THE REPORT OF THE CHIEF VETERINARY OFFICER

ANIMAL HEALTH **2001**

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THE REPORT OF THE CHIEF VETERINARY OFFICER

Animal Health 2001

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The Role of the State Veterinary Service

To assist DEFRA and other Government Departments in achieving their aims in the field of animal health, public health, animal welfare and international trade by:

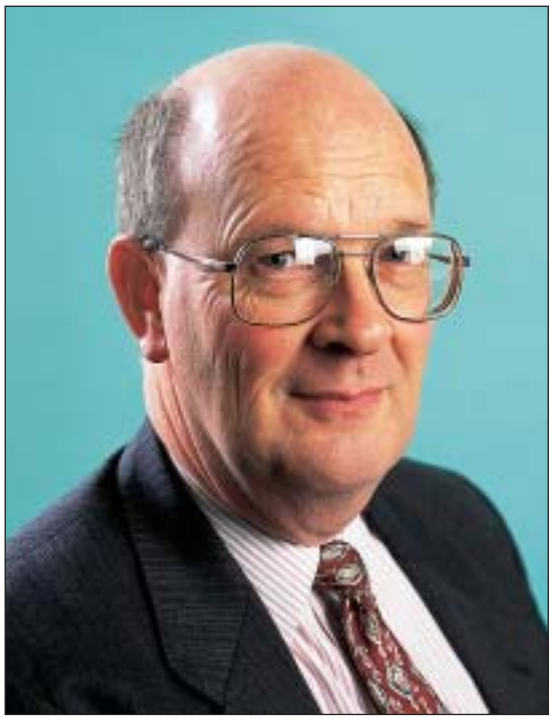
- providing timely, up-to-date and objective veterinary advice to Government on all relevant matters, in particular animal health, public health, animal welfare and international trade, to inform the policy making process;
- implementing agreed policies efficiently, effectively and in conformity with the legislation;
- monitoring the implementation of policies and providing reliable and timely feedback on their effectiveness or otherwise, to inform the policy process;
- representing the Government effectively both in Great Britain and abroad and ensuring that Great Britain's interests are robustly defended in negotiation;
- providing advice, guidance and training to the veterinary profession on matters relating to State veterinary medicine.

Acknowledgement for photographic material

May we express our grateful thanks to the following for their permission to use the photographs contained in this report:

- Richard Davies, AHO, Preston
- Ken Waldrup, USDA Veterinary Surgeon

Introduction



J.M. Scudamore, BSc, BVSc, MRCVS
Chief Veterinary Officer

For many years to come 2001 will remain a memorable year for the State Veterinary Service. Although foot and mouth disease (FMD) dominated events for a large part of the year, this report shows that it was not the only challenge facing us.

In February, following a break of 20 years, FMD reappeared in Great Britain. The first case to be identified was in pigs at an abattoir in Essex. A national tracing exercise rapidly revealed that the index case was 300 miles away in Northumberland. Investigations at this premises indicated that disease had been present for some time and that it was highly likely that onward transmission of disease to other premises had already taken place. Tracing those premises and preventing further onward transmission became the priority. Exports were stopped and a ban on the movement of animals around the countryside was put in place. During our search for infected animals the Animal Movements (ANIMO) System enabled us to identify export consignments that could have been carrying the virus so that we were able to rapidly warn other EU Member States of the risks. It soon became apparent that the scale of operation would require assistance both from other Government Departments and further afield. I am particularly grateful to my counterparts in overseas Government Departments who released veterinary and technical colleagues to assist. The assistance they provided was greatly appreciated and we hope that the experiences gained are of value back home.

After the initial ban on all exports of susceptible stock and products, negotiations began with other Member States through the Standing Veterinary Committee to enable trade to recommence in those areas where it was possible to do so. For our own staff this meant the production of certification for new products previously not subject to such controls, the development of systems to control this trade and provide the assurances sought, along with support from veterinary surgeons in completing the certification. Thanks are due to colleagues in other Member States, the Office International Epizooities and this country for undertaking this demanding but vital work. It is to their credit that we were able to resume so much of our trade in a safe and effective manner.

It soon became clear that a long-term complete ban on the movements of animals was not sustainable and the task of establishing a safe controlled method of allowing movement in order to prevent welfare problems was necessary. The development of a licensing system, from discussion with stakeholders through to delivery on the ground was an enormous undertaking. All those involved deserve credit for producing a national system to a very tight timescale, amending it to meet the differing requirements as the year and the outbreak progressed and ensuring that at all times it was compatible with our disease control measures. The scale of the operation can be appreciated when the figures are seen. There were over 250,000 veterinary inspections before movements for welfare reasons and more than 18,000 inspections prior to on-farm slaughter or movement to a killing place. The Licensing Schemes, along with the Livestock Welfare Disposal Scheme, (first operated successfully in the classical swine fever outbreak in 2000 and which provided a final option for those farms unable to make use of the licensing options) ensured that welfare problems were minimised.

To manage this national outbreak, a nation-wide computer system was needed. The Disease Control System was introduced early in March, and underwent further development throughout the course of the epidemic. It provided local management data and a much needed link between the local Disease Control Centres and the National Disease Control Centre in London.

Although our primary effort was in dealing with the FMD we continued to deal with other notifiable diseases, including the expected cases of bovine spongiform encephalopathy (BSE) that occurred during the year. As part of the ongoing development of control measures for transmissible spongiform encephalopathies (TSEs), we also began testing fallen and casualty animals and a proportion of those cattle entering the Over Thirty Months Scheme. In addition, work progressed on our National Scrapie Plan, the programme designed to create greater scrapie resistance in the national flock and, ultimately, to assist our objective of eradicating the disease completely.

As part of our efforts to reduce the risk of spreading FMD, all routine visits to farms were curtailed for a period. This inevitably meant that our programme for testing for tuberculosis and brucellosis was delayed during the early part of the year, but towards the end of the period efforts were being made to get this programme back on target once more. Similarly, the randomised badger culling trial was suspended but is expected to resume in 2002.

The Pet Travel Scheme, originally launched in February 2000, was extended during 2001 to include 28 western European countries. Since the start of the scheme 33,500 cats and dogs have now entered Great Britain without the need to spend a period in quarantine.

Our plans to develop an overarching Veterinary Surveillance Strategy for Great Britain during 2001 were halted as a result of the FMD epidemic. Work on this project has now resumed and informal discussions with a number of key stakeholders have taken place. The emerging strategy seeks to build on the strengths and address the weaknesses of the current system. The key strengths identified are the number of high calibre contributors to surveillance and the impressive track record in prevention of incursion of exotic diseases over the years. However, the recent outbreaks of classical swine fever and FMD are a real

warning that circumstances may be changing. Surveillance activities across government and the private sector could be better integrated. I anticipate that a draft strategy which addresses this issue will be put forward for public consultation by summer 2002, and after subsequent modifications, work will begin on its implementation. This is an important initiative with clear implications for safeguarding human and animal health.

Finally the State Veterinary Service changed its public identity during the year and became part of a new Government Department, the Department for Environment, Food and Rural Affairs (DEFRA).

It is always a pleasure to recognise the efforts of my staff during the previous year. This year is no exception; they faced an unprecedented challenge and handled it with an unprecedented effort. This year I would also like to recognise the efforts of many others who assisted the permanent staff, either by joining them temporarily to deal with the disease, or by dealing with other tasks such as producing export certification or running licensing schemes, which enabled the permanent staff to concentrate their efforts on the FMD. I am grateful to everyone involved for the commitment they made to the work of the State Veterinary Service during 2001.

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Contents

Bovine Spongiform Encephalopathy (BSE) and Transmissible Spongiform Encephalopathies (TSEs)

The BSE epidemic in Great Britain continues to decline in line with forecasts. The Government's greatly expanded cattle testing programme will provide useful additional information on the prevalence of the disease. From July 2001, where FMD disease controls permitted, Great Britain began testing all fallen stock and casualty cattle over 30 months, all cattle born between August 1996 and July 1997 and a sample of other cattle entering the Over Thirty Months Scheme (OTMS).

Scrapie is a fatal, progressive, neurological disorder of sheep which has been present in the national flock for over 250 years, but on the basis of the available data is not considered to be transmissible to humans. Scrapie has been a notifiable disease in Great Britain since January 1993. During the year plans were made to begin testing a sample of fallen stock and sheep for human consumption from January 2002.

BSE

Current research into BSE in sheep

It is known that sheep had received feed, in Great Britain and elsewhere during the 1980s and early 1990s, containing the same type of contaminated meat and bone meal that was responsible for causing the spread of BSE in cattle. However, no evidence has been found to date that BSE has been transmitted to sheep. Experimentally BSE can be transmitted to sheep by feeding them material derived from the brains of BSE-affected cows. In research trials this artificially produced disease cannot be distinguished from scrapie by examination of clinical signs or by routine test methods.

Mouse bioassay, a laboratory testing technique that may take up to two years to complete, has been used to differentiate between different strains of scrapie, and between BSE and scrapie. Other rapid laboratory methods are under development to enable this differentiation.

Work has been undertaken at both the Veterinary Laboratories Agency (VLA) and the Institute for Animal Health to attempt to establish whether BSE might have transmitted to sheep. Although interpretation is not straightforward, the combined results so far on approximately 180 TSE-affected brains have not produced evidence that is indicative of BSE.

Work on material from the early 1990s has also been conducted by the Institute for Animal

Health. It was anticipated that some results would be ready to present to the Spongiform Encephalopathy Advisory Committee in October. However, DEFRA, who commissioned the work, also commissioned cross-checking research to guard against the possibility of material being contaminated by cattle brains. This cross-checking raised doubts about the validity of the samples being tested.

DEFRA commissioned two independent audits to establish the status of the samples. The results, along with a response have been published and can be found on the DEFRA website. It was concluded that due to inadequate labelling and handling procedures it was not possible, with confidence, to determine which samples had been used in the strain typing work.

BSE in sheep draft contingency plan

On 28 September, British Agriculture Departments published a draft contingency plan on BSE in sheep. The measures, which take that plan forward by accelerating the National Scrapie Plan (NSP) and offering incentives to flock owners to report suspicion of scrapie, were announced on 9 October.

British Agriculture Departments have consulted the sheep industry on plans to:

- extend the NSP for Great Britain to pure-bred flocks which are not registered with breed societies;
- help owners with scrapie-affected flocks to combat the disease by opening the existing NSP to all scrapie-affected flocks regardless of whether or not they are pure-bred flocks;
- increase the rate of compensation for confirmed scrapie cases to £90 for sheep and goats other than for cull females for which the rate will be £30.

These proposals are part of the Government's comprehensive risk management strategy against the theoretical possibility that BSE may be found in sheep. It was always intended to extend the NSP to the non-registered sector. The more flocks in the Plan, the quicker it will be to achieve its objectives.

There is compelling evidence that there is significant under-reporting of scrapie cases in Great Britain. The proposals will give owners an increased incentive to report any suspicions they have that their flock may contain scrapie-infected animals.

Testing

Plans for testing 3,000 fallen stock (sheep) over 18 months old and 20,000 sheep killed in abattoirs over 18 months old were made during the latter part of the year in line with EU survey requirements. The EU requirement to test 15,000 abattoir sheep has been expanded to 20,000 so that the EU survey can be combined with one requested by the Spongiform Encephalopathy Advisory Committee.

Results of the second BSE survey of cattle aged over 30 months

The year 2000 BSE survey of cattle slaughtered under the OTMS in Great Britain sampled 10,037 brains, of which five were unsuitable for examination. In addition to the 39 cases announced in May, three more cases were confirmed, giving a total of 42 (0.42 %)

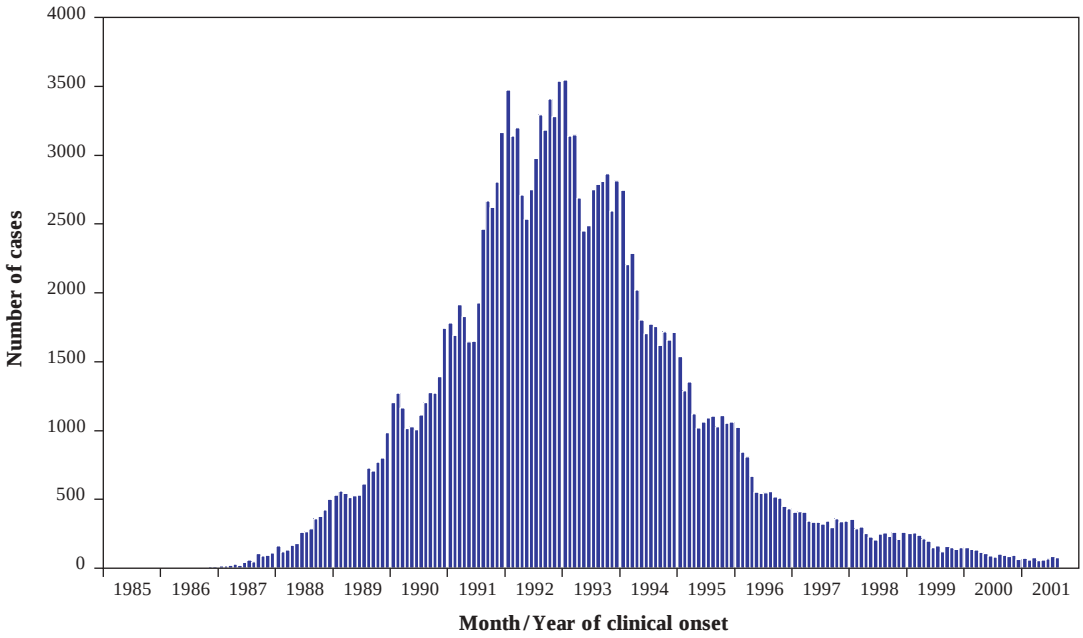


Figure A1.1: *Confirmed cases of BSE in cattle plotted by month and year of clinical onset*

positive cases from the 10,032 samples tested. This compares with 0.45% (18) positive results by the same method of examination in the first survey in 1999 when 3,951 cattle aged over five years old were tested.

The breakdown of test results can be summarised as follows:

- 39 cases were confirmed from the first batch of 9,526 brains, which were tested by histopathology. Of these, 38 were also positive by immunocytochemistry. The 39th was not suitable for this test;
- Of 506 samples that proved to be inconclusive by histopathology, two were found to be positive when tested by Western blot, and were further confirmed by positive immunocytochemistry tests;
- Testing by dissociation enhanced lanthanide fluoroimmunoassay identified a further single positive, which was negative by histopathology, but confirmed by immunocytochemistry.

None of the cattle in the survey were eligible to enter the human food chain because they were all over 30 months old at the time of slaughter. All surviving offspring have been traced and will not enter the food chain either.

New survey for BSE in fallen and casualty stock

On 4 May British Agriculture Departments announced that as part of an EU-wide testing programme farmers are legally required from 1 July to report within 24 hours all cases of fallen (found dead on farm or in transit) cattle aged over 30 months. These carcases are collected from the holding free of charge and a brain sample is taken. The carcase is then incinerated. Samples are subjected to rapid testing for BSE by the VLA.

Casualty (injured or sick) cattle, which are eligible for the OTMS, are sampled under disposal arrangements for the Scheme. Casualties which are ineligible for OTMS are treated in the same way as fallen stock.

Expansion to the BSE testing programme

The Government's BSE testing programme received a major boost when the testing of the cohort of cattle born between 1 August 1996 and 31 July 1997, estimated at between 150,000 to 200,000 cattle, began on 13 November at the Laboratory of the Government Chemist (LGC). LGC was awarded the contract following a competitive tendering exercise. A proportion of these cattle were already being tested in government laboratories but the contract means all cattle in this category will be tested. Cases in cattle born after 1 August 1996 are particularly significant, as this is the date when the strengthened feed controls were considered to be fully effective.

In addition, LGC will test a sample of 50,000 other cattle over 30 months, in line with EU requirements. The tests will give us a more accurate picture of the level of BSE infection in the British herd.

By the end of the year, some 90,000 cattle had been tested. Available tests will detect BSE only in its late stage of incubation. Results indicate that 0.3% fallen stock and 0.6% casualty cattle test positive for BSE; these results, which relate to cattle regarded as at high risk BSE, are not out of line with forecasts and with previous British surveys.

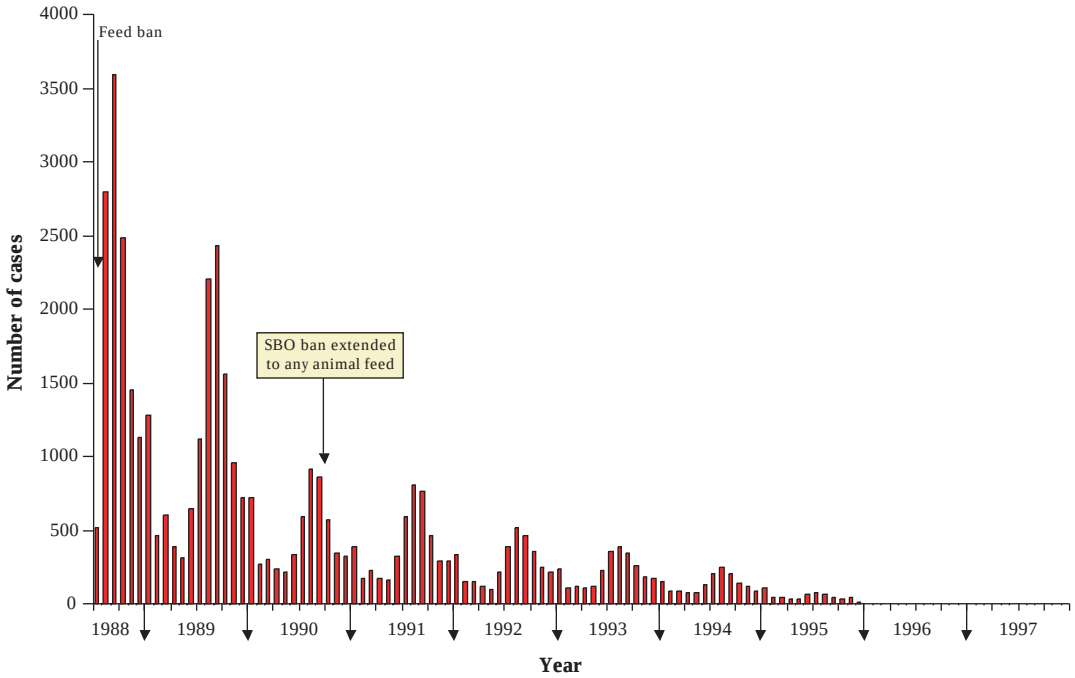
BSE cases born after the mammalian meat-and-bone meal ban

Two animals in Great Britain born after the ban on mammalian meat-and-bone meal in August 1996 tested positive in the expanded BSE surveillance programme:

The first British case was confirmed on 15 June 2001 in a cow born in May 1997. The cow was born nearly 10 months after 1 August 1996, when extra control measures on animal feed containing mammalian meat-and-bone meal were considered to have been fully implemented.

