‘VACCINATION is not a silver bullet: it is a way of reducing risk and transmission pathways. It is just another tool in the box.’ So said Glyn Hewinson, lead TB scientist at the APHA, who was the first speaker in the large animal stream at the conference. Organised by Improve International, which handles OV registration and training in Great Britain, and 5m Publishing, the conference in Swindon on October 22 and 23 was held in association with the APHA.

Having worked on TB for many years, Professor Hewinson said his team was passionate about using the knowledge it had generated to make an impact in the field. But why were vaccines needed? In countries where there was no wildlife reservoir for bovine TB, skin tests and slaughter strategies had been very successful in eradicating the disease. However, when wildlife was involved, as in the UK, eradication was very challenging. The focus needed to be on controlling the disease.

BCG was the vaccine of choice for use in people against TB, and had been shown to be safe in a range of species. However, its efficacy was variable and, when used in cattle, it compromised the tuberculin skin test. This was an issue as bovine TB control was centred around this test, explained Professor Hewinson. The key question was why did the vaccine work in some populations and not others? This was still unknown.

BCG had been widely used in cattle between 1920 and 1950, and studies had shown that bovine TB could be eradicated in five to eight years when BCG was used alongside the gradual eradication of unvaccinated stock. However, it was more economical to use the test and slaughter method and, in theory, he said, eradication should only take one to two years in the absence of a wildlife reservoir. Also, he said, ‘the value of vaccination as a means of reducing infection before tuberculin testing is nullified by the prolonged sensitivity induced by an infected herd.’

There were also legal issues when it came to vaccinating cattle. Vaccination might have implications for trade and there might be prohibition of vaccine use, but the main issue would be the changes that would have to be made to EU legislation. This would require the UK to prove that any vaccine was safe and effective; it would also have to have an internationally validated ‘DIVA’ (differentiating infected from vaccinated animals) test, have acceptance from other member states and have confidence that vaccination would not reduce other efforts to control the disease.

**Vaccination of wildlife**

Moving on to the topic of vaccinating wildlife, Professor Hewinson explained that the Badger BCG vaccine had been licensed in March 2010 following 10 years of research. The vaccine decreased the progression, severity and excretion of *Mycobacterium bovis* infection, but, again, it had not been found to be 100 per cent effective. In addition, it did not seem to benefit already infected animals. However, studies had shown the positive effects of vaccinating badgers. In one study, it was found that the incidence of TB in badgers had reduced by over 70 per cent as a result of vaccination. Furthermore, it had been found that vaccination also had an indirect effect on cubs, reducing their risk of TB.

But what effect did vaccinating badgers have on cattle? While it would be expected that an injectable badger vaccine would lead to a reduced transmission of TB to cattle, there had been no empirical data. ‘This is the real key,’ said Professor Hewinson. ‘Although we see a vaccine effect in badgers, we don’t know what that translates to in terms of protecting and affecting cattle.’

It was reasonable to assume that it would have a positive effect, but large systematic studies would be needed to find evidence for this. Badger vaccination was cheaper than badger culling and it could help reduce the potential negative effects of culling due to perturbation. One option, which Northern Ireland was exploring, would be to use vaccination as an exit strategy, following culling.

The ideal vaccine would be an oral one, as it would remove the need to trap badgers. Proof-of-concept existed to show that oral BCG did confer protection, but more robust evidence was needed. Although oral vaccination should be practical and cheap, baits would need to attract badgers only in order to minimise ingestion by other wildlife. The good news, he said, was that vaccination was around five years off, should research prove it to be successful.

Vaccination, whether in badgers or cattle, was a potential component in the control of bovine TB, concluded Professor Hewinson, but it did not stand alone. A comprehensive and multifaceted eradication programme was needed. The barriers to vaccination were sizeable and would take time to overcome, and in the meantime other methods needed to be used to ‘bear down’ on the disease.

