

To whom it may concern,

the following presentations and observations on the Foot And Mouth epidemic which affected the Scottish border areas and Dumfries and Galloway are offered by:-

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**Pre-FMDV Criticism & Recommendations:**

**Depletion of State Veterinary Service staffing levels.**

**Refusal to accept help from Retired members.**

**Laxity Of British National Biosecurity.**

**Depletion of State Veterinary Service staffing levels.**

The depletion of the State Veterinary Service in the decade before the outbreak had a direct effect on attempts to fight the epidemic which overwhelmed the remaining disease control resources. Some of the reduced complement of staff were on detached duty, e.g. S.W. England for tuberculosis work, at the time of the outbreak. The service had to employ a huge number of veterinary surgeons from whatever source and specific knowledge to meet the challenge. Regardless, there were severe manpower difficulties initially at a crucial time for disease control. Exhausting hours covering the very long distances and dealing with a huge range of work left many physically exhausted. As the dimensions of the problem emerged it was obvious that the veterinary service would have difficulty squaring the ever expanding circle with diminished staffing levels.

In 1995, Mr. Tim Robinson, Veterinary Officer and Vice-Chairman of the MAFF branch of the Institute of Professional Civil Servants (IPCS) commented on Mr. Waldegrave, the minister overseeing the Lebrecht proposals for rationalisation of the veterinary service:

“ It is almost inevitable that cracks will appear. Staff should not be expected to paper over them when the fault more properly lies with senior management and ministers who made the decisions. Unwarranted criticism of our members for shortcomings cause by implementations of these decisions will not be tolerated.”

Mr. Paul Devitte, President of the British Veterinary Association strongly opposed plans to fragment the SVS. At that time the SVS was so short of staff the government was asking ministry staff, e.g. Technical Assistants, to undertake graduate training. At the point of retiral of one of the authors, the SVS already had a stressed commitment to meet its normal national programme with a complement of 394 veterinary graduates. At the outbreak of the epidemic it had shrunk to 286 to combat this task. This staff shortage was due entirely to the politically induced decline of the service.

#### **Refusal to accept help from Retired members.**

At the same time as problems were building from a lack of staff, there were a number of significantly experienced retired members of the State Veterinary Service who were denied the opportunity to assist their colleagues. Specifically, the arbitrary disqualification of persons over 70 years of age, without any consideration of previous experience of the sixties outbreak, or history of trained and applied working knowledge in organisation of disease control centers was deplorable. For example, there was a great demand for telephone information from farmers throughout the entire outbreak. Rather than utilise the experience of more retired members to operate a helpline at the Ayr animal health office they were considered to be too old to approach - incredible! More importantly the guidance for younger members of the profession who were not experienced with FMDV would have been invaluable.

#### **Laxity Of British National Biosecurity.**

There will be much speculation as to how this disease gained access to the UK, a country physically separated from mainland Europe. During a period when foot and mouth was spreading over a significant proportion of the globe why was there no increase in vigilance or public education at the national entry points? Anyone travelling to Australasia will not fail to see the multitude of warnings concerning imports of biological produce. Obviously this reflects the political commitment to farming in Australasia.

#### **FMDV Outbreak Criticism & Recommendations:**

**Delay in introduction of a national animal movement ban.**

**Direct effects of low numbers of staff early in the outbreak.**

**Failure to Trace Sheep Movements.**

**Disposal difficulties delaying Slaughter.**

**Paucity of scientific, veterinary epidemiological input early on.**

**Communication failures between Ayr and Dumfries.**

**Incompatible computer systems.**

**Delay in introduction of Geographical Information Systems.**

**Inefficient Data Handling.**

**Failure of Existing Software - including DCS.**

### **Delay in introduction of a national animal movement ban.**

The fact that the disease was known about on the 19<sup>th</sup> of February, with confirmation on the 20<sup>th</sup>, allowing national movements to go ahead until the 23<sup>rd</sup> is a terrible demonstration of senior MAFF leadership impotency. In future the precautionary principle should be applied to all instances of suspected FMDV. No effort should be spared to develop simple test kits for the diagnosis of notifiable diseases. The technology is already there, it's just a case of applying it to produce a product that already has a substantial global market waiting for it. The much lauded computer modelers should calculate the cost-benefit ratio of same day diagnosis and national movement restrictions.

