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31 December 2007

RECOVERY OF FMD COUNTRY FREE STATUS

UNITED KINGDOM REPORT TO THE WORLD ORGANISATION FOR ANIMAL HEALTH (OIE) TO RECOVER COUNTRY FREEDOM FROM FMD WITHOUT VACCINATION

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1 Executive Summary

This progress report summarises action to eradicate foot and mouth disease (FMD) from Great Britain. It covers the period from 3 August to 00.01 on 31 December 2007.

- 1.1 There were eight infected premises (IPs 1-8) with FMD confirmed at 11 fragmented sites in total. These were detected in two clusters (August and September cluster), all of which were located in the county of Surrey in England. The last confirmed case was on 30 September 2007.
- 1.2 All animals on the infected premises (1578 in total) were destroyed (see Table 6). At cull, animals were subjected to inspection for lesions and sampled for testing. Laboratory tests confirmed FMD in 238 (223 cattle and 15 sheep) animals in total.
- 1.3 The virus involved has been characterised as being essentially identical to O₁ BFS 1860 (a FMD type O virus strain isolate from the 1967-68 UK FMD outbreak), originating from the Pirbright site. Independent reports into the environmental contamination have been published and the main outcomes are outlined in section 3.2.4.
- 1.4 During the August cluster, animals at two premises were destroyed as dangerous contacts (DCs) and one holding was destroyed on suspicion (SOS) of the disease. During the September cluster, animals on five premises within the radius of 3km around the last infected holding (IP8) were destroyed following an epidemiological assessment that they were at high risk of infection. Animals on one holding were destroyed on suspicion of the disease. In total, 582 animals were destroyed and samples were collected for laboratory testing (see Table 6). Laboratory results did not confirm disease in any animal from any of these premises.
- 1.5 Detailed epidemiological analyses were carried out on the basis of information gathered by field teams to support decision making with regard to disease control and surveillance activities and to estimate the likelihood of further spread of the disease (<http://defraweb/animalh/diseases/fmd/pdf/epidreport300907.pdf>). Whole genome sequencing of the virus isolates from each affected holding was also carried out.
- 1.6 All disease control measures as outlined in the OIE Terrestrial Animal Health Code (Chapter 2.2.10) and Council Directive 2003/85/EC were applied with immediate effect following the confirmation of the disease. These included national restrictions on the movement of susceptible animals and full tracing of all movements out of the Protection Zone (PZ) and Surveillance Zone (SZ), including those that took place during the short period (8 – 12 September) when movement restrictions were lifted following the completion of the surveillance activities around the August cluster. Known livestock movements in that period have been traced and no evidence of infection was detected.
- 1.7 Surveillance in the PZ and SZ was carried out in accordance with the OIE Terrestrial Animal Code (Appendix 3.8.7) and Council Directive 2003/85/EC. In addition to surveillance in the PZ during the September cluster, enhanced