The second British case was diagnosed in a cow born on 4 December 1996, just over four months after the ban.

The cows, aged 48 and 54 months respectively at time of slaughter, would not have entered the human food chain because of the rule which prevents meat from animals aged over 30 months being sold for human consumption. They would also have been



Total to 1 January 2001 = 43047 of which 1988 = 11967; 1989 = 12669; 1990 = 5669; 1991 = 4637; 1992 = 3271; 1993 = 2614; 1994 = 1605; 1995 = 596; 1996 = 16; 1997 = 3

Figure A1.2: *BSE in suspects born after 18 July 1988 – confirmed cases by date of birth*

ineligible for the Date Based Export Scheme because of their age.

The animal believed to be the 'first' cow's mother (born in December 1989) is still alive but is excluded from the food chain by virtue of her age. The 'second' cow's mother was traced and had already been killed under the OTMS on 4 September 2000. The offspring of both cases were traced and will not enter the food chain.

In accordance with standing procedures cohort animals (animals from the same herd born six months either side of these animals) have been traced, placed under movement restrictions and barred from the food chain. In these two cases, the cohort animals will, in any case, be excluded from the food chain because of their age.

The source of infection of these cases is not yet conclusively known but it is still considered that Great Britain has stringent rules in place to protect public health and to eradicate the disease.

British Cattle Movement Service goes online

It was announced on 19 February, that farmers, cattle markets and slaughterhouse operators could apply for new cattle passports online and view the data held on their cattle.

These new services are the first phase of making the Cattle Tracing Scheme (CTS) accessible over the internet. Further phases will offer online registration of cattle movements and special access facilities for markets. This

will simplify procedures for cattle keepers and bring benefits to both the industry and Government.

The benefits will be to:

- maximise the value and use of CTS data;
- reduce the burden on farmers supplying information;
- encourage farmers to provide timely and accurate data;
- begin the process of reducing time spent on farm inspections;
- set the scene for further e-business opportunities.

Details about CTS online can be found by visiting the Departmental web site www.defra.gov.uk.

The extension of the Cattle Tracing Scheme to older cattle

The Cattle Tracing Scheme now covers over 98% of the national herd in Great Britain.

The benefits of this full herd coverage include:

- simpler procedures for claiming subsidies;
- reducing the need to provide census information for cattle;
- simplified eligibility checks for the Beef Export Scheme;
- not having to provide the same information on cattle more than once;
- fewer farm inspections.

However, a small number of cattle are yet to receive certificates of registration, as the British Cattle Movement Service requires further information about them. These cattle without certificates are unable to move except under licence to a knacker or hunt kennel.

VLA research: surveillance for BSE in cattle

A survey of casualty and fallen stock began in January 2001 in compliance with European legislation. In addition to the fallen stock surveillance, the European Commission also demanded testing of the cohort of animals born in the winter of 1996 / 1997. Subsequently, the OTMS abattoir sampling began in September.

Scrapie

Background

TSEs are a family of diseases occurring in man and animals that are characterised by a degeneration of brain tissue giving a sponge-like appearance. The family includes diseases such as Creutzfeldt–Jakob disease in humans, BSE in cattle, and scrapie in sheep and goats. While BSE has only recently been identified, scrapie has been known for centuries and on the basis of the available data is not considered to be transmissible to humans. However, EU legislation already in place to protect spread and transmission of BSE also applies to sheep and to goats as a precautionary measure (i.e. removal of specific risk material like brain and spinal cord since 2000, ban of feeding mammalian meat-and-bone meal to ruminants since 1994).

Transmission

Scrapie can be transmitted horizontally, from one animal to another, via environmental routes, or vertically, from ewe to lamb. Young lambs, aged less than 12 months, may develop scrapie, but clinical signs are seen predominantly in animals aged two to five years.

Clinical signs

The fleece may be harsh to handle, tolerance to exercise is reduced, the gait may become unsteady and water metabolism altered so that sheep drink small quantities more frequently. They may also pass abnormally small quantities of urine and rumination may be reduced. Rubbing the poll and buttocks in response to pruritus (itching) is common, although it does not occur in all cases.

In the later stages of disease behavioural changes are exhibited in several ways. Animals may become more nervous or aggressive and may seek separation from the rest of the flock. Hypersensitivity to sound or movement may occur and there may be muscular twitches or tremor (hence the origin of the French word for scrapie, la tremblante). Loss of wool by rubbing and nibbling are common features coupled with a general loss of condition. Rubbing the back commonly stimulates a nibble reflex.

Ataxia (lack of co-ordination), especially of the hind limbs, is a major feature and may sometimes be accompanied by a tendency to move with a stilted, high-stepping gait or to hop like a rabbit. A feature recently described in Shetland sheep is sudden death with characteristic pathology on post-mortem examination. It is not known whether these cases exhibited clinical signs of scrapie which went unobserved prior to death.

The full range of clinical signs is not shown by all sheep and there may be differences, subtle or otherwise, between scrapie in different breeds.

Disposal of infected animals

EU legislation requires that sheep and goats with scrapie cannot enter the food or feed chains. The carcasses of confirmed scrapie-infected animals must be disposed of by incineration or by a high-temperature, pressure-cooking, rendering process designed to remove any infectivity.

Launch of the first phase of the National Scrapie Plan for Great Britain

During the year pedigree sheep breeders were invited to register their interest in participating in a ram genotyping scheme as part of the NSP for Great Britain. The first phase of the NSP is a

breeding programme for genetic resistance to scrapie. The plan aims, over time, to eradicate scrapie from the national flock. Other stages will involve action in relation to scrapie-affected flocks and disease monitoring.

Flock owners who participate in the scheme will have all of their adult (stock) rams and a proportion of their ram lambs genotyped. In the case of smaller flocks, some ewes may also be genotyped. NSP certificates of genotype will be issued. Owners will be required to breed from rams with the more resistant genotypes.

VLA research: surveillance for scrapie

Three test development projects began in 2001 to assist planning for the sheep abattoir survey. The aim of this survey is to enable the use of peripheral tissue for diagnosis and possibly also for genotyping, in order to maximise sensitivity of surveys while simplifying sampling protocols.

Other TSEs

Rare cases of other TSEs have been identified in Great Britain in domestic cats and certain zoo animals. No domestic cats were diagnosed with the disease during 2001 but one case was found in a lion.

Tuberculosis (TB) in cattle

Bovine TB can be passed to humans and although the risk is small, DEFRA is committed to keep the risk of this happening as low as possible. As a result of FMD, it was important to prevent the spread of TB into low TB-incidence counties following movement of cattle from herds in FMD-free counties with higher TB-incidence.

History of TB

During the 1930s, a large proportion of dairy cows were infected with *Mycobacterium bovis (M. bovis)*. Many were kept near large cities to provide urban dwellers with fresh milk. Most were closely confined, in poorly ventilated cowsheds, ideal conditions for the disease to spread. Many cows developed infection in the udders.

To try to control the problem, the Government began testing cattle for TB and slaughtering any that were believed to be infected. To try to prevent the disease spreading to other herds, cattle were not allowed to be moved from farms with a case of TB. These measures have reduced the number of cases to a very low level and remain central to Great Britain's strategy to stop the spread of TB in cattle.

In addition to these measures to prevent the disease spreading between cattle, most milk has been pasteurised since the 1930s to reduce the risk to humans.

Five-point strategy

At the centre of DEFRA's action to stop the spread of bovine TB is the existing programme to test cattle for TB and to slaughter any infected animals. The department has put into operation a five-point strategy to try to control the disease.

1. **Protect public health**
   New arrangements with the Department of Health to investigate potential links with human health and monitor human cases of *M. bovis*.
2. **Develop a vaccine**
   10- to 15-year research programme to develop a TB vaccine.
3. **Research into how TB is transmitted**
   Further research to better understand how infection is transmitted.
4. **Detect and prevent cattle to cattle spread**
   Continue with, and where possible strengthen, routine testing, slaughter and movement restrictions.
5. **The badger culling trial**
   Carry out a field trial to find out whether culling badgers helps reduce TB in cattle.

History of possible spread of TB by badgers

In 1971, a dead badger infected with TB was discovered on a farm that had suffered a TB outbreak in its cattle herd and this seemed to give backing to the theory that badgers are a cause of TB in cattle.

Over the intervening years, a number of different measures were tried to control the disease in cattle by culling badgers in areas where spread of TB from badgers to cattle was thought to be significant. None of these were entirely successful. A much broader strategy to control cattle TB has been developed. This includes research into how the disease is spread, development of a vaccine, and possible improvements to the testing and slaughter programme, but also trying to find out, in a scientific way, how badgers affect the disease in cattle.

TB vaccine

The use of vaccines in either cattle or badgers remains a potential option but is only likely to offer prospects in the long term and success cannot be guaranteed. The demands of an acceptable cattle vaccine are particularly severe since:

- such a vaccine would need both to prevent the establishment of persistent infection and to eliminate transmission;
- it should not give a positive reading in the tuberculin skin test since this would confuse the regular herd testing procedure and create serious regulatory problems;
- a cattle vaccine would not eliminate the likelihood that that a wildlife reservoir of infection will persist in the countryside environment. Exposure of cattle protected by a successful vaccine to this source of infection would result in immunological responses, which may compromise the skin test;
- vaccinated cattle would not be able to be exported without a change in European legislation.

Despite these obstacles, DEFRA is committed to pursuing research into a cattle vaccine and its co-ordination with human TB research, since new technologies are continually developing which may be applicable to cattle vaccine development. Experimental infection of cattle with TB also provides a model of the natural disease, which will provide information on the immunology and pathogenesis of bovine TB relevant to vaccine development for both cattle and badgers and also to the development of improved diagnostics.

In contrast to the cattle situation, vaccination of wildlife would require a less demanding vaccine, as although widespread coverage would be the target, protection of each individual animal would not be essential. The primary role of a wildlife vaccine would be to reduce the severity of disease in the target species and the consequent rate of transmission to cattle. However, a wildlife vaccine would only be effective in controlling TB infections derived from wildlife; a point that has yet to be determined conclusively. If an effective vaccine were available for wildlife the logistics of vaccinating a badger population in the wild presents enormous challenges. The effectiveness of vaccination is likely to be greatly influenced by the route of administration, but there are practical constraints on which route can be employed; oral vaccination is likely to be the preferred route for use in badgers but it may be difficult to achieve a protective immune response.

If the strategy of badger vaccination is to be seriously pursued, experimental facilities to conduct pathogenesis and vaccination challenge studies will have to be made available. This will necessitate sourcing TB-free badgers and possibly rearing offspring that can be used for experimental studies in disease-secure, high-containment facilities. A more demanding requirement would be to validate the potential vaccine in the field and to determine how its success would be measured, particularly as currently there is no reliable rapid, live test for TB infection in badgers. A further consideration is the possibility of transmission of a wildlife vaccine to other wildlife, domestic animals, man and also to cattle, and the impact that may have on tuberculin testing in cattle.

While there is strong pressure for successful vaccination of cattle or badgers to be considered as the preferred strategy, many difficult issues must first be addressed if a vaccination policy is to be pursued. These issues are being considered by the Vaccine Scoping Study under the guidance of the Independent Scientific Group on Cattle TB.

TB testing

As part of the Government's policy to control TB, cattle herds in Great Britain are tested regularly. These tests are carried out at intervals of one, two, three or four years, as set down in European legislation. The interval usually depends on how much TB has been found in the area.

The skin test involves injecting a small amount of tuberculin (a sterile extract obtained from the tubercle bacterium) into the skin of the animal. In most cattle infected with TB, this will cause the animal's immune system to react to the tuberculin and cause a swelling where the injection has taken place.

The comparative intradermal tuberculin test compares an animal's reaction to injections of both bovine and avian tuberculin. If the bovine TB swelling is considerably larger than the avian TB swelling, the animal is designated as a 'reactor' and is considered to be infected with TB.

Reactors are isolated from the rest of the herd, valued and slaughtered. The farmer is compensated for 100% of the market value of the animal. The herd loses its Official Tuberculosis Free (OTF) status and herd movement restrictions are applied. This is a herd incident, commonly referred to as a 'herd breakdown'.

Herd movement restrictions can only be lifted and OTF status restored after all the animals have passed two consecutive tests 60 days apart. Only one such test is required where TB is not confirmed by post-mortem examination or in laboratory tests.

Suspension of routine TB testing

In late February 2001 routine TB testing was suspended as a result of the FMD outbreak, which is reported on in the chapter on Great Britain Disease Surveillance. This suspension included tuberculin testing and disposal and sampling of reactors in the field. High priority tests and removal of reactors carried on under difficult circumstances.

The suspension of routine and most non-routine testing led to a backlog of overdue TB tests throughout Great Britain and the inability in some areas, for farmers to have cattle that reacted to the tuberculin test taken off farm for slaughter with compensation. Areas worst hit were those with a higher incidence of TB in cattle which also suffered an outbreak of FMD.

As a result the number of bovine tissue samples processed at VLA laboratories for mycobacterial culture dropped significantly to a total of 3,582 samples submitted by Animal Health Divisional Offices between 1 January and 30 November. This was a reduction of 1,703 samples compared to the 5,285 samples submitted to the VLA in the corresponding period for the year 2000.

However, although routine and non-routine testing was resumed in certain parts of Great Britain after a suspension of seven months it is, as yet, too early to tell whether leaving some reactor cattle on farm longer than usual has led to an increase in the number of cattle found to react to the tuberculin test.

Publication on national statistics

In April the publication of the national statistics on TB in Great Britain was also suspended due to the scarcity of the raw data from which they were produced and the biases that the suspension of routine TB testing introduced.

Provisional data from the State Veterinary Service Animal Health Database suggested that approximately 12,300 herd tests, comprising some 1,000,000 cattle, were carried out. These showed that approximately 3% of tests on previously unrestricted herds revealed reactors.

Gamma interferon feasibility study

Following the disclosure of confirmed TB reactors in a herd, the farmer is often faced with a long period of repeated short interval tests, at which further reactors and / or inconclusive reactors are disclosed. The gamma interferon blood test identifies some infected animals more quickly, reducing the total time the herd is under restrictions.

During the year, a study into the feasibility of using gamma interferon in cattle breakdown situations was concluded. Though disrupted by FMD, the study was able to show where the likely problems and pressure points would be if a larger scale trial were to be carried out.

Independent report on randomised badger culling trial field operations

The randomised badger culling trial is an important element of the Government's strategy to devise a sustainable, science-based policy to control TB in cattle. This is a large project covering a 3,000 km^2 spread across eight counties in England and involves the participation of approximately 6,000 occupiers of land.

During the year an independent auditor's report was published which provided a means for reviewing and improving two complex areas of trial work: surveying for badger activity and social group territory delineation. Given the nature of the fieldwork it was recognised from the outset that there would be imperfections in surveys of badger activity and the subsequent allocation of setts to social groups. The trial was, however, designed to test the effectiveness of culling operations carried out within the practical limits imposed by field conditions. Whilst minimising survey errors was a priority, future policy recommendations need to be based on practical and effective strategies. Against this background DEFRA noted that the audit did not reveal any fundamental flaws in the trial's standard procedures or their application.

The work of the State Veterinary Service Wildlife Unit in support of the Krebs badger culling trial was also disrupted by FMD. All fieldwork was suspended in February 2001 and was scheduled to recommence in January 2002, effectively resulting in the loss of a whole year of the study.

VLA research: TB-related work

Collaboration between VLA, the Pasteur Institute and the Sanger Centre resulted in the sequencing of the *M. bovis* genome. This represented a milestone in *M. bovis* research and underpins all future DEFRA research in the development of improved vaccines and diagnostic reagents, and in improving molecular tools for studying the epidemiology of *M. bovis*.

A joint VLA–DEFRA feasibility study of the gamma interferon assay in cattle was completed. The trial demonstrated that it was feasible to perform the gamma interferon test in farmers' herds in Great Britain, at the same time as highlighting the areas for further development if the test is to have national use.

Detailed planning of a field study of in-contact and reactor cattle from herds with confirmed TB was undertaken during the year.

The Pet Travel Scheme

The Pet Travel Scheme (PETS) enables pet cats and dogs to enter or re-enter Great Britain without quarantine, provided they meet certain conditions. The scheme was launched on 28 February 2000 allowing pet cats and dogs to travel from 22 countries in Western Europe. Over 33,500 cats and dogs have entered Great Britain under PETS since the start of the Scheme.

Further islands added to the PETS scheme

On 31 January 2001, PETS was extended to allow pet cats and dogs to enter Great Britain from Cyprus, Malta and 26 non-European (or long-haul) countries and territories without having to go into quarantine. The same PETS conditions apply to these animals as to animals brought in from the European countries already covered by the Scheme. However, for some of these countries there are additional requirements. The long-haul countries include Australia, New Zealand, Japan and Singapore.

Bahrain has been approved for inclusion in the Scheme and the necessary legislation to cover this will be introduced in 2002.

Table A3.1: *List of PETS qualifying countries*

Andorra	Finland	Liechtenstein	San Marino
Antigua and Barbuda	France	Luxembourg	Singapore
Ascension Island	French Polynesia	Malta	Spain
Australia	Germany	Martinique	St Helena
Austria	Gibraltar	Mauritius	St Kitts & Nevis
Barbados	Greece	Mayotte	St Vincent
Belgium	Guadeloupe	Monaco	Sweden
Bermuda	Hawaii	Montserrat	Switzerland
Cayman Islands	Iceland	Netherlands	Vanuatu
Cyprus	Italy	New Caledonia	Vatican
Denmark	Jamaica	New Zealand	Wallis and Futuna
Falkland Islands	Japan	Norway	
Fiji	La Réunion	Portugal	

Further countries have been added to the Pet Travel Scheme

Entering Great Britain

To enter Great Britain under the Scheme, pet cats and dogs must travel on specified routes with an approved transport company. There are currently 19 different transport companies authorised to bring pet cats and dogs to Great Britain on 50 different routes.

To widen opportunities for people to use the Scheme, all transport companies running scheduled passenger services into Great Britain were invited to apply to join, or to provide additional routes as the scheme develops.

PETS checks

A total of 11% of all animals presented under the Scheme have failed their PETS check. The main problem encountered relates to the tick and tapeworm treatment requirement; pets must be treated against ticks and tapeworms between 24 and 48 hours before entering Great Britain, in order to prevent the parasites becoming established.

Most pets subsequently continue their journey after either visiting a veterinary surgeon or waiting for the required 24 hours to elapse following the tick and tapeworm treatment.

Quarantine

An animal which is in quarantine will become eligible for early release from the date that it can be shown to comply with all the necessary rules of PETS. All cats and dogs imported into Great Britain, which do not meet the requirements of PETS, must spend six months in quarantine.