### **Direct effects of low numbers of staff early in the outbreak.**

The large scale of the outbreak and the rapidity of spread way surpassed any data handling preparations made. While attempting to put together a relevant disease eradication process, the problem got exponentially worse. Paper folders on affected farms with printed reports, photocopies, faxes, handwritten notes, post-it notes, maps and all manner of disparate sources of information were accumulating rapidly in the epidemiology portacabin in Ayr, on the 17<sup>th</sup> of April 2001. There was usually a single folder per Central Parish Holding Number, (CPH), supposedly containing all the information concerning that farm, be it an Infected Premise (IP), Direct Contact (DC) or unconfirmed example of the former. Each folder was the responsibility of one Animal Health Officer or Temporary Veterinary Inspector. Some staff were based in epidemiology all the time with other vets helping out when they became dirty. As greater numbers of farms went down the folders proliferated and their content, structure and overall intercoordination broke apart. This was primarily due to the imbalance between the increasingly large number of folders, which required attention, and the number of people available to deal with each situation contained within.

### **Failure to Trace Sheep Movements.**

The disease spread into Scotland largely through sheep movements which required the service to identify and trace them as required by the Movement Records Order for cattle, sheep, goats and pigs. There are adequate requirements within the Animal Health Act for livestock owners to record these movements, but there was insufficient staff to check and verify. Failure to trace all contacts with infected animals i.e. animal, personnel, and inanimate must have contributed significantly to subsequent scale of the outbreak. All of the sheep that passed through or around markets with infected sheep should have been slaughtered as soon as the culprit markets were identified. Waiting for blood tests or worrying about disposal of dead animals should have come secondary. Once the markets had provided the trading information, a two day amnesty for information from farmers regarding "extra-ring" sales, followed by severe penalties for anyone failing to declare market contact, should have been instituted. Farmers only have themselves to blame for the exchange of non-traceable sheep at Longtown and they will have to put their house in order.

### **Disposal difficulties delaying Slaughter.**

One is bound to ask seriously - why was cremation chosen for carcass disposal? In Cheshire in the sixties outbreak the many carcasses were buried. In S.W. Scotland on a

still day in Dumfriesshire one could not avoid seeing the multiple plumes of smoke from the funeral pyres. There were reports from farmers of airborne animal hair being widely deposited from burning pyres. Has anyone actually confirmed the epidemiological implications of this form of spread? Was land drainage information considered before decisions are made? If the conditions were right then why were animals not buried? There was much debris left on sites, which required additional labour and staff to ensure proper removal.

Concerns about the number of dead carcasses that would result from a widespread proactive firebreak cull reduced the benefits of this strategy. There was a fear that wildlife would scavenge on fallen ruminants. As a result the firebreak was constantly being readjusted as the disease spread ahead of the previous land area that was targeted for slaughter. One of the authors was responsible for compiling the cull figures for the civilian and laterally the combined civilian and army cull figures. The impact that the army had was immediate and massive. Their command structure and logistic capabilities enabled the rapid culling and disposal of huge numbers of animals within a week of their first animal culled. The failure of the government to bring in the army right away was an either an indication of the lack of basic knowledge of senior MAFF management or a frivolous disregard for factual information by Nick Brown.

#### **Paucity of scientific, veterinary epidemiological input early on.**

Resources were scarce, culling and disposal were deemed the highest priority so the depth of the epidemiological investigation of each folder suffered. Direct contacts were picked up reasonably quickly from information given by farmers but personnel movements and the movement of feed lorries, machinery and milk tankers lagged behind due to lack of resources. The majority of the tracing was forward tracing to determine the next possible farm to require a visit to check for disease. Initially the epidemiological field reports were detailed but as the rate of the outbreak increased they deteriorated as there was not enough time to devote to an increasing number of Infected Premises (IP). The back tracing of the whole epidemiological picture in Scotland got far too little attention with the result that all subsequent decisions on eradication had to have been made based on opinion and not fact. Apart from incomplete animal movement data it became obvious by the 21<sup>st</sup> of March that no one in the epidemiology office in Ayr actually knew for sure which routes of transmission were most prevalent in what species and where.