- surveillance to detect potentially undisclosed infection in cattle began on 1 October. This was completed with negative result. Following the lifting of the PZ in mid October, additional surveillance activities have been carried out and all were completed on 4 November 2007 with negative results. In total, 42,462 blood samples collected from cattle, sheep and goats during the September cluster were tested with negative results. In combination with the samples collected during the August cluster (5,767) the number of blood samples tested negative is 48,229 in total.
- 1.8 All movements of live animals from the IPs, PZ and SZ have been traced and no evidence of infection has been detected. All other identified risk movements (e.g. vehicles, fomites, personnel) from the infected premises have been traced and no evidence of infection has been detected. Investigations suggest that it is unlikely that meat, milk or other products originating in the area subject to PZ or SZ restrictions were in circulation.
 - 1.9 To demonstrate absence of circulating virus in accordance with the OIE Terrestrial Animal Code (Appendix 3.8.7) random serological surveillance of cattle herds and sheep and goat flocks was carried out in defined annuli within the radius of 150km from the Pirbright site. This surveillance has been designed on a sample size that will detect 1% prevalence of the disease with 95% confidence among the herds and flocks. This surveillance was initiated at the beginning of November and completed on 30 November 2007. In total, 11,807 animals were sampled and tested from 305 premises. No disease was detected. In combination with the total number of blood samples tested during the August and September cluster, the grand total number of blood samples that have been tested negative is 60,036.
 - 2.0 Nationwide active monitoring through investigation of more than 200 notifications of suspected disease (report cases), and passive monitoring through intensified inspection at slaughter (> 6 million animals), welfare visits (766) and inspection (1600), inspections prior to licensed movements (> 3 million animals) and other passive surveillance (> 1,4 million animals) demonstrated no FMD at any other holding outside the known affected premises.
 - 2.1 With effect from 31 December 2007 all EU trade restrictions imposed on the UK at the beginning of August 2007 were lifted. Therefore, with effect from this date normal intra-Community trade in animals and animal products from the UK resumed.
 - 2.2 Accumulated evidence from active and passive surveillance demonstrate that the UK has successfully complied with the requirements of the OIE Terrestrial Animal Health Code (Chapter 2.2.10 - Article 2.2.10.7 and Article 2.2.10.8) and the EU rules. Therefore, following the period of 3 months since the last confirmed case on 30 September 2007, the UK requests the OIE to officially recognise that the UK has recovered its status as a country free of FMD without vaccination.

2 Introduction

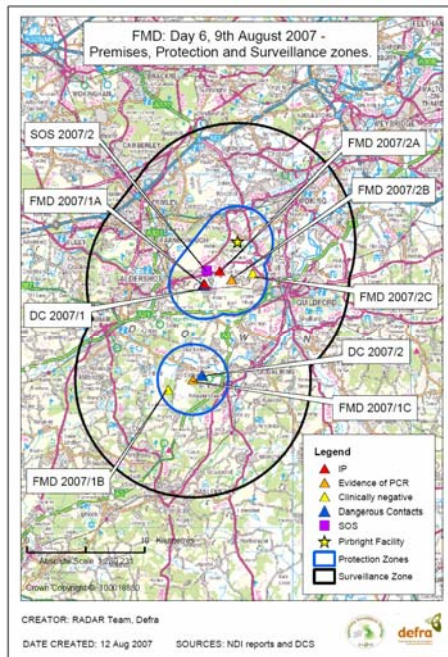
According to the OIE Terrestrial Animal Health Code (2007) (Appendix IV, section 9. Recovery of status), countries applying for recovery of status should comply with the provisions of Article 2.2.10.7 of the *Terrestrial Code* and provide detailed information as specified in sections 3.1 (History), 3.2 (Strategy), 3.3 (Vaccination and vaccines) and 5.2 (Surveillance) of this Appendix. Information in relation to other sections need only to be supplied if relevant.

3 FMD Eradication (Section 3. of the OIE questionnaire)

3.1 History (Section 3.1 of the OIE questionnaire)

In total, there were eight infected premises (IP1 to IP8) with FMD confirmed on 11 fragmented sites between 3 August and 30 September 2007. All IPs were located in Surrey (England).

3.1.1 Detection



In total, two IPs with FMD infection on 4 fragmented sites were confirmed in August 2007 (August cluster) and six IPs with FMD infection on 7 fragmented sites were confirmed in September 2007 (September cluster). No further cases of FMD have been detected since 30 September 2007.

3.1.1.1 August 2007 cluster

The map on the left shows the infected premises (IP) and other premises (i.e. dangerous contacts, slaughter on suspicion) where animals were culled during the August cluster.

3.1.1.1.1 Infected premises (IPs)

This section provides an overview of the infected premises during the August 2007 cluster. Two beef cattle premises (IP1 and IP2) were confirmed with FMD during the August cluster (see Table 1). Beef cattle were the only species

affected. The disease was confirmed by virus detection in the laboratory and on the index case by serology). All animals at the infected premises were culled.