The regulations relating to quarantine are set out in The Rabies (Importation of Dogs, Cats and other Mammals) Order 1974 (as amended). The order provides for an animal landed without a licence to be either directed to quarantine, re-exported or destroyed and its owner prosecuted. Serious offences may be tried on indictment at a Crown Court where offenders are liable to penalties of up to a year's imprisonment, an unlimited fine or both.

As well as domestic cats and dogs, other rabies-susceptible mammals are controlled by the Rabies (Importation of Dogs, Cats and Other Mammals) Order 1974. When any of these other animals are brought into Great Britain, they have to go into quarantine for six months.

Independent assessment

An independent assessment was carried out on data provided by the United States' Government to determine the increase in the risk of importing rabies if cats and dogs from the United States of America and Canada were

to be included in the Scheme. A second assessment was carried out on the risk of other diseases transmissible to humans being imported if the Scheme was to be extended.

PETS requires animals to be fitted with a microchip to enable proper identification

Research

Progress continued, in collaboration with another leading Institute, in the development of a serological test for rabies that does not require the use of live virus, and thus a high level of laboratory containment. Two prototype enzyme-linked immunosorbent assays (ELISAs) are being evaluated by comparing results with those obtained using the fluorescent antibody virus neutralisation test. This is the test that is used under PETS.

Research to increase our understanding of the risk posed by the European bat lyssaviruses progresses. The effectiveness of the current rabies vaccine against the European bat lyssaviruses is being used in this work.

PETS information

More information and fact sheets on PETS are available on the DEFRA website at www.defra.gov.uk or from the PETS helpline (phone: 0870 241 1710, 8.30 am–5 pm Mon to Fri; fax: 020 7904 6834).

VLA research: rabies

Samples for rabies testing remained constant throughout the year. A small but significant number of these samples were from overseas. Further validation of a ELISA rabies test progressed and work was carried out to further improve the specificity / sensitivity of this test. This work is being carried out with a commercial partner and Agence Francaise de Securite Sanitaire des Alimentaires, Nancy, France.

Consumer protection

Zoonoses are diseases and infections which can spread naturally between animals and people. People may become infected through a variety of routes including contaminated food and water, direct contact with an infected animal, and through insect vectors. Successful management of the risks to public and animal health posed by zoonoses requires close collaboration between all those involved in the production of food.

The main aims are to reduce the risk of transmission of infection from live animals to people and other animals by provision of:

- surveillance for zoonotic agents;
- statutory control measures where required by the EU and scientifically justified;
- best available advice on prevention, good husbandry, management and control;
- research to fill in gaps in knowledge.

Background

Zoonoses are defined as 'diseases and infections which are naturally transmitted between vertebrate animals and man'.

A zoonotic agent may be a bacterium, virus, fungus, parasite, or other communicable agent. Zoonoses cover a broad range of diseases with very different clinical and epidemiological features and control measures. Successful control requires joint veterinary and medical efforts, and close liaison between the various government departments and agencies with an interest.

The UK Zoonoses Group

The National Zoonoses Group for England was set up in April 1999 to provide a high-level forum for discussions on zoonoses in England; this group was subsequently replaced by the UK Zoonoses Group. It brings together the professionals from both central and local government involved in animal and public health aspects of zoonoses and their control in the UK. The Group advises Agriculture and Health Ministers on zoonoses issues.

The UK Zoonoses Group met for the first time on 2 October. Although Scotland, Wales and Northern Ireland each had observers on the National Zoonoses Group, the new UK Zoonoses Group is intended to help develop a more cohesive and comprehensive approach to the understanding and control of zoonotic diseases in the UK. This is in line with the recommendation of the BSE Inquiry for better liaison between central government and the devolved administrations on animal and human health issues that have implications for the whole of Great Britain.

Information about the Group, and access to minutes and papers is available on DEFRA's website (www.defra.gov.uk).

Zoonoses

Campylobacter

Under natural conditions, *Campylobacter* species rarely cause disease in farm animals, although surveys indicate that the carriage is high in livestock. The organism can be isolated from the intestine of healthy farm animals, poultry, pets and wild birds. In Great Britain no method has yet been found to reduce the prevalence of these organisms in animals in an entirely consistent and satisfactory way. Much more needs to be learnt about the organism and its epidemiology and ecology and a programme of research is in place to take this forward.

Verocytotoxin-producing *Escherichia coli* O157

The public health significance of verocytotoxin-producing *Escherichia coli* O157 (VTEC O157) came to light in the early 1980s and is now of world-wide importance. VTEC O157 has been found in the intestinal tract of healthy livestock particularly cattle, sheep and goats, but also pigs, horses and wild animals in Great Britain. The organism does not normally appear to be associated with disease in livestock, but it is excreted in their faeces. It is a potential risk to those working closely with farm animals and their environment, as well as to the food chain through the contamination of carcases at slaughter. In addition to a large ongoing research programme, assistance is given to health authorities with on-farm investigations where an animal source is thought likely to be the cause of an outbreak of disease in humans. Assistance with promoting the clean livestock policy is also important.

Salmonella

Species of salmonella have been found in a wide range of animals including mammals, birds, reptiles and fish. Whilst a number of salmonellae may cause disease in animals, ones of public health significance may also be present in the intestines of animals which do not show any clinical signs of ill health. A Government programme for the control of *Salmonella enteritidis* and *S. typhimurium* in breeding flocks of domestic fowl has been in operation in Great Britain since 1989. Any such flock found to be infected with *S. enteritidis* or *S. typhimurium* is slaughtered.

Salmonella in poultry

The statutory monitoring of breeding flocks of domestic fowl for *S. enteritidis* and *S. typhimurium* continued during 2001. Reported incidents of both organisms remained at very low level: three reported suspected incidents (two *S. typhimurium* and one *S. enteritidis*) in broiler breeders and none in layer breeders. On further investigation this resulted in the slaughter of two breeding flocks where *S. typhimurium* was implicated. The number of reported incidents of *S. enteritidis* and *S. typhimurium* in the other sectors of the poultry industry also continued to decline.

Salmonella in cattle

The number of reports of *S. dublin* in cattle continued to increase. However, the number of reports of *S. typhimurium* decreased for the fifth year running. Disease caused by *S. dublin* occurred in all ages of cattle and remained the most common serotype in this species. The associated mortality in cattle aged two to four months with symptoms can approach 25%. The number of isolations of *S. dublin* reported by the Public Health Laboratory Service from humans remains low.

Salmonella in pigs

The most common serotype in pigs during 2001 was *S. typhimurium* (definitive type 104).

Salmonella in sheep

S. arizonae (serovar 61:k:1,5,7) which is often associated with ovine abortion but rarely associated with other disease, remained the most common serotype in sheep during 2001. This is sometimes an incidental finding in presentations other than abortion and isolates can be difficult to interpret. There have been no reported isolations of this serotype strain from humans in the last five years.

Table A4.1: *Comparison of 2000 and 2001 figures for the number of tests carried out and salmonella rates found in types of feedstuffs and raw ingredients*

Product	No. of tests		No. of tests positive		% of tests positive	
	2000	2001	2000	2001	2000	2001*
Processed animal protein at British protein premises	7,442	4,482	157	106	2.1	2.4
British and imported processed animal protein arriving for feedingstuffs use	1,924	953	57	27	3.0	2.8
Linseed meal, rapeseed meal, soyabean meal and sunflower meal at a British crushing premises and other tests on oilseed meals and products for feedstuff use	18,556	10,361	362	245	1.9	2.4
Non-oilseed meal vegetable products	15,748	10,310	169	209	1.1	2.0
Pig and poultry meals	6,448	3,968	59	44	0.9	1.1
Poultry extrusions	6,967	4,832	35	19	0.5	0.4
Pig extrusions	2,387	1,599	12	8	0.5	0.5
Ruminant concentrates	2,893	1,985	34	21	1.2	1.1
Protein concentrates	1,132	593	12	6	1.1	1.0
Minerals/others	3,063	1,548	31	11	1.0	0.7

* provisional

Salmonella in animal feedingstuffs

The controls on the use of processed animal proteins and feedingstuffs changed during the year. From the 1 August, under the Processed Animal Protein Regulations 2001 (which gives effect to Council Decision 2000 / 766 / EC) the feeding of processed animal protein to animals kept, fattened or bred for the production of food was prohibited, with some exceptions (including non-ruminant gelatin used for coating feed additives, animal-derived dicalcium phosphate and hydrolysed protein produced under certain conditions and fed to non-ruminants; fish meal produced under certain conditions may be fed to farmed animals other than ruminants).

A Guidance Note on the Processed Animal Proteins Regulations 2001 is available at www.defra.gov.uk. Imported processed animal and fish protein may be tested for the presence of salmonella under the Importation of Processed Animal Protein Order 1981 (as amended). The surveillance of imported processed animal and fish protein is targeted, making the establishing of trends difficult. However, the number of consignments positive for *S. enteritidis* and *S. typhimurium* during the year remained low, as did the number of consignments positive for other types of salmonella.

Table A4.2: *Results of DEFRA testing between 1997 to 2001 of imported processed animal protein under the Importation of Processed Animal Protein order 1981 (as amended)*

	1997	1998	1999	2000	2001
No. of consignments tested	545	328	240	218	97*
No. of consignments positive	72	24	32	21	10
No. of *S. enteritidis*	0	0	0	0	0
No. of *S. typhimurium*	0	0	0	2	0
% consignments positive	13.2	7.3	13.3	9.6	10.3

* provisional

Table A4.3: *Results of testing of home-produced animal protein between 1997 and 2001 under the Animal By-products Order 1999*

	1997	1998	1999	2000	2001
No. of samples tested	507	571	529	439	221*
No. positive all serotypes	21	25	14	2	0
No. of *S. enteritidis*	0	0	0	0	0
No. of *S. typhimurium*	0	0	0	0	0
% of samples positive	4.1	4.4	2.6	0.5	0

* provisional

Antimicrobial resistance monitoring

Data on the antimicrobial sensitivity of salmonella have been published annually in *Salmonella in Livestock*. However, data was also presented and published on *E. coli*, organisms causing mastitis, respiratory pathogens, and zoonotic organisms isolated at 14 diagnostic veterinary laboratories throughout England and Wales during 1998 and 1999. This data can be viewed by visiting www.defra.gov.uk and is a useful resource to assist:

- practising veterinary surgeons in the selection of appropriate antimicrobials;
- colleagues in the medical field, particularly with regard to zoonotic organisms;
- researchers in the field of antimicrobial resistance; and
- the pharmaceutical industry who will find the information of interest.

Assistance to health authorities

As part of the effort to protect the consumer from exposure to zoonotic organisms, DEFRA provides assistance, when requested, to the health authorities investigating outbreaks of zoonotic pathogens in humans.

DEFRA assisted in a programme of environmental monitoring and health surveillance put in place to protect the public from potential health risks from the FMD control programme. Details of the programme and results of the monitoring are published on the Department of Health's website (www.doh.gov.uk).

Points of interest so far from the continuing monitoring programme are as follows.

None of the 39 suspected human cases of FMD tested positive for the virus. There was no evidence of transmission of the virus to humans during the outbreak.

No gastrointestinal disease was linked to disposal of carcases in the FMD control programme.

Four cases of Q fever were identified in people involved in animal disposal operations.

A marked decline in the number of cases of cryptosporidiosis recorded in humans was noted in the north-west region of England in comparison with the same period last year.

Consultation on a proposal to intensify monitoring and control of zoonoses

A consultation document was issued in October to interested parties on a Commission proposal to intensify monitoring and control of zoonoses which is expected to replace the current Directive 92 / 117 covering zoonoses in due course. Details of DEFRA's consultation exercises are available by visiting www.defra.gov.uk.

Residue surveillance

The Veterinary Medicines Directorate operates two complementary residue surveillance programmes: the statutory programme, which implements European legislation, and a non-statutory programme, which supplements and expands the statutory programme. Summary results of the surveillance in 2001 were published quarterly in the Veterinary Medicines Directorate's Medicines Act Veterinary Information Service newsletter and is available online at www.vmd.gov.uk. The State Veterinary Service provided support to the sampling programme, checking on-farm records and giving advice to farmers. In 2001 the collection of on-farm samples by the State Veterinary Service was disrupted by the outbreak of FMD; the Veterinary Medicines Directorate made alternative arrangements for their collection.

VLA research: foodborne zoonoses

The annual report *Salmonella in Livestock Production 2000* was published in August 2001. For the first year, a dedicated chapter was written for salmonella reports in horses, deer and rabbits. The salmonella data arising from the national abattoir surveys of zoonotic pathogens in cattle, sheep and pigs were presented separately in a summarised form.

A new approach to molecular subtyping of *Salmonella* was developed. This has been particularly effective for differentiation of *S. enteritidis*, including subdivision of PT4, which was difficult to subtype previously. The enhanced differentiation techniques were used for epidemiological studies in the egg and broiler industries and in a collaborative project with researchers in the United States of America.

The VLA will include the examination of rabbit faeces in future outbreak investigations of VTEC O157 following investigation into an outbreak associated with an open farm in East Anglia which implicated wild rabbits as a novel vector for the infection.

VLA research: water borne zoonoses

Outbreaks of cryptosporidiosis in the north-west occur regularly and are associated with one particular reservoir in the water distribution system. Ewes brought down from the hills for lambing are thought to be the source and during 2001 pregnant ewes were kept away from the vicinity of the reservoir to try and reduce contamination. Longer-term remedial work to the reservoir and aqueducts is expected to take up to five years to complete.

VLA research: antimicrobial resistance

The VLA *Annual Antimicrobial Sensitivity Report for 1999* was published on the DEFRA website in September and was the first of such reports to be produced by the VLA. The report included resistance data collected at all of the Regional Laboratories on more than 14,000 veterinary pathogens, commensals and zoonotic organisms, as well as resistance data on almost 4,000 salmonella isolates.

The reduction in submissions to VLA Regional Laboratories due to FMD reduced the number of Chemical Food Safety investigations. The majority of chemical incidents between May and August were lead poisoning cases occurring at turn out, although there were a number of incidents of exposure to or poisoning by pesticides, including metaldehyde, arsenic and bromodiolone anticoagulant rodenticide.

Introduction to veterinary surveillance and emerging diseases

The Chief Veterinary Officer, as the head of the Competent Authority, has overall responsibility for veterinary surveillance within Great Britain. High quality veterinary surveillance is needed in order to manage risks associated with disease and to help protect public health, animal health, welfare and trade.

Implementation of testing programmes for systematic surveillance is a function of the State Veterinary Service. This is supported by a network of laboratories (VLA in England and Wales, Scottish Agricultural College in Scotland) with contractual arrangements to provide both the necessary test facilities and to carry out surveillance on material submitted for diagnosis by private veterinary surgeons (casework). Casework is a vital component in helping to achieve many of the objectives of veterinary surveillance, including detecting new or exotic diseases. In addition, the laboratory network provides the necessary infrastructure to enable structured surveys to be carried out.

The Surveillance Group on Diseases and Infections in Animals plays an important role in co-ordinating surveillance programmes of animal health and welfare on farms, including pathogens of both animal and human health significance. Its membership includes representatives of the Agriculture Departments, the Food Standards Agency and the Department of Health.

The heavy workload imposed by the FMD outbreak meant that work stopped on the development of a strategy for veterinary surveillance. The work restarted towards the end of the year, and it is intended to publish a strategy during 2002.

Information on diagnoses and submissions from all parts of Great Britain are recorded, collated and analysed by VLA in the Farmfile database and published annually in the Veterinary Investigation Diagnosis Analysis handbook, in the *Salmonella in Livestock Production* booklet, and in this Report. The database also contributes to the UK Zoonoses Report.

Further information on surveillance in relation to animal diseases is covered in Section C.

Pigs

Pig-related submissions to VLA Regional Laboratories initially began with every indication of potentially exceeding the previous year's submissions, particularly for diagnostics. However, the confirmation of FMD in pigs in Essex on 20 February rapidly led to a curtailment of these submissions. The British pig/sow population declined by 25% from 2000 to 2001 which reflected the unfavourable economic situation of the pig industry set against the occurrence of postweaning multisystemic wasting syndrome (PMWS) and porcine dermatitis nephropathy syndrome (PDNS), classical swine fever and FMD.

Postweaning multisystemic wasting syndrome and porcine dermatitis nephropathy syndrome

Since the late summer and autumn of 1999, PMWS and the epizootic form of PDNS have been identified, particularly in East Anglia and some parts of south-east and south-west England. PMWS and PDNS are rarely reported in Wales but this may just reflect the low pig numbers there. Despite a significant pig population in Scotland, PMWS was not reported for the first time until February 2001; this is still not a widespread problem in Scotland.

Further spread of PMWS and PDNS occurred during the year with seven VLA Regional Laboratories reporting incidents of PMWS; VLA Bury St Edmunds reported several unconfirmed incidents of PDNS. These syndromes remain largely unresolved problems for the industry and also for the initial clinicopathological differential diagnosis of swine fever. As such, they are a major concern to all those involved within the pig industry. The indications are that they are now widespread throughout England and Wales and that they are having a devastating effect on the economics of many pig units, as well as on the general welfare of affected pigs. A survey was completed at the end of 2001, which coincided with similar surveys in Scotland and Northern Ireland so that results of all three surveys could be reported together. These surveys will provide information on incidence, prevalence, morbidity, mortality and duration of outbreaks of PMWS and PDNS on affected farms in Great Britain.

A method for extraction, amplification (using polymerase chain reaction (PCR)) and sequencing porcine circovirus 2 (PCV-2) DNA from archived, paraffin-embedded tissue blocks was developed at the VLA. Viral DNA was detected in blocks from tissues indicating that the virus was present in British pigs at least

as far back as the 1980s. The sequencing data indicated a high degree of PCV-2 DNA conservation amongst cases which had signs of wasting disease and those which did not.

Salmonellosis

A *Code of Practice for the Prevention and Control of Salmonella* on pig farms was published. Salmonellosis frequently occurs concurrently with PMWS and is often very severe both in individual pigs and in pig groups. This, coupled with the effects of PMWS, almost always means that the salmonellosis does not respond to treatment resulting in concerns for:

- the increased risk of zoonotic spread of salmonella to people working with pigs;
- the increased number of chronically infected pigs leading to an increased risk of contaminated pig meat at slaughter; and
- the wider use of antibiotic medication for the treatment of salmonellosis potentially leading to increased risk of residues at slaughter.

Surveillance of swine influenza

Swine influenza was suspected as the cause of sudden death in an 18 kg grower pig. Post-mortem examination revealed a severe pneumonia; histological examination of lung tissue showed moderately severe subacute bronchointerstitial pneumonia with attenuation and metaplasia of bronchiolar epithelium consistent with infection with swine influenza virus.

