conference papers, advertising flyers etc. and at seminars and field days.

Issue 5: Vaccines Are Not "Bullet Proof"

It is, however, tempting to assume that they are. It is sometimes easier to 'sell' a simplistic solution, than to examine the carcass of the vaccine as it lies in the undergrowth, and put the hard work into ensuring that it is surrounded by all the requisite farm and animal management measures required to support its use. It is also tempting not to explain or emphasise that vaccination offers whole flock or herd protection, not a guarantee of protection for every individual animal under all circumstances.

AgVax has tried to instill honesty into this issue, but to be honest, it's a tough job! Customers sometimes don't want to hear the message, while from a company perspective the complications are not all that attractive either. However, it's an issue that both AgVax and veterinarians must continue to deal with. AgVax has faced up to it, in particular, in respect to the technical information that accompanies the vaccine. It is stated that the vaccine is an adjunct to, not a substitute for, good management, and that a farmer should not spend money on the vaccine unless s/he's prepared to do everything else correctly too.

Issue 6: More Recent R&D

Three related issues became apparent two years ago from veterinarian feedback and farm visits. They were:

- Weaner age and colostral interference.
- Vaccination at time of high stress
- Vaccination at the same time as other concurrent animal treatments.

Note that all these issues relate to management, not to the vaccine per se. With the help of Peter Wilson (Massey University) and Colin Mackintosh (Invermay), which is gratefully acknowledged, AgVax commissioned research trials co-funded by AgVax, Massey and Otago Universities, AgResearch, CSL, the DFA and the GIB. Industry and academic funding for these trials is also gratefully acknowledged and demonstrates both the 'will do' nature of the deer industry when important issues are recognised, and the need for research to provide better information to support good farm management and vaccine deployment. Trial results are presented by Mackintosh *et al.* and Wilson *et al.* elsewhere in these proceedings.

A Golden Opportunity

In summary, the principles and practice of successful vaccine use cannot be separated from the technology that underpins and surrounds the vaccine. What is in the vaccine box is only a small fraction of what is required for vaccine success.

This is the veterinarian's golden opportunity. An opportunity to add value above the shoulder, in partnership with organisations such as AgVax, AgResearch, Massey and the Deer Laboratory at Otago University. It's what AgVax calls Serious Solutions, in contrast to the trivialisation which characterises too many animal health products.

Serious Solutions

What do serious solutions look like? They are

- Hard work
- Difficult
- Intellectually demanding
- Disturb the comfort zone
- Lack the temptations of simplicity
- And are not silver bullets.

However, they also

- Get to the difficult answers
- Are very rewarding
- Build enduring relationships
- Get away from trivialised products
- Offer high profit opportunities
- Shape a new way of doing business.

In short, best practice in vaccine use equates to a serious approach and serious solutions. This is the challenge and the opportunity for us all.