Table 1. Infected premises (fragmented sites) – August 2007 cluster

Ref	DCS Ref	Cattle	Pigs	Sheep	Goats	Total	Date Destroyed
IP 1A	FMD2007/0101	4				4	04/08/2007
IP 1B	FMD2007/0102	38				38	04/08/2007
IP 1C	FMD2007/0103	22				22	04/08/2007
DC1	DCF2007/0001		9	8	2	19	04/08/2007
DC2	DCF2007/0002	14				14	06/08/2007
IP 2A	FMD2007/0201	49				49	07/08/2007
IP 2B	FMD2007/0202	58				58	07/08/2007
IP 2C	FMD2007/0203	12				12	07/08/2007
SOS 2	SOS2007/0002	16	342	3	2	363	09/08/2007
TOTAL (IPs)		167	-	-	-	167	
TOTAL (DCs, SOS)		46	351	11	4	412	
GRAND TOTAL		213	351	11	4	579	

Note: Cattle were the only species infected

IP1 was detected following official notification of a suspected case to the veterinary authorities (IP1B). IP2 was detected as a part of a field visit within the established Protection Zone. FMD was confirmed on these two premises on 3 and 6 August respectively. Both IPs had additional fragmented sites where FMD virus was detected by RT-PCR in blood samples collected at slaughter from clinically normal cattle (IP1C, IP2B).

Two Dangerous Contacts (DCs) premises were identified in connection with IP1 on 4 August. All animals at these premises were culled. No animals showed clinical signs and all samples taken from these animals were found to be negative for FMD by laboratory testing (i.e. virus detection and serology). There were no Dangerous Contacts (DCs) identified in connection with IP2. However, all animals at a holding adjacent to IP2, though with no direct animal contact, were slaughtered on suspicion of disease (SOS2) as a result of suspect clinical signs in cattle reported by the owner on 9 August. All samples taken from these animals were found to be negative for FMD by laboratory testing (i.e. virus detection and serology). Table 3 (see Section 3.1.1.2.1) summarises laboratory testing that was carried out on samples collected from culled animals.

3.1.1.2 September 2007 cluster

The map on page 12 shows the infected premises (IP) and other premises where animals were culled during the September cluster.

3.1.1.2.1 Infected premises (IPs)

This section provides an overview of infected premises during the September 2007 cluster. Six beef cattle premises (IP3 to IP8) were confirmed with FMD during the September cluster (see Table 2). IP3 and IP6 were detected following official notification as suspected cases to the veterinary authorities. Other IPs were detected by serology (IP5) or field visits (IP4, IP7 and IP8) within the established Protection Zone. FMD was confirmed on all six premises between 12 and 30 September. During the September 2007 cluster, cattle were the species affected at all premises. In addition to cattle, FMD was detected in sheep, by serological surveillance, on one holding (IP5) only. In all cases, the disease was confirmed by laboratory detection of virus and in some cases by positive serology. All animals at the infected premises were culled.

Table 2. Infected premises (fragmented sites) – September 2007 cluster

Ref	DCS Ref	Cattle	Pigs	Sheep	Goats	Total	Date Destroyed
IP 3A	FMD2007/0301	13	8			21	12/09/2007
IP 3B	FMD2007/0302	47				47	12/09/2007
IP 3C	FMD2007/0303	29				29	14/09/2007
IP 3D	FMD2007/0304	44				44	14/09/2007
IP 3E	FMD2007/0305	70				70	13/09/2007
IP 3F	FMD2007/0306	17				17	14/09/2007
IP 3G	FMD2007/0307	68				68	16/09/2007
IP 3H	FMD2007/0308	59				59	14/09/2007
IP 4A	FMD2007/0401		743		2	745	14/09/2007
IP 4B	FMD2007/0402	54				54	13/09/2007
SOS 5	SOS2007/5		24			24	15/09/2007
IP 5	FMD2007/0501	22	2	16		40	17/09/2007
IP 6A	FMD2007/0601	2				2	22/09/2007
IP 6B	FMD2007/0602	32				32	22/09/2007
IP 7	FMD2007/0701	16				16	24/09/2007
IP 8A	FMD2007/0801			16		16	30/09/2007
IP 8B	FMD2007/0802	54				54	30/09/2007
IP 8C	FMD2007/0803	17				17	30/09/2007
IP 8D	FMD2007/0804	64				64	30/09/2007
DC 4	DCF2007/4	6				6	01/10/2007
DC 5	DCF2007/5	3				3	01/10/2007
DC 6	DCF2007/6	119				119	01/10/2007
DC 7	DCF2007/7	33				33	01/10/2007
DC 8	DCF2007/8				1	1	30/09/2007
TOTAL (IPs)		608	753	-	-	1361	
Total (DCs, SOS)		161	24	32	3	220	
GRAND TOTAL		769	777	32	3	1581	