Histological investigation into 'sudden deaths' amongst four-month old finishers confirmed that the pneumonic lesions involved a low-grade bacterial infection superimposed upon a viral insult, such as swine influenza, and a cuffing pneumonia consistent with a mycoplasma infection. The piglets had reportedly received a mycoplasma vaccine at seven and 24 days of age. Virus isolation was not attempted in these incidents, emphasising the need to institute virus isolation for proper surveillance for new virus strains.

Surveillance in support of EU and World Health Organisation initiatives was proposed and subsequently initiated on swine influenza which is relevant to world surveillance of influenza A viruses in birds, pigs and humans.

Porcine reproductive and respiratory syndrome

Poor fertility was attributed, on the basis of serological results, to infection with porcine reproductive and respiratory syndrome (PRRS) virus in at least 12 incidents during the year. The main clinical feature of PRRS was an increase in returns to service. On one unit, PRRS manifested as late farrowings, pyrexia and bluish discoloration of the ears; the latter presentation however, is uncommon despite the synonym 'blue ear disease'.

VLA research: hepatitis E

A retrospective survey for antibody to hepatitis E virus in pigs is underway. The numbers of sera from adult pigs from the VLA archive in the past two years was limited mostly due to constraints consequent to the classical swine fever and FMD outbreaks. The sera were supplemented with material from a

comprehensive sow survey collected in 1991. The preliminary results of this testing indicated a seroprevalence of at least 75% amongst the British pig samples.

VLA research: porcine circovirus

An assay for detection and genotyping of PCV2 DNA in archival paraffin tissue blocks was developed. The results show that PCV-2 viruses similar but distinguishable from viruses found today infected British pigs as early as 1986, many years before the marked increase in losses due to PMWS / PDNS in England.

Cattle

The year started on an increasing note of optimism for dairy farmers following a long-awaited increase in milk prices. However, everything changed overnight in late February with the confirmation of FMD. The immediate consequences were over-stocking, with associated welfare problems and the interruption of herd fertility through suspension of artificial insemination (AI). Fertility was later compromised by the retention of older cows and for the same reason a progressive rise in herd somatic cell counts occurred in many dairy herds.

Effects of FMD on the cattle industry

The cold, wet spring and late turnout resulted in many farms running out of fodder. However, the summer and extended autumn created an above-average crop growth, which in some part compensated for these shortages. Conversely, such weather conditions favoured Dictyocaulus, parasitic gastro-enteritis and the continuing increase in fasciolosis, which is now encountered in many areas where it was not previously recorded. Outbreaks of babesiosis and tick-borne fever, through grazing of unfamiliar pastures, were encountered throughout the summer and autumn. Pneumonia in the wetter and milder months of the year was also seen.

Many suckler herd farms were overstocked, with additional problems of being unable to move cows and calves to clean paddocks or house them, and dwindling supplies of bedding. Cryptosporidiosis, coccidiosis and calf scours were seen in suckler herds. Digital dermatitis also proved to be a particular problem for suckler herds and up to 50% of dairy herds were said to be affected in northern England. In dairy herds, the retention of calves and barren cows resulted in over-stocking and led to neonatal scours, which were frequently made worse by inadequate bedding.

On many farms grazing was limited through restricted movements and less than ideal grass growing conditions. This, together with limited buffer feeding and the desire to maximise milk yield, resulted in problems of energy insufficiency. Subsequently, reduced fertility was a widely reported problem in many dairy herds. This added to fertility problems arising from the suspension of AI visits and longer-term problems (i.e. the delay in breeding on many dairy farms and the wait for bull movements to be resumed). Movement restrictions also resulted in grazing on unfamiliar pastures, with babesiosis reported in some herds for the first time. There was suggestion that *Clostridium chauvoei* infections in yearlings may have increased for the same reason.

An increase in mastitis antibiotic usage related to the enforced retention of barren cows, of which many were intended for culling on the basis of their somatic cell counts. Suggestion has been made that there may be a significant increase in the national somatic cell count which may persist for sometime, as the current belief is that maximum production is unlikely to exceed quota, which will provide a further incentive to retain such cows.

The State Veterinary Service and VLA now need to monitor the long term effects of prolonged movement restrictions, compromised husbandry practices etc. in order to be able to respond to any emerging problems and diseases.

Bulk milk serology

The following number of tests have been undertaken since bulk milk antibody testing commenced within the VLA in December 1997:

- 16,641 tests for bovine viral diarrhoea;
- 4,809 for infectious bovine rhinotracheitis and;
- 11,520 for *Leptospira hardjo*.

The submission of samples has broadly reflected the distribution of the cattle population and it seems probable that a significant proportion of herds have been tested at some time.

The use of milk for antibody testing, either from the bulk tank, specific cohorts or from individual animals, shows great promise for the future. Recent studies have confirmed the good correlation between antibody concentrations in milk and serum from individual cows, thereby offering considerable scope for a farmer-friendly, non-invasive estimation of serological status. It seems likely that this approach, and further developments in bulk milk antibody testing, will prove to be of increasing value in the post-FMD era as new herds are assembled from various sources, with associated risks of disease outbreaks amongst naïve animals.

Salmonella and *E. coli* O157

S. dublin was diagnosed three times more frequently than *typhimurium* during the year. Cases of *S. typhimurium* DT104 were largely confined to north-west England and Wales.

There was little change in the number of VTEC O157 incidents. Investigation into one incident of VTEC O157 suggested that wild rabbits may have carried infection from a neighbouring, commercial farm to a public animal park by consumption of contaminated herbage.

Acute copper toxicity

Acute copper toxicity continued to be a problem, which mostly affected individual dairy cows, often fed chelated supplements frequently in excess of requirements. Paradoxically, copper deficiency was also a widespread problem in other herds, affecting cattle of all ages.

VLA research: *Mycoplasma bovis*

Mycoplasma bovis is a primary cause of calf pneumonia, arthritis, mastitis, eye disease and other conditions world-wide and has been estimated to cost the cattle industry millions of pounds in mortality and setback losses annually.

A saponised vaccine for *Mycoplasma bovis* was prepared at VLA Weybridge and evaluated in six-week-old calves. The vaccine was shown to be safe and highly immunogenic. No adverse clinical effects were observed and a significant level of protection against a virulent challenge was achieved. The vaccine will be evaluated under field conditions in 2002.

VLA research: Bovine Viral Diarrhoea

Although considerable variations in antigenic properties have been described for pestiviruses, bovine viral diarrhoea virus isolates from British cattle have been found to be genetically relatively homogeneous. Further work on characterisation of bovine viral diarrhoea virus isolates focused on continental European viruses, which were found to be genetically more diverse than first thought. This raises concerns of the impact of the introduction of such strains to Great Britain during post-FMD restocking.

Small ruminants

Fasciolosis continued to cause serious problems, as did parasitic gastroenteritis in both lambs and ewes. Incidents of cryptosporidia had increased compared with the same period last year and the FMD outbreak brought to light evidence that sheep scab was widespread.

Fasciolosis

As would have been expected from the wet summers and mild winters in recent years, fasciolosis continued to cause serious problems. A total of 13 acute fasciolosis incidents and 53 incidents of chronic fluke infestation were recorded in sheep during 2001.

Sudden death was the commonest presenting sign in cases of acute fasciolosis. Signs in chronic fluke incidents included failure to grow, sudden death, pregnancy toxaemia, recumbency and abortion prior to death. Mortality and morbidity varied with some reports where only single individuals showed clinical signs. Other incidents gave rise to serious concerns for welfare.

Several VLA Regional Laboratories reported incidents in which failure to understand the life-cycle of the organism had resulted in inadequate or inappropriate treatment for fluke. It is often poorly understood that in warm, wet conditions significant numbers of metacercariae will remain on pastures late into the winter and that sheep are therefore liable to re-infestation following prophylactic treatment in autumn. In January and February, several Regional Laboratories reported fasciolosis in sheep, which had been dosed with a flukicide in September or October but had received no further doses.

Several Regional Laboratories commented on incidents of fasciolosis, which were considered uncharacteristic for their areas. In mid-February, very small, immature flukes were found in the liver of a 10-month-old Welsh Mountain ewe lamb by a laboratory, which does not usually see immature fluke in sheep after mid-January. Another Regional Laboratory reporting a diagnosis of sub-acute fasciolosis in January noted that they rarely see fluke in ovine livers in that month. Regional Laboratories continue to maintain vigilance for possible flukicide resistance.

Parasitic gastroenteritis and anthelmintic resistance

Parasitic gastroenteritis continued to be a problem in both lambs and ewes. Resistance was confirmed in a south Dorset flock experiencing progressive difficulties in finishing lambs.

Benzimidazole-resistance was demonstrated to *Ostertagia circumcincta*, *Trichostrongylus* spp. and *Cooperia* spp. Additionally the *Trichostrongylus* spp. were also resistant to levamisole. Advice was given not to use benzimidazoles in the foreseeable future, as it is known that when re-introduced, even after a six-year break, resistance quickly develops again. The advice was to rotate avermectins and levamisole annually with the proviso of monitoring the efficacy of levamisoles by checking faecal egg counts 10 days after worming. In addition, the greater benefits of clean grazing were emphasised.

In a separate incident in the Midlands, anthelminthic resistance to benzimidazoles and to levamisole were confirmed using a larval development test. The farm had experienced poor response to wormers in November 2000.

Sheep scab

Although submissions were severely curtailed due to FMD, it was apparent to many VLA staff working on farms during the FMD outbreak that sheep scab was widespread. Control and treatment options were not always properly understood by farmers. The increasing popularity of 'sheep showers' is worrying, since they are ineffective against sheep scab. Showers commonly produce sub-therapeutic chemical levels in the fleece which inevitably favours the survival of resistant mites.

Cryptosporidia

A total of 25 incidents of cryptosporidiosis were diagnosed in sheep and goats during the first quarter of the year; this compares with 17 in the first quarter of 2000. In one outbreak cryptosporidiosis was diagnosed in a group of 30 one-week-old lambs in which one-third were scouring. Zoonotic involvement was also suspected with an associated human infection. However, this was later considered to have originated from an unrelated foodborne source following further investigation by Environmental Health Officers.

In a second outbreak, 40 out of 120 goat kids were affected on a unit which had problems with cryptosporidiosis the previous year; a 10-day-old animal had already died. Cryptosporidia were identified in large intestinal contents.

Dairy sheep and goats

Anecdotal evidence suggested that the dairy sheep and goat sectors are expanding both in size and number of flocks. This is likely to continue, since currently this agricultural sector produces reasonable returns on investment. However, the different management and intensification involved in dairying increases the potential for significant infectious animal disease problems. Chronic respiratory virus infections (Jaagsiekte retrovirus and Maedi–Visna virus) were encountered on

several occasions causing significant production losses in sheep. Johnes disease and enzootic abortion were also been encountered as significant problems through the year.

Cheek teeth disease

An investigation into severe cheek teeth disease in the Norfolk Horn breed of sheep highlighted the importance of this under-diagnosed condition. Abnormal wear or loss of cheek teeth and secondary infections of surrounding tissues have a significant effect on sheep health, leading to discomfort during eating and weight loss. An increased genetic predisposition in the Norfolk Horn breed has probably occurred due to in-breeding when saving this rare-breed from extinction.

Birds

The detection of avian influenza H10, fortunately of low pathogenicity, in a Lincolnshire broiler breeding flock during a routine surveillance investigation was a reminder that despite the distraction of the FMD crisis, other threats must not be neglected. The increasing emergence of free-range enterprises can be expected to bring new threats and challenges to the health status of the national flock, demanding a vigilant approach to biosecurity and disease surveillance.

Avian influenza

Examination of a variety of tissues from a broiler breeder flock for infectious bronchitis virus resulted in the isolation of an avian influenza virus, subtype H10N7. A Restriction of Movement Order was placed on the premises whilst an intravenous pathogenicity index test and sequencing were performed on the isolate. From the results of the test it was concluded that the isolate was a low pathogenicity avian influenza virus.

Osteomyelitis/chronic spinal abscess

Since October 2000, birds with vertebral osteomyelitis / chronic 'spinal abscess' have been identified in at least 16 flocks of broilers, ranging from approximately 30 to 52 days of age. The latest lesion was seen in a 21-day-old bird, the youngest so far. The incidence within flocks is generally low and seldom more than 1%. Birds show lameness or paraplegia clinically indistinguishable from spondylolisthesis ('kinky back').

Experience has shown that the best way to identify the lesion is to dissect the lungs and kidneys away from the spine. Often a firm, almost hemispherical, cartilaginous and fibrous swelling of the ventral part of the vertebral column in the vicinity of the 'free' thoracic vertebra (T4) is immediately noticeable.

The lesion can be up to 1–1.5 cm in diameter, with a necrotic, hollow core. It is often centred on the caudal, or less often, cranial intervertebral joint of T4. This suggests the lesion is at least partly an 'arthritis' of the intervertebral joint, as well as an osteomyelitis / spondylitis. Occasionally the joints on both sides of T4 are involved in individual birds, giving the lesion a 'dumbell' appearance.

Careful sampling of material from the necrotic core of these lesions, for routine aerobic bacterial culture, yielded Gram-positive cocci identified by API50CHL as *Lactococcus raffinolactis* from a very high proportion of lesions (42 out of 46 affected birds from the first 12 farms investigated). This organism has also been isolated from hock joints, knee joints and sometimes air sacs from birds in a few flocks of around 18 to 24 days old, which subsequently had cases of vertebral osteomyelitis / spinal abscess.

The genus *Lactococcus* was created for some former species of the genus *Streptococcus*, and contains organisms usually associated with the dairy environment and with foods. However,

recent PCR work on a number of our putative *Lactococcus raffinolactis* isolates has shown that they are in fact *Enterococcus cecorum*; a species which occurs very commonly in the intestinal flora of chickens. Occasional, and often in single birds, cases of 'spinal abscess' have been seen for many years. The reason for this apparent sudden increase in the occurrence of more serious flock episodes of this condition is not known, but is worthy of a more detailed study.

Ionophore toxicity in turkeys

Ionophore toxicity in turkeys is a potential and significant welfare problem, and is possibly the cause of sudden onset mass mortality. Prompt investigation and differential diagnosis is necessary to exclude notifiable disease infections, avian influenza (fowl plague) and Newcastle disease. A seasonal publicity campaign, on behalf of the Veterinary Medicines Directorate, targeted at the farming press during the autumn was initiated in an effort to reduce the number of incidents. These episodes are frequently associated with feeding errors, for example inadvertent use of broiler feed. Advanced planning of dietary needs through consultation with feed suppliers and private veterinary surgeons is advisable to minimise the risks.

Infectious laryngotracheitis outbreak in a pure-bred flock

Towards the middle of September 2001, two submissions of single replacement pullets from a pure breed domestic fowl flock were made to the VLA. The premises from which they originated contained approximately 1,500 birds in various breeding pens and a flock of approximately 200 laying hens; ducks, geese and guinea fowl were also on site.

The presenting clinical history was of respiratory disease in a group of 100 replacement pullets aged between 10 and 14 weeks. The birds were treated for mycoplasmosis but did not respond to treatment. Clear nasal discharges with some crusting, snuffling and watery eyes were described and some birds were 'gaping'. Initially four out of 100 birds died but morbidity was 40% and subsequently mortality rose to this figure. The first bird to be submitted had no obvious respiratory lesions but had a slightly enlarged spleen. The second 12-week-old bird had an enlarged spleen, enlarged kidneys and haemorrhagic contents

to the intestines. Histological examination of tissues from this bird showed a mild non-suppurative encephalitis, multifocal fibrinoid splenic and hepatic necrosis, and a chronic pericarditis and myocarditis. No cause of the intestinal haemorrhage was determined.

Further information from the premises described spread to the layer flock. With the mortality, histological lesions and spread to other birds on the premises, notifiable disease could not be ruled out and the incident was reported to the local Animal Health Divisional Office as suspect notifiable disease.

Visits by a Veterinary Officer confirmed acute disease with some neurological signs. Ducks on the premises appeared to have conjunctivitis and one goose was ill; the history of vaccination for the flock was unknown. Movement restrictions were placed on the premises and further samples were collected and sent directly to VLA Weybridge.

Blood samples taken from various birds on site showed variable antibody titres to Newcastle disease. However, no haemagglutinating viruses were isolated or detected from any of the samples submitted, including tissues taken for viral examination from the second bird to be submitted to the Regional Laboratory; PCR examinations for *Chlamydia psittaci* were also negative. Subsequently cell culture detected the presence of infectious laryngotracheitis virus and restrictions were lifted.

It appears that the incident was a case of acute infectious laryngotracheitis causing considerable mortality amongst a group of replacement pullets. Egg drop in the laying flock was also described, but the situation on site has gradually resolved.

Wildlife

A programme to deliver 'surveillance for wildlife disease' to Government for the first time in England and Wales was instigated during the year. FMD testing of specimens from wild deer all proved negative.

Surveillance for wildlife disease and arbovirus

A programme to deliver 'surveillance for wildlife disease' to Government for the first time in England and Wales was instigated during the year. Mammalian and avian species will be examined, but the current priority is surveillance for West Nile disease and other arbovirus infections in birds.

One important aspect of this programme was to screen wild birds for West Nile virus infection in conjunction with developing a diagnostic test for the virus at VLA Weybridge. The project and new test were online in August 2001 and from 20 submissions of approximately 40 birds no evidence of the disease has been found.

FMD in wildlife

Testing of specimens for FMD from approximately 100 wild deer, which were sent to the Institute of Animal Health, Pirbright, all proved negative for the causative virus. Epidemiologists confirmed that there was no indication that deer had played any part in British epidemic. This was not surprising as it was suspected that wild deer would not be at great risk of the infection. However, farmed deer had been culled where this had been thought necessary. The VLA was unaware of any reports that hedgehogs or other wildlife species had been involved.

Mass mortality of hares

During the autumn, the VLA was informed of three mortality incidents where hares had been found over a period of days. The numbers of bodies counted varied from six to 12, but the actual mortality in each incident was likely to be much greater. In the first incident in Northumberland, VLA Newcastle confirmed European brown hare syndrome as the cause of death. Investigations at VLA Winchester are still in progress, and bodies have not yet been submitted from the third report at the time of publishing this Report.

While there may be no link between these, it is possible that European brown hare syndrome may be a common factor. This calici-virus infection causes severe hepatitis in hares and occurs predominantly in autumn months.

Miscellaneous captive exotic and farmed species

Submissions for captive exotic and farmed species were markedly reduced following the diagnosis of FMD in February.

Tuberculosis

One case of tuberculosis was diagnosed in an adult male llama. Unfortunately, there was no fresh material available for culture; in previous years *M. bovis* has been diagnosed in this species.