Mr. Michael Thrushfield from the Royal Dick Vet should have been asked to join the Epidemiology department right from the start to establish what the disease was doing. Small minded parochialism on behalf of the individual in charge of the epidemiology office prevented an earlier arrival. His belated arrival at the Epidemiology office on the 24<sup>th</sup> of March was the first real attempt to factually study the disease itself, and predict how to tackle it, rather than chase around the countryside shooting, burning or burying the results of it. The individuals in charge were far too busy with disease control organisational issues. Regional scientific advice should have been taken to determine priorities rather than a one size fits all approach. The constituent MAFF staff in charge were taking opinionated decisions without actually studying the facts of the disease

themselves. The lack of epidemiological insight into the outbreak from the start most definitely increased the overall numbers of animals which became infected.

### **Communication failures between Ayr and Dumfries.**

Vets from the field were based in Dumfries while the control centre was based in Ayr. This was a significant problem for epidemiology and a direct effect of the rationalisation in the 90's. The lines of communication were poor. The Dumfries office had no access to the folders so they did not know where the priorities were. The Ayr office was sending out work to a constantly varying number of vets in Dumfries as the turnover from clean to dirty was compounded by vets being drawn away to do the sheep cull. The vets were frustrated by patrol visits to follow up tracings as after a while no one knew what farms had already been killed-out or when the last vet was on what farm. This resulted in unnecessary visits to farms with no animals, or farms that had been recently visited. Inefficient use of vets led to Dumfries deciding on allocation of vets even though there was already an Allocations Department in the Ayr office. Overall the usage of email was low. Most of the communication was by semi-computer literate staff via faxes and phone calls. Without the vets having mobile phones things would have been a lot worse. As faxes arrived to Ayr they would be frequently rejected as the two fax machines were already busy. Later a fax machine did arrive at Epidemiology but that example was typical of the lack of physical resources still present 6 weeks into the outbreak.

A master spreadsheet was set up by the 2<sup>nd</sup> of April merging and manipulating spreadsheets from the allocations department, civilian cull teams army cull teams and epidemiological information on the latest infected premises and direct contacts. Maintaining the accuracy of the spreadsheet was a constant problem as each department had their *own* spreadsheets which they updated *themselves*. Consistency was also a major problem because the spreadsheet had to be emailed to the Army office in Dumfries, the Scottish Executive, Page St in London and the civilian office in Dumfries. Each user would have more up to date information for their part but less up to date for others causing a daylong incongruity in data.

### **Incompatible computer systems.**

Incompatible computer systems were a major block to communication between Ayr and Dumfries. The majority of the computers at Ayr were connected to the MAFF computer system but this system did not allow the transfer of emails with a file attachment. The Maff system in Dumfries had no common drive with the MAFF system in Ayr so that route was also out. The civilian office in Dumfries only had **one** computer available to it, at the time, that could be used to receive the large spreadsheet update every day. All the other computers were connected to the old MAFF computer system awaiting an update that was due, late, later in 2001. This one computer was connected to the Scottish Executive computer system ('Scotts'). Printouts of a 5000 line spreadsheet were far too long to manually search. There were a few 'Scotts' computers at the Ayr office that were of use for communicating with other sites but the 'Scotts' computers were not connected to VetNet.

### **Delay in introduction of Geographical Information Systems.**

VetNet is a dated central database containing information about farms mainly used for tuberculosis eradication. In the context of the outbreak VetNet was used to provide CPH

No's, details of holding types and map references for plotting the centre of the zones. By the 22<sup>nd</sup> of March when the more up to date Scottish Executive Geographic Information Service data was used to plot the holdings there were discrepancies between the map references which amplified the arbitrary zonation given in the first place. The Scottish Executive was slow at releasing the data that allowed the maps of farms to be used to guide the decisions on which farms were deemed contiguous. What does contiguous mean anyway for stock housed indoors away from the outlying fields when a farm is not circular? In future the TVI should have a global positioning sensor to document exactly where the stock are. A farmer's resistance to arbitrary 'contiguous farm' decisions made for want of time to investigate each case is certainly justified, especially when he might be two kilometers from the locus of infection and the wind has been blowing in the opposite direction for the last two weeks.