Note: Cattle and sheep (in one case) were the only species infected

Following the confirmation of infection at IP4, an outdoor pig unit was identified immediately opposite this IP and under the same ownership. Pigs were inspected late in the evening of 14 September and appeared to be normal. However,

following the report by the owner on 15 September that some pigs had blisters on their snouts, a decision was taken to slaughter this herd on suspicion (SOS5). Culling of this herd was completed on 15 September and samples collected for testing. No FMD-positive results were detected in the samples collected. Animals on five premises (DC4 – DC8) within a radius of 3km around the last confirmed holding (IP8) were destroyed following an epidemiological assessment that they were at high risk of infection. No positive results were detected in the samples collected.

Table 3 summarises laboratory testing of samples collected from animals at cull from IPs, DCs and SOSs.

Table 3. Summary of testing that has been performed for IP, DCs and SOSs

Ref	Date of Sampling	Cattle	Pigs	Sheep	Goats	Number of samples submitted	Material	Lab Results	Tests Performed
IP1A	04/08/2007	4				4	Blood	Neg	PCR, VI, Ab ELISA
IP1B	03/08/2007	38				3, 41	Epithelium, blood	Pos	LFD, Ag ELISA, PCR, VI, Ab ELISA
IP1C	04/08/2007	22				22	Blood	Pos	PCR, VI, Ab ELISA
DC1	04/08/2007		9	8	2	5	Blood	Neg	PCR, VI, Ab ELISA
DC2	05/08/2007	14				9	Blood	Neg	PCR, VI, Ab ELISA
IP2A	06/08/2007	58				5, 7	Epithelium, blood	Pos	Ag ELISA, PCR, VI, Ab ELISA
IP2A	07/08/2007					32	Blood	Pos	PCR, VI, Ab ELISA
IP2B	07/08/2007	58				58	Blood	Pos	PCR, VI, Ab ELISA
IP2C	07/08/2007	49				2, 12	Epithelium, blood	Neg	PCR, VI, Ab ELISA
SOS2	08, 09/08/2007	16	342	3	2	2, 346, 3	Epithelium, blood, fluid	Neg	Ag ELISA, PCR, VI, Ab ELISA
IP3A	12/09/2007	13	8			2, 21	Epithelium, blood	Neg	Ag ELISA, PCR, VI, Ab ELISA
IP3B	12/09/2007	47				4, 1, 4	Epithelium, vesicular fluid, blood	Pos	LFD, Ag ELISA, PCR, VI, Ab ELISA
IP3C	14/09/2007	29				3, 27	Epithelium, blood	Pos	LFD, Ag ELISA, PCR, VI, Ab ELISA
IP3D	14/09/2007	44				44	Blood		PCR, Ab ELISA
IP3E	13/09/2007	70				69	Blood	Neg	PCR, Ab ELISA
IP3F	14/09/2007	17				17	Blood	Neg	PCR, Ab ELISA
IP3G	14/09/2007	68				2, 62	Epithelium, blood	Neg	LFD, Ag ELISA, PCR, VI, Ab ELISA
IP3H	14/09/2007	59				1, 59	Epithelium, blood	Neg	LFD, Ag ELISA, PCR, VI, Ab ELISA
IP4A	13/09/2007		743		2	7, 67	Epithelium, blood	Neg	Ag ELISA, PCR, VI, Ab ELISA
IP4B	13/09/2007	54				6, 54	Epithelium, blood	Pos	LFD, Ag ELISA, PCR, VI, Ab ELISA
SOS5	15/09/2007		24			24	Blood	Neg	PCR, Ab ELISA
IP5	17/09/2007	22	2	16		12	Blood	Pos	Ab ELISA, PCR, VI
IP5	17/09/2007	22	2	16		16, 40	Probangs, blood	Pos	PCR, VI, Ab ELISA
IP6A	21/09/2007	2				1, 1	Epithelium, blood	Neg	Ag ELISA, PCR, VI, Ab ELISA
IP6B	21/09/2007	32				3, 34	Epithelium, blood	Pos	Ag ELISA, PCR, VI, Ab ELISA
IP7	24/09/2007	16				14, 17	Epithelium, blood	Pos	LFD, Ag ELISA, PCR, VI, Ab ELISA
IP8A	30/09/2007			16		15	Blood	Neg	PCR, Ab ELISA
IP8B	29, 30/09/2007	54				2, 1, 54	Epithelium, vesicular fluid, blood	Pos	LFD, Ag ELISA, PCR, VI, Ab ELISA
IP8C	30/09/2007	17				17	Blood	Neg	PCR, Ab ELISA
IP8D	30/09/2007	64				64	Blood	Neg	PCR, Ab ELISA
DC4	01/10/2007	6				6	Blood	Neg	PCR, Ab ELISA
DC5	01/10/2007	3				3	Blood	Neg	PCR, Ab ELISA
DC6	01/10/2007	119				119	Blood	Neg	PCR, Ab ELISA
DC7	30/09/2007	33				33	Blood	Neg	PCR, Ab ELISA
DC8	30/09/2007				1	1	Blood	Neg	PCR, Ab ELISA