Chorioptic mange

Two cases of chorioptic mange *(Chorioptes bovis)* were diagnosed in camelids. This mite is reportedly difficult to treat effectively. Camelids in Great Britain have been affected by *Chorioptes*, *Psoroptes* and *Sarcoptes* mites.

Salmonella

Reptiles may be a source of zoonotic salmonellosis. *S. arizoniae* was isolated from a pine snake and *S. nima* and *S. kisarawe* were identified in a lizard collection. In both cases, sampling followed outbreaks of salmonellosis in the owner's family.

Welfare

Although the VLA Regional Laboratories are consulted on a wide range of welfare issues arising from cruelty and/or neglect, the majority of the welfare surveillance information is gathered alongside the main endemic disease programme. In all farmed species it is the failure to recognise endemic disease and treat it appropriately, or to instigate prophylactic control measures effectively, which gives greatest cause for concern.

VLA monitoring

The VLA is monitoring changes in husbandry systems and nutrition, lack of efficacy of prophylactic and therapeutic regimes and changing patterns of disease. Each of these may have an influence on the emergence and development of endemic diseases and have the potential to compromise animal welfare as a result.

Parasites

The continuing increase in the prevalence of fluke in sheep and cattle has been widely reported. It has been of particular concern in the areas of the country where it is not traditionally reported, often being unrecognised and untreated as a result. The changing pattern of lungworm infestation has also been highlighted previously, particularly its prevalence in adult cattle, and apparent legacy of changing anthelmintic control measures, reduced use of vaccines and climatic factors. The control of parasites in organic farming systems is problematic, and a number of VLA Regional Laboratories have been asked to advise.

Sheep ectoparasites

Cases of Sheep ectoparasites are reported to Regional Laboratories regularly and problems with treatment regimes are often highlighted, with those suggesting lack of efficacy being reported to the Veterinary Medicines Directorate as suspected adverse reactions. Regional Laboratories commented on the underlying problem with lice, which may follow successful scab treatment.

Mineral deficiency

The increasing trend towards home-mixed rations continued on many cattle units. Calcium / phosphorus imbalance and increased lameness incidents, and vitamin A deficiency and associated blindness have been identified on many farms.

Disease in continual through-put pig systems

Disease in continual through-put pig systems are often reported and investigated. Cases involving pneumonia and enteric disease are most widely reported in which morbidity and mortality can often be high. Many incidents, particularly on units in East Anglia, were complicated by the underlying emergence of post-weaning multisystemic wasting syndrome and porcine dermatitis nephropathy syndrome.

Ionophore toxicity in turkeys

The accidental inclusion of ionophores in turkey finisher ration, or the feeding of an incorrect ration such as broiler feed, led to outbreaks of ionophore toxicity being reported by a number of Regional Laboratories. Affected birds become recumbent and are unable to feed and drink, mortality can be high. Again the Veterinary Medicines Directorate was informed, and the outbreak dealt with as a food safety incident.

GB notifiable disease surveillance

This chapter includes an overview of the 2001 FMD outbreak. A full report has been submitted to the Office International Epizooities and a special edition of the State Veterinary Journal is in production. FMD was confirmed in pigs in an Essex abattoir on 20 February 2001; the first case in Great Britain since 1981. In total there were 2026 confirmed cases across Great Britain and 4,017,000 animals were slaughtered during the year in order to eradicate the disease. The virus responsible for the outbreak was confirmed as the highly virulent pan-Asiatic O type. Restrictions were placed on all FMD-susceptible livestock movements within Great Britain, although this ban was gradually lifted when areas were declared FMD-free; the last reported case was on 30 September 2001. There were four cases reported in Northern Ireland.

FMD

Background

Initial outbreak in Great Britain

The first case of the 2001 outbreak was confirmed in pigs in an abattoir in Essex on 20 February 2001. The source of infection was traced to a pig unit in Tyne & Wear, Northumberland where disease was thought to have been introduced at the beginning of February. Sheep on a neighbouring premises are believed to have become infected by airborne spread from the pig unit.

These sheep were subsequently moved through Hexham market in Northumberland and Longtown market in Cumbria between 13 and 20 February. During these movements other sheep became infected. Disease was subsequently spread to other parts of Great Britain and Northern Ireland as a result of sheep and personnel movements through markets and by dealers. Subsequent local spread took place creating a series of minor epidemics.

Epidemiological enquiries have shown that over 50 premises from the Solway Firth to Devon were already infected by the initial movement before disease was confirmed on 20 February.

The disease

FMD is a highly infectious viral disease which affects cattle, sheep, pigs and goats and some wild animals such as hedgehogs, coypu, rats, deer, camelids and zoo animals including elephants. Symptoms include vesicles (blisters) in the mouth and / or on the feet and other signs which vary somewhat but may include:

- **cattle:** fever, dullness, off feed, shivering, reduced milk yield and sore teats in milking stock, slavering, tenderness of feet or lameness;
- **sheep and goats:** fever, lameness, stiff-legged walk, off colour, tendency to lie down, increased mortality;
- **pigs:** fever, lameness, dullness, off feed.

The FMD virus

There are seven main types of FMD virus and the incubation period varies depending on the strain but can be between two and 14 days. The virus responsible for this year's outbreak was the highly virulent pan-Asiatic O type. FMD, whilst being extremely infectious, is a relatively 'weak' virus, in that it can be killed easily by certain disinfectants, heat and low humidity (hence, the reason it tends to occur in winter months, when moisture levels are high).

FMD can be spread by:

- direct contact with an infected animal (which may excrete the virus a few days before signs of the disease develop);
- airborne spread from an infected animal, which happens readily, depending on weather conditions and local geography;
- indirectly by infected material carried on persons, clothing, vehicles, equipment, sheepdogs, scavenging animals and vermin.

The disease kills only a small percentage of infected animals, mainly the very old and young, and most animals recover in a matter of a few weeks. It is extremely rare for humans to catch the disease, although the last reported case in Great Britain was in the 1967 / 1968 outbreak; the symptoms are mild and flu-like.

The Food Standards Agency advised that there were no implications for the human food chain via this epidemic.

Disease reporting procedures

In line with many other countries, Great Britain has strict FMD reporting procedures. Any person who suspects this disease in an animal or carcase must notify the DEFRA Divisional Veterinary Manager or the police immediately.

Samples are normally sent to the laboratory for confirmation of diagnosis

Restrictions are imposed on a suspected / infected premises. A prompt investigation is then made by a veterinary inspector. If signs suggest that FMD is present, the veterinary inspector, after consulting with DEFRA Headquarters, signs a notice (Form C) which prohibits the movement of animals within a 8 km radius. Samples are normally sent to the laboratory for confirmation of diagnosis.

Laboratory diagnosis and serological surveillance

Laboratory diagnosis was usually based on virus isolation from samples of epithelium taken from affected animals. Serological surveillance testing is based on the detection of antibodies to the FMD virus, an immunological response to infection, rather than direct detection of the agent itself. Serology cannot show whether an animal has FMD in the earliest stages of infection, as most animals do not become positive for antibodies for about five to 10 days after the first appearance of clinical signs. Animals are most infectious two to four days before they show any such signs.

There were two main serological tests: an ELISA test for routine screening and a virus neutralisation test to confirm the ELISA positives or inconclusive results. A competitive solid phase ELISA for FMD was developed for use in the outbreak and was validated and adopted by the Office International Epizooities as a prescribed test.

In March, as the epidemic progressed, a significant requirement for serological testing to support FMD control and surveillance was anticipated. Available testing capacity at the beginning of the epidemic was 400 serological tests per week. Testing for FMD virus has to be conducted in secure laboratories with high levels of disease containment. A project team was established to plan the testing requirement and develop testing capacity. This was initially increased at the laboratory of the Institute for Animal Health, Pirbright; the World Reference Laboratory for FMD. The Centre of Applied Microbiological Research undertook some serological testing on behalf of DEFRA. Major refurbishment was undertaken to install serological testing facilities at the VLA's sites at Penrith, Shrewsbury and Luddington, and the Animal Health Trust at Newmarket; the final laboratory to start testing. With all laboratories operating, a weekly throughput of 200,000 samples became possible. During the year over three million blood samples were tested from 32,000 farms with nearly 1.9 million tests for surveillance work. Overall, 0.08% of samples tested positive for antibody to the FMD virus.

Serosurveillance played a major part in monitoring dissemination of undisclosed FMD. It was of particular value for investigating sheep flocks and goat herds for evidence of exposure to infection, as clinical evidence of disease is not always apparent in these species. It was also the only way to determine when it was safe to lift Restricted Infected Area / Infected Area status and will be crucial for helping Great Britain to regain its FMD-free status.

The most significant application of serological testing was surveillance around infected premises and testing of sheep prior to movements.

Strategy

DEFRA's contingency plans, which were drawn up in compliance with, and met EU requirements in December 1993, estimated the human resources needed to deal with an outbreak of FMD in Great Britain, based on EU recommendations at that time.

However, the scenario that DEFRA faced was that of widespread dissemination of the virus around the country before the initial diagnosis was made. This was far in excess of the assumptions made in the contingency plan. Indeed it is likely that at least 26 primary

outbreaks occurred in Cumbria alone as a result of animal movement. This does not include the additional primaries in the country as a result of transmission by vehicles or people associated with a very large sheep market.

Risk assessment

The spatial epidemiological model 'InterSpread' was developed during the early 1990s, and subsequently enhanced and refined, for use in the advent of an FMD outbreak; it was therefore used from the start of the outbreak. The initial use of the model was to evaluate potential control strategies and provide an estimate of the duration and magnitude of the epidemic for each strategy, in terms of the number of infected premises.

These analyses were conducted during March and involved examining vaccination strategies and pre-emptive culling, as well as the effects of the timespan between detection of infected premises and slaughter. For the control policy which was closest to the one implemented from late March, the model predicted an epidemic of approximately 1,800 to 1,900 affected farms with eradication between July and October 2001 with a low probability of continuing beyond October 2001; in the event this was a remarkably good estimate. The model was also used on a day to day basis, to compare the predicted occurrence with the observed incidence and to monitor for any unusual events, such as the occurrence of infected premises in previously unaffected locations.

Veterinary risk assessments were prepared and updated as and when required

The model was also run to examine the consequences of the virus being seeded to specific areas where the density of susceptible species was relatively high. This was done to identify potential hot spots. The consequences of seeding infection into a pig premises in the east of England was also examined during the latter stages of the epidemic. This was to examine the potential spread within the pig population and to cattle and sheep. The results showed that this would not present any great cause for concern provided that the ban on animal movements was maintained.

Throughout the outbreak, veterinary risk assessments were prepared and updated as and when required. These were made available via the DEFRA website.

Table C1.1: *List of veterinary risk assessments*

Moving livestock directly from farm a to farm b	Sheep shearing
Moving livestock (sheep, cattle, pigs) carcases from their place of slaughter to a different place for disposal	Opening farm shops
Bulk Feed Delivery to Form D premises by lorry	Car boot sales on agricultural land
Opening footpaths to the public	Collection and transport of bull semen and artificial insemination of cows
Feral Deer on infected premises	Grouse shooting
Moving sheep to an alternative place of slaughter, and from there to a further place for disposal	Sheep dipping
Feral wild boar and domestic livestock	Vaccination of TSE experimental animals
Meat and waste products distribution	Pick Your Own operations on farms
Opening deer parks to the public	Shooting Pheasants and Partridge
Horse racing meetings	Wildfowling
Farm visits by DEFRA personnel	Falconry
Specified equestrian events	Hunting with dogs
Moving hay and straw onto a farm	The risk of causing new outbreaks of FMD if the wildlife unit resumes work on the randomised Badger Culling Trial
Official equestrian events on non-agricultural land	What is the risk of causing new outbreaks of FMD if livestock are sold in markets?

Personnel

In London, the Joint Co-ordination Centre was established both to co-ordinate the efforts of all the government departments involved in dealing with the epidemic and the field operation. The Joint Co-ordination Centre was organised and staffed primarily by DEFRA and the Army. It included representatives of the Department of the Environment and Transport for the Regions, Department for Education and Employment, Department of Health, the Environment Agency, the Regional Co-ordination Unit for Government Offices in the Regions, the Devolved Administrations, the Association of Chief Police Officers and the National Farmers Union. In the field, Divisional Veterinary Managers set up Disease Control Centres in all the affected areas, drawing initially on locally available resources, such as local veterinary practices, agricultural colleges and auction marts for suitable personnel. Accommodation was arranged, communications (most notably with stakeholders) were established and training was provided. At the end of March, as the

situation developed and new policies increased workloads, the staffing at the local Disease Control Centres was further enhanced and Regional Operations Directors were appointed who were members of the Senior Civil Service. They supported the veterinary staff already in the field and provided the administrative input to operations, such as disposal, finance and personnel. These centres were also staffed by people drawn from other parts of DEFRA and many Government Offices, both centrally and in the regions. As an example, the Newcastle office grew from seven to 200 staff in two weeks and expanded to over 500 staff over a slightly longer timescale.

At the same time as the operation in the field was strengthened, the Army (101 Logistic Brigade) were brought in, under the name 'Operation Peninsular', to support the slaughter and disposal operation in the field and to provide logistic support, both to the Disease Control Centres and to Headquarters. They brought not only the manpower for the many tasks necessary in such a large operation in the field, but also the expertise and experience of managing a large logistics operation; the Army had around 2,000 personnel involved at the peak of the epidemic. Their emphasis on battle rhythm and the importance of communication and information flow by 'birdtables' (meetings for representatives of key groups in order to resolve particular concerns) held three times a day, was as important as their logistic skills. Each Disease Control Centre was supported by a different unit of the Army who provided, organised and replaced their staff as necessary, finally reducing and withdrawing them as the need lessened. However, they remained on 24-hour standby across the country. The whole exercise demonstrated how effective cross-departmental teams could be.

Qualified slaughtermen offered support and many casual clerical staff were hired to deal with the huge volume of administrative work. Press officers from other Government Departments and the Government Information Service were also drafted in to help both at Headquarters and at local level to deal with the many media enquiries. Additional Animal Health Officers and lay-bleeders, including a considerable number of veterinary students, also assisted. Veterinary staffing was supplemented by the following:

- over 2,500 temporary veterinary inspectors (TVIs) of whom nearly 700 were from 20 countries abroad;
- over 650 foreign government veterinary and technical staff, many of whom came under the terms of the International Veterinary Reserve agreement.

Communications

Instructions from headquarters to field staff were issued through the dedicated field information website **(VIPER)**, making access to instructions quick and easy to retrieve. Hard copies were produced in local offices for transmission to staff working in the field.

Regular briefings took place for staff in Disease Control Centres around the country. This was a good example of joined up government as meetings were held with DEFRA staff, local authorities, other Government Departments, Army personnel and other interested parties.

At the height of the crisis, briefing was made available across the Department with the introduction of the Knowledge Network briefing system. This meant that personnel across the whole department had immediate

access to current briefing and messages. The DEFRA briefing system had an average of 3,480 hits per month on the Intranet site after its launch in April 2001. All DEFRA staff had access via the intranet to a single source of briefing, which began to cover other areas of departmental interest. The Communications Directorate worked with the Cabinet Office to bring forward the launch of a project, part of a wider cross-Government initiative, making briefing available to all Government Officials. DEFRA was one of the first central Government Departments to achieve this.

The News Co-ordination Centre and other Government Departments were able to use the DEFRA Knowledge Network as one of several key sources of information, in order to prepare, support and maintain their own outputs.

An FMD site was established on the DEFRA website to serve as the definitive news source on the outbreak.

There are several stages involved in building a pyre

Offers of assistance

A database was compiled centrally to log offers of assistance. This enabled local Disease Control Centres to search for additional services and products as required.

The huge variety of offers of equipment and supplies included combustible materials and fuel, disposal and incineration facilities, machinery, scientific / environmental assistance and transport etc.

For example, a total of 91,140 railway sleepers and 9,750 tonnes of coal were used, much of which was obtained through the offers of assistance from national and international sources. These were used in the building of pyres for the disposal of carcases.

Vaccination

The British Government had vaccination under active consideration at all stages of the outbreak, and took into account the European and international legal framework within which the use of vaccination could be deployed. Great Britain had contingency plans in place to support a vaccination programme, including access to emergency supplies of vaccine.

Classic ring vaccination was not a practical option when the outbreak was detected. It was very soon clear that about 1.3 million sheep movements had taken place before the first case of FMD was identified and it was believed, and since confirmed, that the virus had been spread across a wide area. A preventative vaccination programme was proposed for cattle in two of the hardest hit areas of Great Britain. It was essential that farmers and others

who would be affected by the decision, supported the programme; not least because of the rules concerning movement restrictions, controls and treatments (especially for meat) with which they would have to comply. At the time it was debated, the necessary level of support was not there.

Over the summer, ring vaccination was looked at again as clusters of new cases developed. But the priority was to eradicate the disease, and scientific and veterinary advice remained that this goal would be achieved fastest and most effectively through culling and through the application of tight biosecurity measures.

Preventative vaccination of pigs was also looked at when the disease appeared to threaten the large pig rearing areas of the country, but again the risk and cost / benefit analysis did not support its use at that time. A key factor was the difficulty in complying with the requirements to achieve pH levels <6 in pork, taken with the overall improved disease situation and the expectation, which was realised, that restrictions on export trade in pork would resume before the autumn.

In December, Great Britain was a key contributor to, and a joint sponsor of, an international conference on the prevention and control of FMD. The conference usefully highlighted some of the key areas the EU needs to address and DEFRA will be working with our European partners in carrying the work forward. The conference identified the need to develop a broad range of disease control options, based on science and including emergency vaccination, to meet particular circumstances. It was agreed there was a need for flexibility in the choice of methods for controlling and eradicating the disease, improved communications and an urgent need for tests to differentiate between infected and vaccinated animals. The conference also considered ways of preventing future outbreaks, including tightening up on import controls at the European border.

Action taken

Restrictions and testing

A premises was placed under 'Form A' restrictions if FMD was being investigated and remained in force if confirmed. A 'Form A' notice placed severe restrictions on movements to and from the premises and prohibited any animal, person or object entering or leaving the premises without permission. Samples, if required, would be taken from suspect animals by a veterinarian and tested at a laboratory. Confirmation of the disease was normally on the basis of clinical signs.

Movement controls

Following confirmation of FMD on 20 February and as soon as it became apparent that the disease was widespread across a sizeable part of the country on 23 February, the whole of Great Britain was designated a Controlled Area. The effect was to ban movements of all farmed livestock throughout Great Britain.

Closure of footpaths/ban on shooting and hunting

Local authorities were given the statutory powers to close footpaths and rights of way, wherever considered necessary. Shooting of game or any other wildlife, hunting with hounds or falcons and point to point meetings were all prohibited within Restricted Infected Areas / Infected Areas, to minimise the risk of the disease spreading on boots or clothing or by the disturbance of wildlife that might carry infection beyond the area concerned. However, these restrictions were relaxed and certain activities were permitted subject to special licences, which were issued depending on how close to an infected premises the activity would be taking place and the length of time that had elapsed since the last confirmed case of infection.