One would assume that for a virus that can spread in plumes there would be detailed meteorological office data for each outbreak. There were few pig units infected and the virus did not seem to be spreading over large distances by aerosol as it turned out. However the lack of preparedness in this area was shocking. Intermittent faxes with scant contextual data for the plumes when they arrived, usually late, would have sunk the entire country, as the spatial distribution was already great due to the widespread transportation of sheep. It must not be forgotten that the next outbreak could be as different as 1967 vs 2001. All preparations should be made for a virus that shows the full potential for respiratory spread.

### **Inefficient Data Handling.**

To say that the handling of data by MAFF during the outbreak was inefficient is a complement. If one cares to read the 'descriptive epidemiology of the 2001 foot-and-mouth disease epidemic in Great Britain : the first five months' J.C. Gibbens et al, Vet. Rec 149 720-743, a little critical examination of the materials and methods will put you in the picture.

'A detailed history is collected' when the vet interviews the farmer. However when there aren't enough experienced field epidemiologists to 'ensure all relevant details are collected' an inexperienced vet does the job and we hope that all the pertinent questions are asked. 'All movements are identified' ideally but the farmer is a Mr Kirpatrick dealing in sheep left, right and centre his movement records consist of scraps of paper, fuel receipts, memory lapses, and limited answers. A Mr. Kirpatrick will have to be interviewed several times before the full size and scope of the animal dealings and contacts become clear. This is often days down the line and the database in Page St. is already behind the virus by a week.

'Traced holdings' might be spread right across the entire country and there aren't enough MAFF vets to visit each one simultaneously as there is an exponential rise in infected premises and the organisational framework is not designed to cope with a national outbreak. This is the key to the failure by the existing control measures- right at the time when the most work needs to be done epidemiologically, there aren't enough vets ready so each day lost in mobilising the full range of control measures is irreversible. A national FMDV reserve with yearly drills should be set up. MAFF cannot justify employing all the veterinary officers it would need for a national outbreak. The regular

large animal veterinary surgeons should be available at a day's notice fully trained and ready to go. An annual retainer would provide the incentive.

'When a market is involved' there will be extra-ring sales with no documentation and no movement records. These details were significant for Longtown and will not appear on the 'database' in Page St. until farms go down at a later date and the dealing comes to light. Market wardens should be employed to police the Movement Records Order. If resources are tight then the veterinary profession must not block the expansion of the role of non-veterinary staff, which would allow a greater number of individuals to police the Order.

'The standard form completed by the VO on each premises' once disease is confirmed, remains that way. These forms and the field epidemiology report are inserted into the folders in the epidemiology office in Ayr and each one is worked through by a VO in the office. This is a classic duplication of effort. If each form was also being reviewed by the Page St. headquarters why was the same thing being done at the divisional offices when there were a limited number of staff? The 'information on the database' was not made available to Ayr Epidemiology office. The Gibbens et. al. paper asserts that they were the first to receive all the information, so why was this not disseminated to the regional offices? The simple fact of the matter is that no matter how much information they had on their database; Microsoft Access was not installed on any of the MAFF computers in Ayr or the civilian office in Dumfries. The MAFF computer system is not compatible with Microsoft Access therefore headquarters must have been using a more up to date computer system. When you use two computer systems that cannot communicate with each other what kind state of preparedness is that?

At the Ayr Epidemiology office there were vets searching through hundreds of rows of printed departmental spreadsheets to confirm the status of a farm before sending the job out to be allocated. All the time there was the promise that there was a database being constructed by Computing Science individuals from the Scottish Executive in Edinburgh. Senior Scottish MAFF management authorised this venture while on the ground there was no way it could be used by any more than 4 computers in Ayr and 1 computer in the civilian office in Dumfries. They were developing the database on a 'Scotts' system while 95% of the staff fighting the disease had access to a MAFF computer system that could not use the 'Scotts' Database. Computer-illiteracy is endemic within MAFF itself. Rank and file permanent MAFF staff has had little or no formal training on the use of basic computer packages like Microsoft Excel or Microsoft Access. This situation is the direct result of Senior MAFF management computer-illiteracy or failure to invest in their own staff.

