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## Owen Paterson MP visits the USA to discuss Bovine TB Policy

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### Michigan

The visit was organised by Michael VanderKlok who is the Bovine TB Eradication Co-ordinator, State of Michigan Department of Agriculture and Dr James Earl, US Department of Agriculture Assistant Area Veterinarian in Charge.

They had organised a tremendous programme for me. A remarkable number of experts were lined up in a series of meetings to discuss the various aspects of TB. I was profoundly embarrassed at the huge trouble that they had gone to on my behalf.

On arrival I was shown the countryside of North East Lower Michigan from the air, which is a patchwork of woods and lakes interspersed with small beef and dairy farms. Farming is the second largest industry in Michigan after car manufacturing. There are 1,050,000 head of cattle in Michigan with 21,400 located in the five north eastern counties, where TB is concentrated. Any threat at all to the farming industry is taken extremely seriously. There are 600 cattle herds in the five North Eastern Counties and the woods harbour a substantial population of White Tailed Deer. The problem that they have faced in handling TB is the small size of many of the farms and the frequent movements on and off farm as in the UK. Secondly, the White Tailed Deer has an iconic status and hunting is central to Michigan culture so there has been huge resistance to measures to control the disease in wildlife.

### Chronology

- 1975 The last TB infected herd was identified and there was also an isolated TB case in deer.
- 1979 TB free status granted
- 1994 Second TB case in White Tailed Deer
- 1995-1998 Whole herd testing with TB test within five miles of any positive tested deer
- 1998 First TB infected cattle. Governor appoints first TB eradication co-ordinator concentrating on five Counties.
- 1998 -2003 Testing of farmed cervid herds.
- 1999 Mandatory testing and movement restrictions. Testing in a ten mile radius of any reactors in deer or livestock. Introduction of mandatory surveillance of all 18,000 cattle herds.

### Current regime

- High risk area - In the eleven counties every herd (1100 herds including 55,000 cattle) tested every year. All movements need a permit. Any positive test, herd is depopulated and left fallow for six months. Alternatively, tested every 60 days and then every six months, for five consecutive years,

with all positives slaughtered.

- Rest of State - one test over a three year period, until all proved negative. Current programme is random surveillance including 1000 herds per year.

#### Other cattle related measures

1. Electronic identification and readers established in markets. Every animal in the northern endemic area has to have electronic ID.
2. Indemnity upgraded from 75% of fair market value to 100%.
3. Mandatory testing costs paid for by State and Federal Government.
4. Federal Government gives funds to fence in feed storage areas and to exclude deer. 45 farms have been fenced at a cost of \$6,000 - \$7,000 per farm. Approximately \$300,000 spent so far. I visited a farm in Presque Isle County where 300 head of cattle were now entirely housed indoors.
5. Major education programme launched. Producer group meets four times per year. All major opinion makers are consulted before new policies are announced. Information leaflets, bumper stickers and public radio announcements used to get the message across.
6. On some farms Pyrenean Mountain Dogs have been housed out of doors with cattle to keep deer away.
7. Moving cattle from closed farms is a felony with a fine of up to \$50,000.

#### Testing

All meat sold has to be killed in a federally inspected plant by the Food Safety Inspection Service. Any carcass with lesions is held back and histopathology carried out and then confirmed by PCR. If TB is evident the carcass is destroyed. Milk can be sold from closed up farms but not from reactor cattle. Gamma Interferon is used on positive reactors and roughly 7% show false positives as only 5% of skin test show positive this is therefore only throwing 0.3%. PCR is used as a confirmatory test on dead animals to save the time of a culture.

#### Action on Deer

Deer hunting is carried out by 750,000 hunters, approximately 50,000 of whom are located in the five counties. In 2004 over 1.7 million deer licences were issued and 453,000 deer harvested. The brief hunting season is a central part of Michigan culture. Schools and the local General Motors plants close on the first day of the Hunting Season. Ten humans are killed every year during this onslaught ("I thought that he was a deer" being the most common excuse!).