Export controls

The export of FMD susceptible live animals, meat, fresh milk and other animal products from Great Britain was prohibited immediately after the first confirmed case of FMD. In addition, urgent tracing began of all exports to EU Member States of FMD susceptible animals from suspect areas, since 1 February 2001 but before the export ban came into effect.

Protection zones/surveillance zones

Following confirmation of disease, a protection zone of 3 km was imposed around the infected premise. A surveillance zone was also imposed which was between 3 km and a minimum of 10 km around the infected premises, although the size was sometimes increased if prevailing weather conditions were likely to spread the disease further. The protection zone and the surveillance zone together are known as an Infected Area.

Restricted Infected Area

At certain times it was deemed necessary to enforce stricter controls in order to prevent the spread of disease. This was done by employing a Restricted Infected Area, which imposed compulsory biosecurity conditions on livestock farms within it. These included compulsory cleansing and disinfection of all vehicles entering or leaving livestock premises, the requirement for a disinfectant foot bath at the entrance and strict controls on the movement of animals.

Division of country into three areas

Certain movements under official control were permitted for reasons of animal welfare or to allow animals to be slaughtered for human consumption as it would not have been possible to impose a permanent and total movement standstill across the whole of the country. For this purpose, the country was divided into three types of area:

- **provisionally free areas** where no outbreaks of FMD occurred;
- **at-risk areas** where FMD outbreaks were stamped out and Infected Area restrictions were lifted;

- **infected areas** where there had been or still were, FMD outbreaks and where Infected Area movement restrictions continued to be applied pending completion of serological surveillance in the protection zones.

County classification

Later, livestock movement arrangements were based on county, unitary authority and metropolitan district classification. Classification was based on the following:

FMD-free counties

- never had an outbreak of FMD **or**
- no outbreaks of FMD for three months, **and**
- serological surveillance in 3 km zone and 3 to 10 km zone around individual outbreaks complete and seropositive sheep / flocks destroyed, **and**
- all at-risk flocks (farms under Form D investigations and farms known to have received sheep between 1 and 23 February) resolved, i.e. dead or tested negative.

FMD at-risk counties

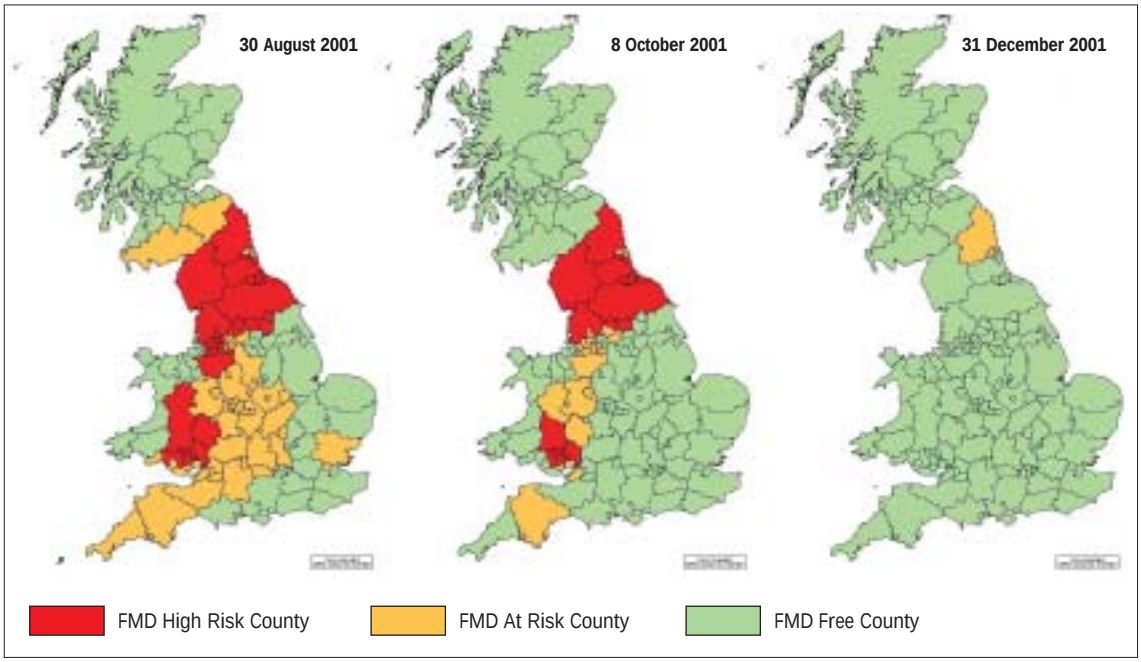
- no outbreaks in the county for the past 30 days and entirely outside an existing Infected Area / Restricted Infected Area, **and**
- serological surveillance in 3 km zone completed, **and**
- serological surveillance in 3 to 10 km zone around outbreaks not complete or at risk flocks (farms under Form D investigations and farms known to have received sheep between 1 and 23 February) still to be resolved, i.e. dead or tested negative.

FMD high risk counties

- outbreaks of FMD in the past 30 days, **or**
- surveillance in 3 km around outbreaks not completed, **and**
- surveillance in the 3 to 10 km zone not completed, **and**
- flocks at risk of FMD (farms under Form D investigations and farms known to have received sheep between 1 and 23 February) not resolved.

In allocating counties to these classifications, DEFRA also took into account the number of sheep in the county concerned and the previous weight of FMD infection as well as the amount of serological surveillance completed.

Figure C1.1: *County classification showing decline of disease*



Authorised movements

Movements under official control were permitted from areas of low to high FMD risk. Movements in the reverse direction were not permitted until later in the outbreak when limited movements of cattle and pigs were allowed on condition that the animals being moved were subject to prior official veterinary examination and that they were quarantined on the premises of destination for 21 days after they had moved.

In addition to the above, movements under the Livestock Welfare Disposal Scheme (a scheme set up to permit animals to be sent for disposal on welfare grounds) were allowed, subject to official veterinary inspection. Also certain other movements, under official control and subject to licence, were permitted; for example, so that animals could receive veterinary attention or so that they could be moved to common grazings.

Compulsory slaughter

All animals on infected premises were slaughtered and compensation paid. Slaughter on the grounds of suspicion of disease was also undertaken, particularly in the case of sheep where the diagnosis of FMD on the basis of clinical signs was difficult. Carcases were either destroyed on pyres or were buried or rendered. The extent to which these methods were used varied during the outbreak and depended in part on the species of animal involved. Cattle over five years of age cannot be buried but must be destroyed by incineration or rendering because of BSE concerns. A target time of 24 hours was set for the slaughter of animals on confirmed / suspect premises starting from the time suspicion of FMD was reported to the local Disease Control Centre.

FMD-susceptible species on premises identified as being at risk of disease **(dangerous contacts)** due to contacts / links with an FMD

infected premises and identified as a result of the epidemiological enquiry, were also slaughtered. FMD-susceptible species on premises neighbouring **(contiguous)** to an infected premises were also slaughtered. However, in the latter cases, cattle and certain other animals did not need to be killed if the official veterinarian responsible for the infected premise concluded, on the basis of a risk assessment that the conditions of biosecurity under which the cattle had been held did not result in their exposure to FMD.

A target time of 48 hours was set for the animals on contiguous premises to be destroyed, starting from the time suspect FMD was reported to the local Disease Control Centre.

All animals on infected premises were slaughtered

In some parts of the country, notably parts of Cumbria, Dumfries & Galloway, the compulsory slaughter of all sheep within a 3 km radius of an infected premise was undertaken due to concerns that extensive undisclosed disease in sheep might pose a threat to cattle in the area.

Compensation

Farmers received compensation for the full market value of slaughtered animals whether they were dangerous contacts or infected animals. In addition, compensation was paid for any feeding-stuffs or any other materials destroyed or seized as being contaminated, which could not be satisfactorily disinfected. There was no compensation paid for consequential losses however they arose.

Cleansing and disinfection

Cleansing and disinfection of premises that were slaughtered out took place after carcases had been removed. All farm buildings, machinery, farm vehicles, storage bins, silos that could have been contaminated with FMD virus etc. were thoroughly cleansed and disinfected with approved disinfectants. Cleansing and disinfection of slaughterhouses and markets etc. was also carried out if there had been any possible contact with FMD infected animals.

Lifting of restrictions

Lifting restrictions in Infected Areas is governed by EU rules and the process takes at least 30 days to allow for disinfection and cleaning and time to ensure that blood tests carried out on animals in the protection zone have proved negative for FMD. This was a rigorous process and involved veterinary inspections and laboratory testing, including blood testing, on farms around the infected premises to make sure the disease had not been overlooked.

Once farms were released from Infected Area restrictions, animals could be moved, if necessary, to any slaughterhouse willing to accept them as long as it could be reached on an uninterrupted journey, which took less than four and a half hours; a veterinarian no longer had to inspect them before movement.

Farmers could apply for licences to move their livestock to other areas under the livestock movement schemes and they were no longer restricted to licensed movements in their own Infected Area.

Biosecurity

Livestock farmers were advised that in order to stop the continued spread of the disease, the following biosecurity measures needed to be adhered to:

- prevention of contact between different groups of livestock;
- minimising the number of journeys made to visit stock;
- carrying out, at all times, the most rigorous cleansing and disinfection of personnel, equipment and vehicles.

Strict biosecurity was essential

Advice also stated that contact did not have to be direct such as examining or lambing an infected animal, but could be indirect, including driving a vehicle over a track where infected sheep have walked or putting equipment down on straw where sheep have been bedded or lambed. A small particle of infected dung trapped in the tread of tyres or boots is a typical example of how the virus may be inadvertently spread between farms.

Rural recovery

In October, Great Britain's rural recovery co-ordinator, Lord Haskin, published his findings into the state of the Cumbrian rural economy; the area hit hardest by the disease. Lord Haskins recommended helping the short-term survival of business.

The report highlighted measures needed to promote the recovery of the tourism and small business economy in Cumbria.

Regional seminars on recovering from FMD

A series of regional seminars, backed up by a programme of business advice for farmers whose animals had been culled, was rolled out by DEFRA. Comprehensive advice on restocking was also made available.

Farmers from over 7,500 premises who had their animals culled, received invitations to a series of seminars. These were organised through the Rural Development Service of the DEFRA.

When cleaning and disinfection had been completed, farmers whose stock had been compulsorily slaughtered were eligible for up to five days of free business advice. It was suggested to farmers that they might wish to consider remodelling their business, which could be assisted by the Department's environmental and rural development schemes. In areas where a large number of premises have been slaughtered out there may be opportunities for group activity such as marketing, environmental management or resource sharing.

The advisor, with the help of the farmer, also reviewed the farm business and arranged for an environmental evaluation to be conducted by an appropriate specialist. This helped farmers take strategic decisions about the future of the business and prepare a recovery plan.

Last case and last infected area

The last case of FMD in Great Britain was on 30 September. However, the last remaining Infected Area was not lifted until midnight on 28 November; this released 1,474 farms from Infected Area restrictions. The lift followed a programme of blood testing of sheep and goats within the 3 km protection zone around infected premises. Blood testing continued on sheep and goats within the 10km surveillance zones as part of the process towards the reclassification of counties to 'at-risk' and 'FMD-free'.

The future

Restocking

Restocking can only take place under the following conditions:

- Full and final cleansing and disinfection of the farm must take place and a period of 21 days allowed to elapse;
- Movements of stock onto the farm must be licensed by DEFRA or the Scottish Executive Environment Rural Affairs Department;
- The numbers of livestock permitted for initial restocking must be set out in the premises restocking plan, which has to be approved by the Divisional Veterinary Manager;
- Depending on the origin of sheep, testing of the flock of origin and all the sheep to be moved may be required;
- Animals must be inspected regularly for four weeks following restocking. Sheep and goats will be blood tested after 28 days. If all is clear, restrictions are lifted, following a final veterinary inspection.

Full and final cleansing and disinfection on the farm must take place

If the farmers do not wish to restock at once, restrictions are lifted four months after the full and final cleansing and disinfection, subject to a final inspection. If it was not possible to complete a full cleansing and disinfection to DEFRA's satisfaction, 12 months **must** elapse after the preliminary cleansing and disinfection before restocking can take place.

The issues around restocking went much wider than the rules designed to prevent a re-occurrence of FMD on a premises. Other issues included how to ensure that the stock brought in was free from other diseases, and making farm business and environmental advice available so that farmers could consider the business options open to them.

Resumption of imports

The ban on the importation of FMD-susceptible animals from Member States was subsequently lifted on 12 November 2001.

Independent inquiries

Two independent inquiries and a Policy Commission were set up reporting to the Prime Minister and the Secretary of State for Environment, Food and Rural Affairs into the lessons to be learned from the 2001 outbreak and the future of farming and the countryside. These are:

- **Inquiry into the lessons to be learned** from the FMD outbreak of 2001 and the way the Government should handle any future animal disease outbreak, to be chaired by Dr Iain Anderson, to 'make recommendations for the way in which the Government should handle any future major animal disease outbreak, in the light of the lessons identified from the handling of the 2001 FMD outbreak in Great Britain';
- **Scientific review by the Royal Society** of questions relating to the transmission, prevention and control of epidemic outbreaks of infectious disease in livestock. The committee is to be chaired by Sir Brian Follet FRS and is to 'review scientific questions relating to the transmission, prevention and control of epidemic outbreaks of infectious disease* in livestock in Great Britain, and to make recommendations by summer 2002'. (*i.e. transmissible disease that have the potential for very serious and rapid spread, irrespective of national borders, that is of serious socio-economic or public health consequence and that is of major importance in the international trade of animals or animal products);
- **Policy Commission on the Future of Farming and Food**, as pledged by the Government, to be chaired by Sir Don Curry is to "advise the Government on how a sustainable, competitive and diverse farming and food sector can be created which contributes to a thriving and sustainable rural economy, advances environmental, economic, health and animal welfare goals, and is consistent with the Government's aims for the Common Agricultural Policy reform, enlargement of the EU and increased liberalisation".

These inquires should be completed within six months. If any important emerging recommendations are made, DEFRA will publish interim findings.

Great Britain's FMD-free status (without vaccination) for the purposes of international trade was restored by the Office International Epizooities on 22 January 2002

Other diseases

Brucellosis

The national brucellosis surveillance programme continued during 2001. Bulk milk samples from all dairy herds were tested every month; beef breeding herds are blood-tested every two years. During the year, the planned level of bulk milk sampling was maintained, although blood sampling of beef herds was temporarily reduced due to FMD control measures. Cattle keepers are required to report all abortions or premature calvings to the Divisional Veterinary Manager so that the possibility of brucellosis can be eliminated. Treatment for brucellosis of cattle and contacts which have been exposed to infection must be slaughtered.

VLA research: *Brucella*-related work

A new assay, the fluorescence polarisation assay was evaluated for detection of antibody to Brucella in cattle, swine, sheep and goats. This assay is to be validated prior to introduction as an alternative test.

During the year, research focussed on identification of novel vaccine candidates and production of DNA vaccine constructs. Progress was made with a mouse model for evaluating the efficacy of *Brucella melitensis* candidate genes cloned into suitable expression vectors. The target date for completion of this is April 2002.

An ELISA was developed to detect production of pig gamma interferon from specifically stimulated porcine whole blood preparations. Evaluation of porcine interferon responses for the specific diagnosis of brucellosis infection in pigs, using field samples from France, is hoped to begin in early 2002.

Enzootic bovine leukosis

Surveillance for enzootic bovine leukosis (EBL) continued by annual testing of bulk milk samples from 20% of dairy herds and blood testing of 25% of beef breeding herds. The planned level of bulk milk sampling was maintained during the year, although blood sampling of beef herds was temporarily reduced due to FMD control measures.

VLA research: enzootic bovine leukosis

The achievement of EBL disease-free status in Great Britain in July 1999 enabled some changes to be made to the EBL surveillance programme. A reduction in the volume of testing of milk from dairy cattle and serum from beef cattle, in line with EU requirements, was discussed and initiated with DEFRA. A tendering exercise was completed to appoint approved laboratories to conduct surveillance testing for both EBL and *Brucella*.

Measures were put in place within VLA Weybridge and VLA Winchester during 2001 to permit continued surveillance and diagnosis of EBL during the FMD epidemic. However, very few samples were received. The shortage of samples does not affect the national disease-free status as herds only have to be screened every four years.

VLA research: classical swine fever

The Mammalian Virology Detection Unit continued to receive submissions from suspect cases of classical swine fever (CSF), due to the increased awareness within the Animal Health Service. Large numbers of suspect cases were also anticipated due to the increasing incidence of porcine dermatitis and nephropathy syndrome.

Significant numbers of serological tests for CSF were performed in 2001 and VLA investigated 20 cases of deaths among sentinel pigs on restocked farms, all with negative results. In addition, reverse transcription PCR tests (RT-PCR)were carried out on samples archived during the outbreak, to provide DEFRA with additional epidemiological information. In 2001, submissions of suspect cases of CSF ran at five per week, but declined markedly following the outbreak of FMD.

A collaborative project which is underway with the Institute of Animal Health, Pirbright, will investigate the immunopathogenesis of CSF. Initial work is focussed on the effects of CSF infection apoptosis and the production of cytokines.