The problem with writing everything down on paper is that the folders are only accessible to individuals in the epidemiology office. Vets in the field do not know the context of their visits. Farmers do not know the details of their own cases and the folders have to be searched manually to answer any query. Duplication of information is widespread because of the folders loose structure when the pressure of new cases builds and each new piece of information is on a separate sheet because different people work on a single folder at different times. This scenario was the actual 'collation of data' at the divisional epidemiology offices. The divisional epidemiology offices had far more information on each IP than Page St. as demonstrated by the source column of the 'Data

Dictionary' referred to in the Gibbens et. al. paper. Why were national decisions being made with limited information for a regionally heterogeneous outbreak?

### **Failure of Existing Software - including DCS**

If the 'Disease Control System' (DCS) was supposed to be used during the Foot And Mouth outbreak why was it not used in the Ayr epidemiology office? VetNet was used to confirm the CPH No's, map references and holding species information. This information was combined with whatever information was relevant to each department on separate spreadsheets. Only by the 2<sup>nd</sup> of April, forty-three days after the first outbreak, was skeletal information from Notifications, Epidemiology, Civilian Cull, Army Cull, and Allocation Departments combined together on an Excel spreadsheet. The combined spreadsheet had many faults also. The copies of faxes from Notifications did not always arrive on the day they should. Epidemiological information merely added the correct map references from GIS, the type of species held on the farm and the name of the vet who diagnosed the case. Cull information was always a day late but the prize for inaccuracy goes to the Allocations department. It emerged at that time that the person allocating the jobs for vets in Dumfries was binning all the uncompleted jobs each day assuming that the next days job sent down from the Allocations department in Ayr where a reflection of the current priority.

Mr Derek Mackintosh, the Head of Veterinary Services (HVS) was part of the attempt to cover up the inadequacy of DCS. As the order went out to go back over every folder from the first 100 nationally infected cases and enter the details onto the DCS. This computerisation of information was 6 weeks too late and resulted in resources being diverted from the outbreaks at the time. The purpose of this exercise was to make sure all the farms that may have been infected before the national movement ban had their folders audited. DCS was of no other practical use to the staff at the Epidemiology office in Ayr. How much of the Gibbens et. al. paper is derived from retrospective analysis of the disjointed folders. Decisions made during the outbreak had no where near the factual content derived to write the paper. Many broad assumptions would have had to be made for any modeling.

### **Ayr Management Power Struggle.**

The failure of communication between Ayr and Dumfries was compounded by the fact that Mr. Paddy Grant DVM failed to organise the necessary equipment & staff for Dumfries as he was up in Ayr vying for responsibility with the Temporary DVM Mr. Graeme Cochrane who was in charge of the Ayr Animal Health Office. Mr Cochrane was under a lot of pressure to get things up and running. The least thing he could have expected was a partnership approach Ensuring that both individuals, of equal seniority, were coordinating activities, with one in Ayr and the other in Dumfries would have helped the communication difficulties enormously. Mr Charles Milne concentrated his efforts on integrating the Army into the disease control operation with remarkable increases in cull figures as already referred to. Mr. Milne is now the DVM for Ayr, a silver lining in a clouded management structure.

## **Post-FMDV Recommendations**

**Epidemic Disease computer system.**

**Chair of Epidemic Disease Control at a Scottish University.**

**Amnesia Creep.**

**Epidemic Disease computer system.**

The reasoning for the condemnation of the MAFF computer systems is already established. The focus now must be to overhaul the system and keep it up to date with technological and disease control measurements. It was embarrassing to be informed by the New Zealanders that they had already developed a modern disease control system, EpiMAN-FMD, which was specifically designed to deal with the wide variety of issues for which the MAFF system was fatally deficient.

Incorporation of Geographical Information System software with a single multi-user networked Database would have many benefits. Each desktop should have a navigable and searchable map of Scotland with defined colours for each classification of premises. A farm could be located within the spatial framework upon which so much of the epidemiological picture depends. Once a farm is selected **all** the information concerning that farm from all sources should be up to date and free of duplication because it is a single source. Within each farm each category: farm CPH, field CPH No's, Farmers Name, Address, Contact Numbers, Species, Quantity, Map reference, Disease status, Infection timelines, Animal movements on and off, Personnel Movements on and off, Vehicle movements on and off, Milk tanker Round information, Meteorological Data, Veterinary visits and results, etc. etc. should all be in the one place at the one time with no information waiting on scraps of paper for more than 6 hours. Hire a troop of typists if you like. Better still give the field vets palmtops with capability to enter data directly into the database from the field.

