

Foot and Mouth: more questions than answers



Professor Duncan Stewart-Tull asks some awkward questions about the handling of the recent **Foot and Mouth epidemic**




Jean-Yves Maillard's article '*Foot in mouth*' in the September 2001 issue of the *News* raises more questions about the handling of the outbreak but also indicates the problem of restricting one's search of the scientific literature to computer databases; when were the studies on the effectiveness of the disinfectant containers carried out? In general the databases start from the early 1980s so much of the earlier research is now ignored. The late Prof Iwo Lominski once rejected a paper on the grounds that there was insufficient reference to the literature and in his response to the Editor he stated that '*the responsibility of every good scientist is to search the literature with the thoroughness of a Benedictine monk*'. I cannot vouch for the monks but the sentiment is understandable!

The TV images of all and sundry dipping their boots in containers of disinfectant and then stepping back onto the wrong side of the barrier line indicated that the process was at best cosmetic. In addition, the build up of mud and excrement in the dip would probably lead to a rapid inactivation of the chemical. Some forty years ago there was an isolated FMDV case in Surrey and the laboratory where I worked had disinfectant soaked sacking laid on the road so that we had to walk some ten feet over these before entering the driveway. It was interesting that one vet recently stated on TV that such treatment rotted his shoes, we were obviously not alone when this occurred in the 50s. In answer to the question about the disposal of decomposing animals leaking body fluids it was stated that the virus cannot be transmitted once the cow is dead. If this is true then what is the evidence which led to the subsequent imposed quarantine and costly disinfection of farm premises. One view expressed was that disinfection was a '*virtual reality*'.

The Royal Society of Edinburgh hosted a meeting on *Foot and Mouth* at the British Association meeting in Glasgow towards the end of last year. It was apparent that there is a need for much debate on the future policy for the control of this and other animal diseases as many questions remained unanswered. As Prof. Fred Brown stated '*no real epidemiology of the disease has been done and so far it is just stamp collecting*' and in regard to vaccination, which he favoured, '*would vaccination have helped to contain the disease and if not why do we have a strategic reserve of vaccine?*' Seven countries have a strategic reserve but do not use the vaccine regularly. In Western Europe there was a policy of vaccination from 1952-1990 this

required 2 billion doses of vaccine per annum, by 1991 there were no recorded cases and vaccination was stopped. However, it took 10-20 years to reduce the disease in Holland, France and Germany. Similarly, in Argentina animals were routinely vaccinated but within a year of ending vaccination outbreaks occurred. The last outbreak in the USA occurred in 1929 and in view of their concern USDA offered their assistance that was not accepted. Prof Dave Rowlands pointed out that there are seven serovars of FMDV and with antigenic variation it makes it difficult to mount a large-scale vaccination policy. FMDV is so highly contagious that rapid identification and culling of infected animals is essential to control an epizootic. Fortunately, there is a rapid PCR assay which detects all seven types of FMDV but does not amplify the vesicular stomatitis, swine vesicular disease nor the vesicular exanthema of swine viruses. This assay can detect viral RNA 24-96hr before the appearance of clinical symptoms. One query was did the virus change during the epidemic? Vaccination of animals during the outbreak would have decreased viral transmission but only after a delay and not from infected animals. Vaccination compared to culling would not have brought the epizootic under control as quickly and was not a good option for eradication. There was a view that vaccination could have been used in flocks within the surrounding zone of an outbreak as a policy of 'vaccination to kill' since stimulation of the immunity took 3-4 days. Another point of view was that vaccination could be used to protect rare or valuable livestock; it was obvious in the aftermath that all slaughtered animals were considered priceless by individual farmers. '*Unless the world starts to think about global immunization there will be a next time!*' This debate on the prophylactic use of the vaccine will run for some time and will also include the economic argument - who will pay for the vaccine and its administration to animals?