Table C1.2: *Last recorded outbreaks of notifiable disease in Great Britain*

DISEASE	ANIMALS AFFECTED	LAST OCCURRED IN GREAT BRITAIN
African horse sickness	Horses	Never
African swine fever	Pigs	Never
Anthrax	Cattle and other mammals	1997
Aujeszky's disease	Pigs and other mammals	1989
Avian influenza *(fowl plague)*	Birds	1992
BSE	Cattle	2001
Blue tongue	Sheep and goats	Never
Brucellosis *(Brucella abortus)*	Cattle	1993
Brucellosis *(Brucella melitensis)*	Sheep and goats	1956
Classical swine fever	Pigs	2000
Contagious agalactia	Sheep and goats	Never
Contagious bovine pleuropneumonia	Cattle	1898
Contagious epididymitis *(Brucella ovis)*	Sheep and goats	Never

Continued over

Table C1.2: *Last recorded outbreaks of notifiable disease in Great Britain (continued)*

DISEASE	ANIMALS AFFECTED	LAST OCCURRED IN GREAT BRITAIN
Contagious equine metritis	Horses	1997
Dourine	Horses	Never
Enzootic bovine leukosis	Cattle	1996
Epizootic haemorrhagic Virus diseases	Deer	Never
Epizootic lymphangitis	Horses	1906
Equine viral arteritis	Horses	1998
Equine viral encephalomyelitis	Horses	Never
Equine infectious anaemia	Horses	1976
FMD	Cattle, sheep, pigs and other cloven hooved animals	2001
Glanders and farcy	Horses	1928
Goat Pox	Goats	Never
Lumpy skin disease	Cattle	Never
Newcastle disease	Birds	1997
Paramyxovirus of pigeons	Birds	2001
Pest des petits ruminants	Sheep and goats	Never
Rabies	Dogs and other mammals	1970
Rift Valley fever	Cattle, sheep and goats	Never
Rinderpest *(cattle plague)*	Cattle	1877
Scrapie	Sheep and goats	2001
Sheep pox	Sheep	1866
Swine vesicular disease	Pigs	1982
Teschen disease	Pigs	Never
Tuberculosis *(bovine TB)*	Cattle and goats	2001
Vesicular stomatitis	Cattle, pigs and horses	Never
Warble fly	Cattle, deer and horses	1990

Table C1.3: *Summary of statistics of the principal animal and poultry diseases in Great Britain from 1997 to 2001*

Years	1997	1998	1999	2000	2001
Anthrax					
Counties involved	1	–	–	–	–
Confirmed cases	1	–	–	–	–
Cattle deaths	1	0	0	0	0
Aujeszky's disease					
Counties involved	–	–	–	–	–
Outbreaks	0	0	0	0	0
Avian influenza					
Counties involved	–	–	–	–	–
Outbreaks	–	–	–	–	–
Birds slaughtered	0	0	0	0	0
BSE					
Counties involved	64	62	60	62	62
Animal deaths – cattle	5,313	4,046	2,857	1,798	1,153
Confirmed cases (by histopathology)	4,847	3,445	2,677	1,541	1,095
Contagious equine metritus					
Counties involved	2	–	–	–	–
Confirmed cases	2	0	0	0	0
Enzootic bovine leukosis					
Counties involved	–	–	–	–	–
Outbreaks	–	–	–	–	–
Number of reactors	0	0	0	0	0
Equine viral arteritis					
Counties involved	3	1	–	–	–
Outbreaks	3	2	0	0	0
FMD					
Counties involved	–	–	–	–	32
Outbreaks	–	–	–	–	2,030
Animals slaughtered	0	0	0	0	4,068,000
Newcastle disease					
Counties involved	6	–	–	–	–
Outbreaks	11	–	–	–	–
Birds slaughtered	648,000	0	0	0	0
Paramyxovirus of pigeons					
Counties involved	12	10	22	12	16
Outbreaks	17	18	36	27	20

Table C1.3: *Summary of statistics of the principal animal and poultry diseases in Great Britain from 1997 to 2001 (continued)*

Years	1997	1998	1999	2000	2001
Scrapie					
Counties involved	46	48	43	44	36
Confirmed cases	508	500	593	606	302
Classical swine fever					
Counties involved	–	–	–	3	–
Outbreaks	–	–	–	16	–
Animals slaughtered	0	0	0	74,793	0
Swine vesicular disease					
Counties involved	–	–	–	–	–
Outbreaks	–	–	–	–	–
Animals slaughtered	0	0	0	0	0
Warble fly					
Counties involved	–	–	–	–	–
Confirmed cases	–	–	–	–	–

International trade

DEFRA has an important role in ensuring that businesses and individuals are able to export animals and products by providing health guarantees to importing countries. Various measures are adhered to in order to maintain Great Britain's high animal health status. These were designed to ensure that imported animals and products of animal origin do not present unacceptable risks to the health of other animals or to people.

During the year, EU protection measures against FMD prohibited the export and import of livestock and bi-ungulate animals and placed restrictions on exports of products made from them (including milk). The ban on the importation of FMD-susceptible animals from Member States was subsequently lifted on 12 November 2001.

Exports and export controls

DEFRA has a responsibility to ensure that exports of live animal and animal products from Great Britain to Member States are in accordance with EU requirements. For Third Countries, exports are facilitated by arrangements to meet the requirements of the governing authorities in the country of destination. This is usually by export health certification, signed by an official veterinarian of the Department providing assurances regarding the current disease status in Great Britain and the health of the animal(s) or appropriate hygiene measures or processing for products. For this reason it is usually necessary for the consignment to be subject to veterinary examination prior to exportation.

Animal products

Export restrictions on animal products of bi-ungulate origin

Following confirmation of FMD in Great Britain, a Commission Decision was introduced banning all exports, including milk, of bi-ungulate origin as from 21 February 2001. A subsequent Commission Decision on 1 March replaced this and introduced certain relaxations to the Decision which were amended and updated several times during the course of the epidemic to enable a step by step approach to exports (accompanied by official certification in most cases) of the following:

- goods treated in such a way as to destroy the FMD virus;
- untreated non-Great Britain goods processed / stored / transported in such a way to prevent contamination with the FMD virus;

- untreated goods (fresh meat / preparations) derived from animals reared and slaughtered in disease-free areas in Great Britain.

Initially, processing establishments had to be wholly dedicated to processing 'export-eligible' material, but after a period during which no further outbreaks of FMD were reported, it was permissible to dedicate a time period for the processing of the material intended for export.

Only meat and products from pigs from areas which had never had a case in the current outbreak were eligible for export at first. However, this was subsequently extended to include those which had been free for three months and in which serosurveillance had been completed with satisfactory results. Also, the species of origin was extended to include cattle, sheep / goats, farmed game and wild game.

Restrictions on the export of bovine goods from Great Britain as a result of BSE continued. However, the two establishments previously approved to export beef derived from cattle born, reared and slaughtered under the Date Based Export Scheme withdrew their approval following the FMD outbreak and at the time of writing this report had not sought re-approval.

Portal surveillance to ensure compliance of the export restrictions due to BSE was extended to include FMD related restrictions.

Notifications to Member States and Third Countries

DEFRA notified the EU Member States and Third Countries of which FMD-susceptible animals had been exported prior to the FMD outbreak, and some exported animals originated from premises which were subsequently found to be infected. This resulted directly in outbreaks of disease in France and Ireland.

Semen exports

In the wake of the Classical Swine Fever outbreak in August 2000, there was steady progress made in regaining lost ground for the export of pigs and porcine semen. However, this was halted when FMD broke out and, at the beginning of the FMD outbreak, only bovine semen collected in Great Britain before 1 February 2001 was permitted to be exported to Member States. DEFRA was successful in getting agreement under EU Rules to allow the export of other categories of semen as follows:

- frozen bovine and porcine semen collected before 1 February 2001;
- frozen bovine and porcine semen imported into Great Britain in accordance with conditions laid down in relevant Commission Decisions;
- frozen bovine and porcine semen collected after 30 September 2001 in accordance with conditions laid down in relevant Commission Decision.

Ban on export of bovine embryos

Export of bovine embryos from Great Britain was already banned due to the BSE situation. This ban relates to all bovine embryos whether produced in Great Britain or imported, and whether intended for export to EU Member States or Third Countries.

Live poultry exports

Exports of live hatching eggs and day-old poultry was only marginally affected by the FMD outbreak. A number of countries initially placed a ban on all live animal imports from Great Britain but following negotiations between DEFRA and these countries, based on the fact that poultry are not capable of contracting FMD, a relaxation of the ban for nearly all importing countries was achieved. However, a small number of countries maintained their restrictions on live poultry imports from Great Britain until almost the end of the year.

Horse exports

Additional export requirements for horses from Great Britain were imposed under EU FMD protection measures, because of fears of mechanical transmission of the virus. Some Third Countries temporarily suspended the importation of horses from Great Britain or required additional safeguards.

Imports and import controls

In order to ensure that animal diseases are not imported into Great Britain DEFRA enforces a system of controls which rely primarily on imported animals and animal products being accompanied by health certification and being subject to post-import veterinary inspection. The controls fall into two main categories: those for imports from EU Member States and those for imports from Third Countries.

However, responsibility for safeguarding Great Britain's animal health status does not rest solely with DEFRA. In accepting the greater freedom under the Single Market, importers must assume responsibility for knowing what they are importing and under what conditions it should be imported.

Controls on legal imports

Most live animals consigned to Great Britain from other Member States must be accompanied by an official health certificate. The certificate contains information on the origin of the animals and also includes assurances relating to their health status. EU controls require certification and notification of arrival of imports into Great Britain from other EU Member States. DEFRA has powers to carry out spot checks at the premises of destination.

Animals and animal products being imported into Great Britain from Third Countries must be checked at a Border Inspection Post either in the first Member State they transit when they reach the EU or in Great Britain if on a direct route.

Imports from both EU Member States and Third Countries which do not comply with import conditions are re-exported or destroyed and personal imports of animal products are strictly limited.

Following interruption by FMD, work on disease control measures resumed on a new Statutory Instrument to replace the Products of Animal Origin (Import & Export) Regulations 1996.

Controls on illegal imports

No matter how strict import controls are it is not possible to guarantee that disease will never enter the country. In Great Britain, co-ordinated cross-Government action is underway to reduce the risk from imported meat and other products, including:

- better information for people travelling;
- more effective sharing of information among the enforcement agencies;
- better targeting of resources at ports;
- actively considering further options.

During the year, DEFRA was in the process of updating and strengthening enforcement legislation on imports and this is scheduled to be in place by early 2002.

Captive birds

The new Commission Decision on captive birds took effect on 1 November. This laid down harmonised conditions for export health certification, post-import quarantine and disease testing for captive birds imported to EU Member States from Third Countries. This involved very little change to quarantine measures in Great Britain but there were considerable changes in other procedures, such as the abolition of import licences and greater involvement Local Veterinary Inspectors in quarantine inspection duties.

As a result of the introduction of harmonised conditions for the import of captive birds to all Member States, it was possible to reduce the formalities associated with the movement of captive birds within the European Community. Licensing and quarantine have been abolished for the import of captive birds and pet birds to Great Britain from other Member States.

Poultry imports

British poultry imports are mainly commercial generation layers or broilers. There was some increase in the volume of imports, as a reduction in sales of red meat, as a result of FMD, resulted in greater sales of poultry.

VLA research: international trade programme

In Autumn 2001, serum samples taken from turkey poults imported from the United States of America whilst in quarantine were found to be sero-positive for *S. arizona*. Repeat testing was also sero-positive for many birds but no *Salmonella* was isolated from the birds at post-mortem or from two rounds of intensive faecal culture from the flocks. On subsequent inquiry, it was discovered that for the past several years the United States' turkey company had routinely used a multi-organism polyvalent 'autogenous' flock vaccine in parent flocks. Included in this vaccine were *S. agona*, *S. anatum* and *S. reading* as well *P. multocida*. It is possible that the use of this vaccine may have provoked some non-specific maternal immunity but there are no antigens shared with the turkey Arizona strain and the vaccine has been in use for several years without producing the persistent reactors which occurred with this consignment. It is possible that a temporary change in growth conditions for vaccine production may have led to increased immunogenicity or that the parent flock may have been exposed to a transient *Salmonella* infection which may have led to higher than normal maternal antibody levels.

VLA research: equine viral arteritis

A TaqMan RT-PCR test for screening semen was developed, which is superior to virus isolation as a means of detecting equine viral arteritis. Once full validation is achieved, the test will be offered for consideration as an alternative to pre-export isolation for import certification.

Livestock protection

Artificial breeding activities were severely curtailed by the FMD epidemic during 2001. Emergency artificial insemination (AI) regulations were implemented to allow certain activities to resume. Significant restructuring of the bovine AI industry took place during the FMD epidemic, with one company ceasing to offer inseminator services and the closure of another semen processing centre.

Artificial insemination

AI in cattle and pigs is carried out under statutory controls. Most activities may take place only under authority of licences granted by the appropriate Minister.

Due to the FMD epidemic a veterinary risk assessment was carried out and appropriate licence conditions developed to allow certain activities to resume. In order to implement these, it was necessary to amend the FMD order and bring in emergency AI regulations.

Bovine AI

Bovine semen may only be collected from bulls which have undergone clinical examination and testing by a DEFRA Veterinary Officer or, exceptionally, an AI centre veterinarian. However, on-farm semen collection was suspended during the FMD epidemic.

Significant restructuring of the bovine AI industry took place during the FMD epidemic, with one company ceasing to offer inseminator services and the closure of another semen processing centre. These premises were subsequently purchased by a consortium, which plans to reopen them in due course.

Training in AI

The epidemic highlighted legal and practical difficulties over inseminator training. Steps were taken to begin to regularise the position by preparing a draft order under the Veterinary Surgeons Act and a draft amendment to the 1985 AI Regulations.

Ovine AI and embryo transfer

Great Britain does not normally regulate ovine germplasm movements but these were not permitted into, within or out of infected areas except under licence during the FMD epidemic. Licences to permit some AI and embryo transfer in sheep within FMD infected areas were issued. Inconsistencies, however, developed between controls over the movement of live animals and controls over the movement of germplasm.

Porcine AI

No movements of semen were permitted from pig AI centres within infected areas.

Animal welfare

Dealing with the FMD outbreak had the potential to cause severe welfare problems for the animals directly involved or affected by essential movement restrictions. DEFRA introduced a number of measures to help alleviate problems caused by such restrictions and also issued detailed guidance on the slaughter of animals in the field. Great Britain continued to offer valuable input into EU and Council of Europe discussions on farm animal welfare.

Measures to alleviate welfare problems caused by FMD restrictions

Restrictions on animal movements due to FMD had the potential to increase the risk of significant welfare problems where stock could not be moved. DEFRA took a number of measures to help alleviate these problems.

- Advice was provided to farmers under restrictions with respect to changes in housing, feeding and management to deal with increased numbers of stock on their premises.
- Animals were allowed to graze on land set aside under the Arable Area Payment Scheme and licensed movements to common grazings were permitted, and where risk assessment was allowed licences to move fodder were issued.
- A licence for the movement of animals, which allowed them to move across roads on the same holding and / or between local holdings under the same ownership, was introduced. This licence was issued on welfare grounds and was subject to certain conditions.
- Arrangements were introduced for the licensed movement of animals over long distances, subject to condition and licences for movement of animals on common land. In total over a quarter of a million veterinary inspections were made on consignments of animals prior to movement for welfare purposes and no cases of FMD were detected.
- Animals could be moved for veterinary treatment under Animal Treatment Licences and licensing arrangements were put in place to allow the dipping and shearing of sheep.
- The Livestock Welfare Disposal Scheme was opened to deal with severe welfare problems arising from the FMD restrictions that could not be dealt with by any other means. This scheme provided for the removal and disposal of animals, the cost of which was paid by DEFRA. Just over two million animals were taken into the scheme during the year. A second scheme for light lambs dealt with a further half a million animals up to the end of November, when the Scheme closed.

As the FMD epidemic progressed, changes were made to facilitate the movement of animals, balancing the welfare benefits of the movements with the potential risk of spread of FMD. Finally, in September, a new system of licensing movements administered by local authorities came into force for FMD-free counties, animals other than sheep in 'at-risk' and 'high-risk' counties, and for sheep in 'at-risk' and 'high-risk' counties. The occupational and local licences were replaced with sole occupancy licences which allowed animals to move between premises in the same management and control for husbandry or management reasons, thus facilitating their welfare.

Slaughter during the FMD epidemic

It is a fundamental requirement that animals must not be subjected to avoidable excitement, pain or suffering before or during slaughter or killing for disease-control purposes. Animals that are stunned before slaughter are unconscious and cannot feel pain. DEFRA's aim is to encourage the highest standards regardless of the method used to kill or slaughter animals.

Detailed guidance on the slaughter of animals in the field was issued in order to enhance the standing instructions on welfare at slaughter. Although there was considerable concern about the slaughter of animals during the outbreak, subsequent investigation indicated that the majority of complaints were based on misunderstandings by the general public as to the approved procedures.

Religious slaughter

There are long-standing provisions in British law which, subject to specific requirements, permit the slaughter of animals for food without stunning to meet Jewish and Muslim requirements. Whilst the Government would prefer that all animals were stunned before slaughter, it recognises the needs of certain communities and accepts the importance which they attach to the right to slaughter animals for food in accordance with their beliefs. The law requires that religious slaughter must be carried out only in licensed red meat slaughterhouses or, in the case of poultry, in licensed or other officially regulated slaughterhouses.

A list of slaughterhouses willing to offer a religious slaughter service to the Muslim community during the festival of Eid-ul-Adha was prepared and issued to Muslim organisations in 2001.

EU wide ban on pithing of cattle

The EU wide ban on pithing of cattle going into the human or animal food chain was introduced during the year.

Amendment to the Welfare of Animals (Slaughter or Killing) Regulations 1995

Consultation exercises were carried out seeking views on the introduction of amendments to The Welfare of Animals (Slaughter or Killing) Regulations 1995.

A minor amendment to these Regulations came into effect on 31 December, which permitted a wider range of gas mixtures to be used to kill poultry.

New codes of practice for slaughterhouses

Preparations for new codes of practice for both red and white meat slaughterhouses were being made during the year.

The Veterinary Surgeons Act 1966

As promised under the Government's 'Action Plan for Farming' action is being taken to amend Schedule 3 of the Veterinary Surgeons Act and introduce three Exemption Orders. The Government does not want to needlessly reserve to veterinary surgeons, procedures that could be carried out by properly trained and competent para-professionals. The welfare of animals would be protected, as only trained para-professionals would be allowed to perform these deregulated procedures. The new regulations would also encourage greater co-operation between para-professionals and veterinary surgeons.

During the year, a consultation exercise was carried out on DEFRA's proposal to amend Schedule 3 of the Act. This would allow trained and qualified veterinary nurses, and student veterinary nurses under supervision, to carry out certain procedures on all animals, rather than only companion animals as at present.

Another consultation was carried out relating to the concept of allowing properly trained and certified para-professionals to carry out artificial insemination of mares and certain acts of equine dentistry. A third proposal, to allow para-professionals to carry out per rectum ultrasound scanning of cattle for pregnancy detection, has been the subject of two previous consultations. These procedures are currently only allowed to be carried out by registered veterinarians.

Welfare on farm

The number of visits made to check compliance with welfare legislation and codes fell to 1,430 in 2001; a direct consequence of FMD. However, a total of 251,901 veterinary inspections were made in association with movement for welfare purposes during the outbreak. Some 18,127 veterinary inspections were made to assess welfare needs prior to on-farm slaughter or movement of animals to a killing place for the purpose of maintaining welfare standards under the Livestock Welfare Disposal Scheme.

Great Britain continued to offer valuable input to EU and Council of Europe discussions on farm animal welfare. DEFRA-funded research supports Great Britain's position during negotiations and ensures that policy development and application has a sound scientific base.

The Council of Europe Standing Committee on the Protection of Animals Kept for Farming Purposes adopted a recommendation on turkeys and continued to discuss draft recommendations for pigs, rabbits and fish.