Key to tests: PCR, real-time RT-PCR; VI, virus isolation in cell culture; Ab ELISA, serology for antibodies to structural and/or non-structural FMD virus proteins; Ag ELISA, ELISA to detect FMD virus antigens in tissues or cell culture supernatants; LFD, lateral flow device for detection of FMD viral antigens in vesicular fluids or tissues.

3.1.2 Descriptive epidemiology

This outbreak was dominated by infection in beef cattle, with the exception of IP5. This was a smallholding containing a small number of sheep which may have become infected from the cattle as a result of the disease remaining undetected in the cattle.

The outbreak occurred in an area where farming is generally on a small scale. Farms are made up of a number of parcels (fragmented sites) of land and the majority of cattle are extensively grazed with no handling facilities which presented difficulties in their clinical inspection. This led to a decision to enhance surveillance in the PZ (and SZ). This surveillance involved more frequent clinical examinations, blood sampling and laboratory testing of both cattle and sheep in order to detect potentially undisclosed infection as quickly as possible.

The epidemiological investigations in this outbreak have also indicated a transmission over a distance of at least 16km (see section 3.1.2.2). Transmission of infection by the movement of animals did not occur during the outbreak which was associated with the immediate imposition of a national animal movement ban. At the same time, the nature of the farming in this area results in a very low frequency of movements between farms, most of which are local movements within the county of Surrey and to a lesser extent to other counties in the south-east of England, with infrequent long distance movements.

3.1.2.1 The virus – investigation into a source of infection

Initial identification and further analysis of the viral genome (VP1 gene) was carried out by IAH Pirbright. The strain of virus has been determined as Type O₁ BFS (British Field Strain) 1860 (FMD O₁ BFS 1860/67UK), which is a virus strain recovered from the FMD epidemic that occurred in Great Britain in 1967. This strain only exists in FMD reference laboratories and vaccine manufacturing plants and is not known to be in circulation anywhere in the world. The closest such facilities to the outbreak area are at the Pirbright site in Surrey. The next closest location where the virus is held is in mainland Europe.