Until 1998 many hunting clubs and land owners had fed deer in the winter encouraging deer to congregate and spread disease. A ban on feeding deer was introduced in 1998 which was challenged in the courts by hunters and required new legislation which was introduced by the Department of Natural Resources. A concerted and determined plan to halve the deer population was introduced by increasing the number of licences for the deer cull, extending the hunting season, lowering licence fees and giving unlimited licences for deer without antlers. Crop damage permits had been issued for decades allowing deer to be culled outside the hunting season; from 2000 these were allowed for year round disease control by landowners. These measures have reduced the deer population from 160,000 to approximately 90,000 in the core TB infected area of approximately 660 square miles

In 2001 the value of White Tailed Deer hunting was approximately \$498million compared to value of

cattle sales of \$290million in 2002. Public opinion would not tolerate eradication of the deer population. There was clearly little evidence of suffering in deer with TB. Hunters saw little human health risk and resented making sacrifices for cattlemen who brought the disease to Michigan in the first place. A major PR campaign was essential.

## Results

Since 1995 Michigan State and the Federal Government have each spent around \$50 million. Since 1995 138,000 deer have been tested and from 1995-2003 479 were positive and in 2004 only 28 tested positive out of 15,000 tests. Between 2000 and 2005 over 1 million bovine animals were tested. In 1998-2003 there were 26 positive beef herds and 2000-2003, 7 positive dairy herds. In 2004 there were no positive tests in cattle herds in the whole State and when I was there they were a fortnight away from going clear on cattle herds in 2005. They have since gone clear on cattle herds in fiscal year 2005. Since my visit there has been one positive in the new financial year which began on 1st October.



Diagnostic Center for Population and Animal Health  
Michigan State University, Lansing

This is an astonishing \$58million state of the art veterinary research centre employing 150 people and central to their success in combating Bovine TB. I met Professor John Kaneene and Dr Carole Bolin and showed them the correspondence I have had with Professor Wellington of Warwick University and Ben Bradshaw MP, attached at the end of this report. They have not so far used PCR technology in the manner proposed by Professor Wellington. Dr Fine who was away in Mongolia is conducting a research programme into the use of PCR on environmental analysis and the length of time that TB survives in soil and hay once cattle are removed. She has deliberately contaminated barns with TB organisms, monitoring the weather and humidity over a year. They have established that the organism can survive 60 days. They have two years worth of data on soil, hay, corn and water from 14 farms and will soon start a programme of PCR tests on cultured samples.

Professor Kaneene stressed that PCR detects genetic material; it cannot differentiate between live and dead organisms. However, PCR is being used on a regular basis. Currently the traditional TB skin test provokes reactors which get a second skin test or gamma interferon. If still positive, samples of tissue are cultured in a laboratory. If lesions are found further slices are taken and PCR used to speed up decision making as a culture takes up to 10 weeks. PCR is also used to check that the TB strain is not Avian or Kansasii. Also cultures can be contaminated by other bacteria, by a virus, or by human error. PCR eliminates such mistakes and is treated as valid for action by the USDA.

Although no one is yet using PCR on live animals, new PCR kits, developed for the army in Iraq, are as small as a briefcase and there is absolutely no practical reason why tests could not be done on the environment from the back of a truck in less than two hours. A well equipped laboratory could do over 1000 a day. They believe that PCR would work on material around setts. It was felt that Ben Bradshaw's letter to me was quibbling. Even if a PCR test did detect *Mycobacterium Kansasii*, although technically correct, the discovery of any TB complex should be enough to prompt action, as

any TB in a badger sett needs removing. It is still debatable if MPB70 is the best target but no single gene complex is perfect. PCR is still extraordinarily fast and accurate. Hospitals do not fuss what type of TB; they only want to know that there is TB around. Kansasii tends to be a secondary infection hitting weakened animals and it is rare. As a screening, MPB70 could be fine and can be followed up by a culture and more rigorous testing.