Pigs

European Commission proposals to amend the Council Directive 91/630/EEC on pig welfare were formally adopted on 23 October and separate proposals for a Commission Directive 2001/93/EC amending pig welfare agreed at the Standing Committee. One of the key provisions of these directives is an EU-wide ban on close-confinement sow stalls to be in place by 1 January 2013. In addition, there are provisions for changes in the flooring requirements and the necessity for manipulable bedding material.

Chickens

Full public consultation on the draft English regulations to implement Council Directive 99/74/EC, laying down minimum standards for the welfare of laying hens and a new draft Welfare Code of Recommendations closed on 3 August. A new Welfare Code specifically for meat chickens was prepared.

Welfare during transport

FMD effectively stopped live animals leaving Great Britain. This resulted in efforts being redirected to support the various domestic movement schemes for livestock mentioned earlier in this chapter. New standards for cleansing and disinfection centres for livestock vehicles were introduced.

DEFRA contributed to a review of Council Directive 91/628/EEC, which sets down the EU rules governing animal welfare in transit. This review commenced with a discussion on the Commission's report on the experience of Member States.

Great Britain had a key role in drafting and negotiating revisions to the Council of Europe Convention on the Protection of Animals during International Transport, with the aim of approval in 2002. This involved participation in a full working party and two drafting groups.

Farm Animal Welfare Council

The Farm Animal Welfare Council's role as the Government's advisory body on farm animal welfare is to review the welfare conditions applying to farm animals and to advise Ministers in Great Britain of any legislative or other changes that may be necessary. The council's independent website (www.fawc.org.uk) was launched in June to coincide with its Open Meeting and the publication of the its Annual Review for 2000/2001.

A separate working group was set up to consider the animal welfare implications following the outbreak of FMD and an Extraordinary Council Meeting was convened in May to address these issues and provide advice to Ministers. The Farm Animal Welfare Council submitted evidence to the Policy Commission on Food and Farming and to the Royal Society Inquiry into infectious diseases in livestock.

The Farm Animal Welfare Council also provided advice to Ministers on the welfare implications for low value and surplus animals and produced an interim report on the animal welfare implications of Farm Animal Assurance Schemes. Advice relating to the welfare implications of developments in biotechnology was provided by the Agriculture and Environment Biotechnology Commission and evidence provided to the House of Lords Select Committee on animals in scientific procedures.

Work continued on the preparation of reports on the welfare of farm animals at markets and at slaughter.

A successful review of Welfare During Transport Research and Development, available at www.defra.gov.uk, was held in October, in conjunction with the Chief Scientists Group. This resulted in a constructive discussion between DEFRA, researchers, the industry and welfare groups.

Research and development

DEFRA relies on research to inform its policies and influence its decision-making. The animal welfare research and development programme contributes to the DEFRA aim of ensuring that farm animals are protected by high welfare standards. The research programme helps to provide a sound scientific basis on which to consider possible improvements to welfare legislation and codes of practice. The DEFRA budget, in 2001 / 2002, for research and development work on animal welfare is approximately £3.6 million.

Citizen's Charter

The Citizen's Charter Statement of Service Standard for the Veterinary Field and Investigation Services describes the standard of service which DEFRA aims to achieve and sets out the complaints procedure.

Due to their very heavy involvement in FMD, four Animal Health Divisional Offices were unable to provide statistics for 2001. Data is also unavailable for a further AHDO in the process of being established. For this reason a detailed breakdown has not been included in this report.

During 2001 a total of 313 complaints were received by 19 Animal Health Divisional Offices; this was 82 more that in 2000. However, over 266 of the 313 were related to the outbreak of FMD.

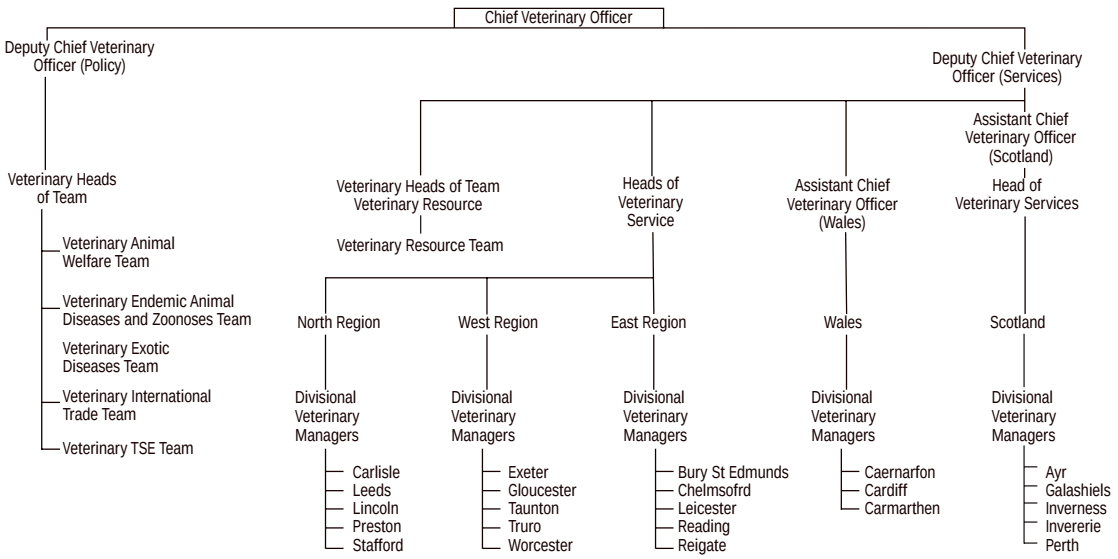
The Animal Health Divisional Offices were able to resolve 308 complains satisfactorily at a local level and five were dealt with by Head Office.

Management report

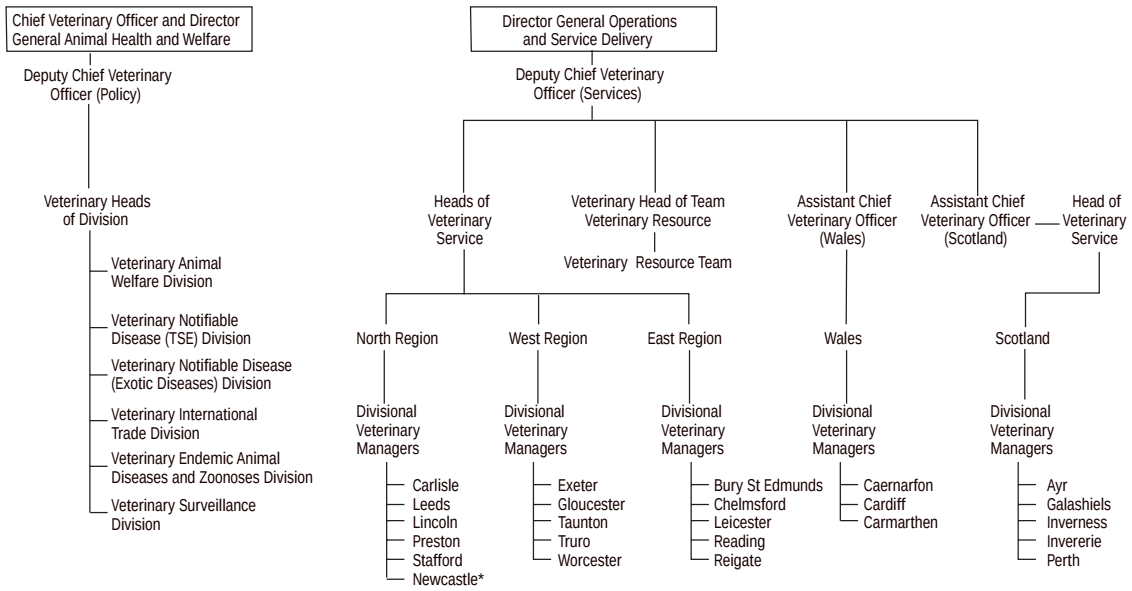
The Ministry of Agriculture, Fisheries and Food was formally incorporated into the Department for Environment, Food and Rural Affairs (DEFRA) on 9 June 2001. The new Department reflects the Government's intention to modernise and rationalise its approach to farming and food production. The new Department also incorporates elements from both the Home Office and the Department of Environment, Transport and the Regions. An extensive programme of managerial training and departmental awareness is under way, and further developments in departmental identity and corporate image are to be expected during the coming year.

The State Veterinary Service structure was altered significantly in December 2001. The part of the State Veterinary Service managed by the deputy Chief Veterinary Officer (Services) now reports Mark Addison, Director General of Operations and Service Delivery for DEFRA. The Chief Veterinary Officer has been appointed Director General of Animal Health and Welfare, and will sit on the DEFRA Management Board. He will be supported by three directorates: the deputy Chief Veterinary Officer (Policy) heading the Veterinary Directorate, together with the Directorate of Animal Health and Welfare and the Directorate of TSEs. The Chief Veterinary Officer will also act as the Head of Profession for veterinary surgeons across Government departments.

Senior management structure of the State Veterinary Service at 01/01/2001



Senior management structure of the State Veterinary Service from 03/12/2001



* Newcastle – A new Animal Health Divisional Office to cover Northumberland, County Durham, Tyne & Wear, Teeside and Cleveland is in the process of being established

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See TSEs

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SCRAPIE

See TSEs

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Nil

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Nil

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Nil

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Food Safety Act 1990

Nil

Agricultural (Miscellaneous Provisions) Act 1968

Nil

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The Sheep and Goats Spongiform Encephalopathy (England and Wales) (Compensation) (Amendment) Order 2001

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Statistical Tables

Table 1: *Number of stock slaughtered and compensation paid 1997-2001*

	1997		1998		1999		2000		2001	
	No.	£	No.	£	No.	£	No.	£	No.	£
Bovine Tuberculosis (Cattle)										
a) Affected animals	-	-	-	-	-	-	-	-	-	-
b) Reactors and dangerous contacts	3,760	2,386,029	6,083	3,605,242	6,900	5,770,983	*6,954	7,307,797	5,903	7,074,125
****Total Bovine Tuberculosis (Cattle)**	3,760	2,386,029	6,083	3,605,242	6,900	5,770,983	*6,954	7,307,797	5,903	7,074,125
Bovine Tuberculosis (Deer) (3)										
a) Affected animals	11	-	37	-	49	-	25	-	2	-
b) Reactors and dangerous contacts	0	0	6	0	6	0	6	0	0	0
****Total Bovine Tuberculosis (Deer)**	11	0	43	0	55	0	31	0	2	0
Aujeszky's Disease (Pigs) (1)	-	-	-	-	-	-	-	-	-	-
Bovine Spongiform Encephalopathy (2)	5,313	3,027,379	4,046	2,095,114	2,857	1,342,214	1,798	712,025	1,153	576,582
Foot and Mouth Disease	-	-	-	-	-	-	-	-	4,068,000	3,999,300
Scrapie (4)	-	-	285	5,397	715	14,795	646	15,610	355	9,434
Avian Influenza	-	-	-	-	-	-	-	-	-	-
Newcastle Disease	648,000	3,966,462	-	224,809	-	-	-	-	-	-
Classical Swine Fever (Pigs)	-	-	-	-	-	-	74,793	4,392,101	-	-
Swine Vesicular Disease	-	-	-	-	-	-	-	-	-	-
Total Compensation	657,084	9,379,870	10,457	5,930,562	10,527	7,127,992	84,242	12,427,533	4,075,413	11,659,441

(1) The cost of the eradication scheme was met by the pig industry.
(2) Compulsory slaughter commenced 8 August 1998.
(3) Compulsory slaughter with compensation for deer was introduced on 1 September 1989.
(4) Compulsory slaughter with compensation commenced on 29 July 1998.

* Revised figures
** Provisional figures

Table 2: *Outbreaks of notifiable diseases, excluding tuberculosis, in each county of Great Britain – 2001*

County	Anthrax	Scrapie	CSF	FMD	EBL	PVM in Pigeons	Newcastle Disease	BSE	CEM	EVA
Avon	–	0	–	–	–	–	–	8	–	–
Bedfordshire	–	0	–	–	–	1	–	1	–	–
Berkshire	–	0	–	–	–	–	–	7	–	–
Buckinghamshire	–	9	–	–	–	–	–	13	–	–
Cambridgeshire	–	0	–	–	–	–	–	3	–	–
Cheshire	–	19	–	16	–	1	–	19	–	–
Cleveland	–	0	–	–	–	3	–	3	–	–
Cornwall	–	21	–	4	–	–	–	34	–	–
Cumbria	–	6	–	893	–	1	–	20	–	–
Derbyshire	–	0	–	8	–	–	–	12	–	–
Devon	–	44	–	173	–	1	–	47	–	–
Dorset	–	2	–	–	–	–	–	22	–	–
Durham	–	1	–	93	–	–	–	4	–	–
East Sussex	–	1	–	–	–	2	–	14	–	–
East Yorkshire	–	0	–	–	–	0	–	0	–	–
Essex	–	3	–	11	–	0	–	7	–	–
Gloucestershire	–	0	–	76	–	0	–	18	–	–
Greater London	–	0	–	–	–	0	–	1	–	–
Hampshire	–	0	–	–	–	–	–	17	–	–
Here&Worc	–	6	–	43	–	1	–	12	–	–
Hertfordshire	–	0	–	–	–	–	–	4	–	–
Humberside	–	0	–	–	–	–	–	11	–	–
Isles of Scilly	–	0	–	–	–	–	–	0	–	–
Isle of Wight	–	2	–	–	–	–	–	3	–	–
Kent	–	0	–	5	–	1	–	8	–	–
Lancashire	–	1	–	53	–	1	–	20	–	–
Leicestershire	–	1	–	6	–	1	–	23	–	–
Lincolnshire	–	0	–	–	–	1	–	7	–	–
Manchester	–	0	–	–	–	2	–	0	–	–
Merseyside	–	0	–	–	–	1	–	0	–	–
Norfolk	–	0	–	–	–	1	–	40	–	–
North Yorkshire	–	17	–	134	–	–	–	47	–	–
Northamptonshire	–	4	–	1	–	–	–	8	–	–
Northumberland	–	3	–	87	–	–	–	10	–	–
Nottinghamshire	–	0	–	–	–	–	–	7	–	–
Oxfordshire	–	9	–	2	–	–	–	21	–	–
Shropshire	–	1	–	11	–	–	–	26	–	–
Somerset	–	1	–	8	–	–	–	56	–	–
South Yorkshire	–	1	–	–	–	–	–	10	–	–
Staffordshire	–	0	–	48	–	–	–	20	–	–
Suffolk	–	0	–	–	–	–	–	20	–	–
Surrey	–	0	–	–	–	–	–	3	–	–
Teeside	–	0	–	5	–	–	–	0	–	–
Tyne & Wear	–	0	–	6	–	–	–	0	–	–
Warwickshire	–	5	–	2	–	–	–	14	–	–
West Midlands	–	0	–	–	–	–	–	0	–	–
West Sussex	–	1	–	–	–	–	–	18	–	–
West Yorkshire	–	0	–	6	–	–	–	10	–	–
Wiltshire	–	3	–	9	–	–	–	22	–	–
Worcestershire	–	0	–	26	–	–	–	0	–	–
England Total	–	161	–	1,726	–	18	–	670	–	–

NB: Several counties and boundaries have changed since some diseases were first diagnosed. The original county names have been kept to keep continuity of figures.

Table 2: *Outbreaks of notifiable diseases, excluding tuberculosis, in each county of Wales and Scotland – 2001 (continued)*

County	Anthrax	Scrapie	CSF	FMD	EBL	PVM in Pigeons	Newcastle Disease	BSE	CEM	EVA
WALES										
Anglesey	–	0	–	13	–	–	–	0	–	–
Carmarthenshire	–	0	–	–	–	–	–	–	–	–
Clwyd	–	56	–	–	–	–	–	8	–	–
Dyfed	–	39	–	–	–	–	–	15	–	–
Gwent	–	1	–	–	–	–	–	2	–	–
Gwynedd	–	14	–	–	–	–	–	6	–	–
Mid Glamorgan	–	0	–	5	–	–	–	0	–	–
Monmouthshire	–	0	–	26	–	–	–	0	–	–
Powys	–	18	–	69	–	–	–	21	–	–
South Glamorgan	–	0	–	–	–	–	–	1	–	–
West Glamorgan	–	0	–	–	–	–	–	0	–	–
Wales Total	–	128	–	113	–	–	–	53	–	–

County	Anthrax	Scrapie	CSF	FMD	EBL	PVM in Pigeons	Newcastle Disease	BSE	CEM	EVA
SCOTLAND										
Borders	–	8	–	11	–	1	–	2	–	–
Central	–	0	–	–	–	–	–	1	–	–
Dumfries & Galloway	–	2	–	176	–	–	–	8	–	–
Fife	–	1	–	–	–	1	–	0	–	–
Grampian	–	5	–	–	–	–	–	1	–	–
Highland	–	4	–	–	–	–	–	2	–	–
Lothian	–	0	–	–	–	–	–	3	–	–
Orkney & Shetlands	–	72	–	–	–	–	–	0	–	–
Strathclyde	–	0	–	–	–	–	–	3	–	–
Tayside	–	0	–	–	–	–	–	3	–	–
Western Isles	–	0	–	–	–	–	–	0	–	–
Scotland Total	–	92	–	187	–	2	–	23	–	–

Total For England, Scotland & Wales	–	381	–	2,026*	–	20	–	746	–	–

*This total excludes four outbreaks in Northern Ireland

NB: Several countries and boundaries have changed since some diseases were first diagnosed. The original country names have been kept to keep continuity of figures.

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A new Animal Health Divisional Office to cover Northumberland, County Durham, Tyne & Wear, Teeside and Cleveland is in the process of being established.

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Abbreviations/Acronyms

A

AI	artificial insemination

B

BSE	bovine spongiform encephalopathy

C

CEM	Contagious equine metritis
CSF	classical swine fever
CTS	cattle tracing scheme

D

DEFRA	Department for Environment, Food and Rural Affairs

E

EBL	enzootic bovine leukosis
EC	European Community
ELISA	enzyme linked immunosorbent assay
EU	European Union
EVA	Equine viral arteritis

F

FMD	foot and mouth disease

L

LGC	Laboratory of the Government Chemist

N

NSP	National Scrapie Plan

O

OFT	Official Tuberculosis free
OTMS	Over Thirty Months Scheme

P

PCR	polymerase chain reaction
PDNS	porcine dermatitis nephropathy syndrome
PETS	Pet Travel Scheme
PMV	Paramyxovirus
PMWS	post-weaning multisystemic wasting syndrome
PRRS	porcine reproductive and respiratory syndrome

R

RT-PCR	reverse transcription polymerase chain reaction

T

TB	Tuberculosis
TSE	transmissible spongiform encephalopathy

U

UK	United Kingdom

V

VIPER	veterinary instructions, procedures and emergency routines
VLA	Veterinary Laboratories Agency
VTEC O157	verocytotoxin-producing *Escherichia coli* O157

DEFRA

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