Access control and security is a must with each individual specified with defined roles to avoid corruption of data. All correspondence by email should be added to each file. All of the roles are predefined and this avoids the wasted time spent early on trying to organise everyone. The software itself could be used to prompt the person using it for all the necessary details. It could also train each office vet to show them their own part in the overall disease eradication measures.

Farmers already have a unique username and each one should have a password, which allows them to examine their own records on the web. This is a perfect way to disseminate sensitive information as every farmer will have access to a basic computer in the near future. The graphical display of information would allow them to appreciate the progression of the disease in their area and their comments on their own file could be used to make sure that it is as accurate as possible. A team approach is much more favourable to a didactic approach when it's your animals that are for the slaughter and there is no one in the regional office that really knows what is going on.

The geographical information system is most powerful in interpreting the combined results of all the data being input by everyone working in unison. Its all retrospectively clear when the full details are merged at a later date to produce a full account of the spread but that information is far more useful proactively throughout the disease. One only has to see a skilled Geographical Information System Operator manipulate the data to realise just how powerful these systems are. These machines can print out maps that are merged with each other to form 16m<sup>2</sup> views of the current situation in any area. The ability of the visual cortex to interpret the significance and progression of farm specific colour coded maps, which represent thousands of values in a database simultaneously, was grossly underused during this outbreak. The pattern of spread would be immediately clear if the single database was interrogated in this way.

Milk tanker rounds could be superimposed upon the existing maps to interpret their significance. Land cover, location of pyre material, and drainage potential could be mapped against the latest proposal for a cull disposal. Spatial distribution of veterinary manpower and determination of priorities for visits with low numbers of staff. These are a few of the direct benefits of a visual approach to a spatially dependent problem. Demonstration of the progress of serological monitoring was one belated use of the capabilities of Geographical information Systems.

#### **Chair of Epidemic Disease Control at a Scottish University.**

The reluctance of farmers and vets to accept the advice of a heterogeneous mix of scientists from London was inevitable. The decline of veterinary educational significance in the minds of the politicians resulted in a dearth of scientific veterinary epidemiological advice at the divisional level. Scotland should decide on its own policies itself as the farming conditions are different and the control measures require more regional significance. Anyone giving out scientific advice on the future of a person's farm should have a strong background in agriculture and a good scientific knowledge of disease. A postgraduate program headed by a Chair of Epidemic Disease Control should be maintained in one of the Scottish Veterinary Schools such that the Scottish Executive has up to date regionally relevant advice to rely on whenever this type of situation happens again. This educational resource could also be used by DEFRA in Scotland and the Scottish Reserve Veterinary Practitioners for continual educational programs on the science behind the organisational and epidemiological control measures. Specifically, the remit should involve the collaboration with those countries, which have a greater contribution to gross domestic product from agriculture, and are more likely to devote a greater amount of resources to control program updates.

The Scottish Executive should fund the development of marker vaccines as part of a drive to put epidemic disease control in Scotland onto a proactive scientific footing rather than reactive opinionated prostration. There is a serious debate on the subject of vaccination as a protective mechanism against disease. Scotland uniquely qualified to supply the highest quality of breeding stock to world agriculture. It must be unambiguously defined if vaccination is implemented that we can identify vaccinal states against natural status with maximal confidence. The fact that the previous government sidelined the research into the development of marker vaccine without thought for the future is a black mark on the intelligence of the governing elite. This epidemic had

directly cost the treasury 2.7 billion pounds. 2.7 billion pounds over 34 years for research into notifiable disease would have changed the face of world agriculture.

**Amnesia Creep.**

We would like to commend all the junior Scottish staff who worked so hard in difficult circumstances to deal with this truly devastating disease. We also would like to commend the farmers for sticking with the control program even when it was not always founded on epidemiological facts. However, hard work and long hours is no substitute for proactive research on world leading control programs and education of DEFRA staff on the technologies to prepare them for the worst eventuality. There is no point to any of these inquiries if the lessons are learned and forgotten again. It is the duty of all those involved in foot and mouth to remind the next government and those thereafter that we will not tolerate short-term cost cutting policies that cost the country dearly in the long run. Prevention is better than cure and that must be the focus for the future.