#### USDA APHIS Maryland

I met Dr Michael Dutcher, Senior Veterinarian in charge of Bovine TB eradication, who has spent some years in Michigan as a working vet and now runs the Federal programme. Like Professor Kaneene, he agreed that presence of any micobacteria on pasture would suggest repeated exposure as micobacteria are killed by ultraviolet light. TB has very nearly been eradicated in the US but survives in cattle in Mexico and deer in Michigan. Despite this, Michigan is just about to go two years without a cattle herd breakdown. New Mexico has had three herds in the last two years and Texas has gone 18 months without an outbreak. Key to the US programme is limiting movement across regional lines depending on TB status. TB free States have virtually free movement, restricted States have pre-movement testing on herds or individuals. There are five status levels from TB free through to no movement at all. Some States are even tougher internally, so although the Federal Government designates Michigan at level four e.g. no reaction within 60 days of movement, a neighbouring state such as Indiana may demand tougher standards. Pre-movement testing is a key tool and producers pay but producers would not have cooperated if Federal and State Governments had not been tough on wildlife; he admitted that the meetings with wildlife representatives had been extremely heated. Pre-movement testing is not just a tool to prevent disease spreading; it is an incentive which actually pushes producers and States to achieve higher TB status. It must be used alongside concerted efforts to eliminate disease in wildlife.

The TB test is only as good as the tester but gamma interferon removes this element of subjectivity and combined gives a very thorough screen, confirmed by the Irish experience. PCR is now widely used alongside culture on dead tissue, as it only takes seven days maximum and a culture can take two months. A second key element in the Federal strategy is surveillance. Incentives and cash awards are given to encourage slaughterhouses to look aggressively for TB on the slaughter line. A State's TB status is also decided by the State's level of rigour in slaughterhouse surveillance. Awards are given to individual inspectors for identifying TB lesions during visual inspections: \$100 on sight, \$300 on confirmation and \$1000 to a team working a line if it leads to a positive herd. At plant level the award recognises plants with the best record of submissions each year. They find more positive herds through slaughterhouses than herd testing except in Michigan.

The Michigan deer is the last real reservoir but the public will not accept any further reductions in the deer population. They are now actively looking for vaccinations for wildlife. New Zealand is far more advanced, trialling BCG vaccines as well as investigating the potential use of sterilisers on possums. The old chestnut of vaccinating cattle leading to the difficulty of identifying vaccinates and non vaccinates has been resolved either by gamma interferon which can be targeted at antigens not in the vaccine, or by PCR as MPB70 is not in the vaccine.

Like all the vets, he was utterly astounded by the grotesque dimensions of the TB epidemic in the UK.

USDA considers TB to be a serious zoonosis which is dangerous to humans. It is a grave threat to the cattle industry; cattle will be debilitated, will grow more slowly and exports will be stopped. They are extremely concerned by imports of infected cattle from Mexico and no Mexican dairy cattle or breeding cattle are allowed in at all. There is even concern that some may be smuggled in as part of the drugs trade. USDA is even proposing new regulations for roping steers for rodeos so that they would be held at the border, TB tested and if positive, gamma interferoned and slaughtered.

#### Conclusion

Considering the infinitesimal number of cases in the US compared to the UK, it was impossible not to be overwhelmingly impressed by the absolute determination of Federal and State authorities to eliminate Bovine TB. It was also clear that they will look at every possible technique, whether physical, medical or legal at Federal and State level to bear down on the disease. Given the extraordinary concentration of disease shed by super-excreting badgers in the UK, there was clearly no doubt that we should be pressing the Government to trial PCR technology as we have already proposed.

The USA shows clearly that Bovine TB can be eradicated in cattle and wildlife by a combination of the following:

- fast, accurate and modern diagnosis.
- rigidly enforced but workable pre-movement testing and movement restrictions.
- vigorous, if unpopular, campaign to bear down on disease in wildlife.

It must be emphasised that only a combination of all of these will work. Picking only one or two of them will not eliminate the disease. It can be done.

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