**Preventing the spread of PED**

Porcine epidemic diarrhoea (PED) was a non-statutory, non-notifiable disease, explained Susannah Williamson, veterinary lead of the pig expert group at the APHA, but it was a new and emerging threat that should not be ignored. PED was caused by an alphacoronavirus and was similar to transmissible gastroenteritis (TGE), although there was no cross protection between the two. The virus targeted the epithelial cells of the small intestine wall and caused diarrhoea.

The disease was first reported in Great Britain in the 1970s, but its viral cause was not determined until 1978 in Europe. After spreading throughout Europe in the 1970s and 1980s it then appeared to ‘peter out’. It was suspected that Europe exported the disease to Asia, where there had been large outbreaks in the 1980s and 1990s. PED was now considered endemic in this region. In 2012, China noticed a virulent strain of PED virus that was causing high mortality in
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PED-infected faeces as could be seen in a tonne of TGE-infected faeces — this was an incredibly high output.

Shortly after the PED outbreak in North America, there had been a temporary ban on trade with the UK, but this was not sustainable. However, the European Commission stepped in and required testing and isolation of pigs in their country of origin before import to the EU. PED had also been added to a ‘voluntary import protocol’, an industry-led system which tested for the disease before importation.

There was a vital role for the vet in preventing PED from entering Great Britain, she said. Vets could assess the biosecurity risks, identify those for priority action, embed a ‘farm gate barrier mentality’, and relate costs to tangible benefits. Detection was key; vets needed to be able to recognise the signs of disease and to send samples off for PCR testing. The signs to look out for in young pigs were explosive diarrhoea and high mortality. In older pigs, the disease did not cause mortality, and so there was no difference between the virulent and mild strains. But, again, the clinical sign was explosive diarrhoea. The key sign was rapidly spreading disease with high morbidity. ‘You are the eyes and ears on the ground,’ she told delegates.

The good news was that the UK had excellent diagnostic tools, had funding for detection and investigation from industry and Defra, and, with appropriate biosecurity, PED could be kept out of pig farms, even if it was brought into the country on a pig vehicle. In addition, industry had put a proposal to the Government to make PED a notifiable disease. The result was slightly different from a usual notifiable disease.

PED was spread by the faeco-oral route, so the route of transmission could be pig and feed lorries, manure, slurry, dirty boots, and so on. To put the risk in context, Dr Williamson pointed out that there could be as much virulent virus in 28 g of

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International movement of horses

Focusing on the global role of the OV and looking towards the equine sector, Fiona McCormack, director and veterinary adviser for Peden Bloodstock, an international horse transportation company, discussed the movement of horses and the issues associated with this. She noted that some movements could be anticipated years in advance as horses would be moved from continent to continent for competitions.

The main priorities when moving horses were maintaining the welfare and peak fitness of the animal; safeguarding global equine health; and facilitating international show schedule demands. While doing this, other things had to be considered, including keeping feed, drugs, vets and grooms consistent so as not to stress the animals.

Europe was the primary training ground for competing horses and, from there, horses travelled to both large and small events. The average competing horse travelled weekly, she said, and this applied across the globe.

To indicate the scale of the job in hand, Miss McCormack explained that, for the Rio Olympics, which will take place in 2016, 236 horses and 78 paralympic horses would need to be transported.

The OIE was in charge of surveillance and trade, and had set down a ‘safe list’ of countries that the UK could trade horses with and UK horses could travel to. Many countries were not on this list. This could be because of their disease risk, or because they had never previously been open to the UK and so their disease status was unknown. The key diseases to consider when transporting horses, as set down by the OIE, included African horse sickness, glanders and equine infectious anaemia. The information provided by the OIE was used to protect the horses while in the country and to ensure that appropriate measures were put in place to do so.

There were certain challenges that came with horse transportation, said Miss McCormack. Certification and the knowledge of certifying vets could vary dramatically between countries, as could definitions and interpretations. In addition, vaccination protocols differed between countries. There were also challenges with the transport that had to be used. International flight schedules were very tight and one of the major challenges was finding a slot to fly. Once this had been found, everything else had to fit around it.

‘Everything has to tie together, with all the different agencies that are involved in shipping horses,’ she said. ‘But, ultimately, we are all working together to ensure that the welfare and the health of the horse is paramount.’

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