In Scotland, in Dumfries and Galloway, extensive culling led to successful control in a reasonably short period. Why was this so? It was due in part to the aftermath of the Lockerbie disaster because at that time an Emergency Planning Team was set up in Dumfries and when the FMD outbreak started this team was immediately alerted. Extensive culling of flocks occurred within 24hr of an outbreak, and on contiguous premises in an area of 3km within 48hr and this achieved successful control. The outbreak was first recognized at a slaughterhouse in Brentwood, Essex on 20 February 2001 and by 23 

February there were really 76 outbreaks and at this stage the epizootic was out of control. Government advisers seemed to indicate in March that it was under control but there were several factors which acted against them a) the infected pigs were to be slaughtered more than 200 miles from the farm but there was no information as to how the virus had reached the UK. *'How did the pigs become infected?'* The evidence seems to be from pigswill. *'How did sheep become infected?'* *'Were sheep the first species to become infected?'* *'Are sheep infectious for cattle and pigs?'* *'Are convalescent sheep able to transmit the disease?'* Some 159 sheep in a flock were tested serologically and only one was positive, 14 days later only one remained positive. It was stated that convalescent animals could still produce virus after several years. *'How important are carrier animals?'* *'How much do we know about passage from deer to sheep and vice versa?'* *'Can mice, rats, carrion birds and foxes, which might have fed from dead carcasses left in the fields for days, transmit the disease?'*

Farmers' topping-up quotas and the lack of knowledge about FMDV symptoms may have

contributed to the problem due to the possibility of infected animals being moved. The control measures were not helped by lax biosecurity, relaxation of movement restriction, as witnessed by the outbreaks down the M5 and the subsequent hardships in Devon. In addition, culling and the definition of 'contiguous farm' were challenged and more animals were lost because of the delays in the legal process.

What do we do next time?

There seemed to be agreement that there was a need to act quickly, i) impose a stand-still policy in the movement of livestock with incentives and deterrents to dissuade offenders, ii) impose transmission blocks, iii) to have preclinical diagnostics readily available, and iv) to have a realistic plan to control spread of the disease. The pros and cons of culling and prophylactic vaccination may extend the debate beyond our own shores as they involve are global issues. In the UK, it is hoped that the government will provide the scientific community with the resources to enable them to answer the many questions

raised by members of the public and the farming community who attended this meeting.

Scientists and the media have a long way to go as you will see from the views of a member of public chatting up two young female students on a South West train in July 2001:

'It is thirty years since the last outbreak of Foot and Mouth disease, you'd think they would have an environmentally friendly vaccine by now.'

'The 'flu outbreak last winter was an MOD trial of bioterrorism by air dispersal'

'Did you know there's bleach in your drinking water - must harm your health'

'I loved Discovery but I didn't want to pay for it'

I informed him that he was talking a load of rubbish!

Duncan Stewart-Full ■

Headaches cured with friendly bacteria?

An article published in the June edition of *Laboratory News* suggests migraines may become less of a headache thanks to the latest research by Italian scientists. A study presented at an infectious diseases conference in Milan found that some headaches appeared to be caused by the common stomach bug *Helicobacter pylori*.



Treatment with antibiotics and 'friendly' bacteria cleared up both the bacteria and migraines in some sufferers said the researchers. *Helicobacter pylori* live in the lining of the stomach and gut of up to 40 per cent of adults in the UK. Infection is known to cause stomach ulcers and has been

linked to many other conditions including heart disease (see article by Bob Owen in the June issue of the *News*). To study the bacterium's effect on migraines the researchers divided 130 migraine sufferers infected with *H.pylori* into two groups: over the course of three weeks they gave one group a course of antibiotics and the other group the same antibiotics plus *Lactobacillus*. The group continued to take *Lactobacillus* supplements for several months. After one year the symptoms experienced by the two groups were significantly different; 50% of the patients who had received the antibiotics alone were still having migraines, however, only 20% in the *Lactobacillus* group reported migraines. This apparently correlated with the amount of *H. pylori* found in the patients' guts one year on: there was a 40% drop in the number of bacteria in the antibiotic only group and a 70% drop in the *Lactobacillus* group.

The study's leader, Dr. Maria Gismondo of the University of Milan told the conference: "Our understanding is that *Lactobacillus* could be used not to cure or eradicate *H.pylori* but to prevent relapse of *H.pylori* infection and headache." However, reaction to the study by other scientists was cautious.

Delegates pointed out that the study had not included a control group, therefore no firm conclusions could be drawn.

Back to the Aspirin then!