Preliminary epidemiological and laboratory investigations suggested that the most likely source of infection in animals at IP1 was exposure to a vaccine/laboratory strain of the virus from the Pirbright site. Independent reports into the environmental contamination have been published and the main outcomes are outlined in section 3.2.4.

3.1.2.2 Temporal and spatial spread

Figure 1 summarises the temporal distribution of confirmed FMD cases during the August and September clusters.

Figure 1: Summary of FMD cases in Surrey in 2007

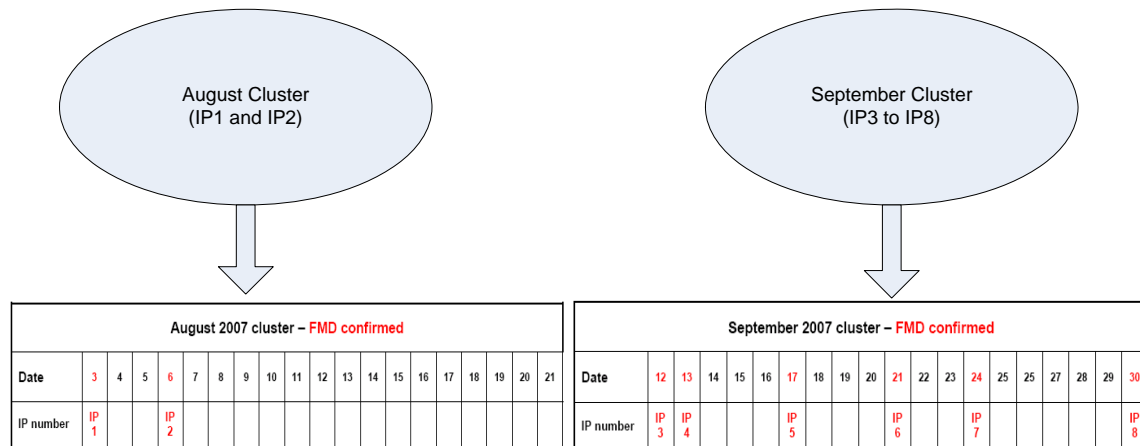
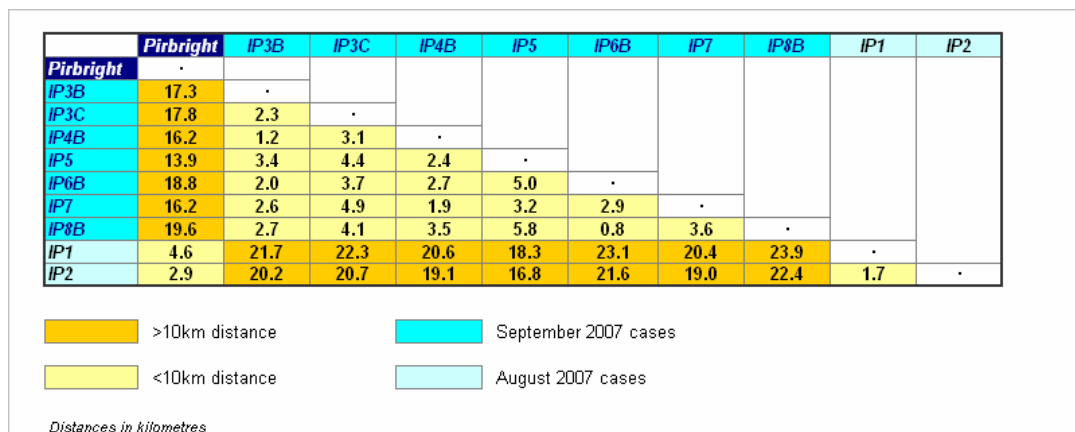


Figure 2 shows calculated distances between each infected premises and the Pirbright site.

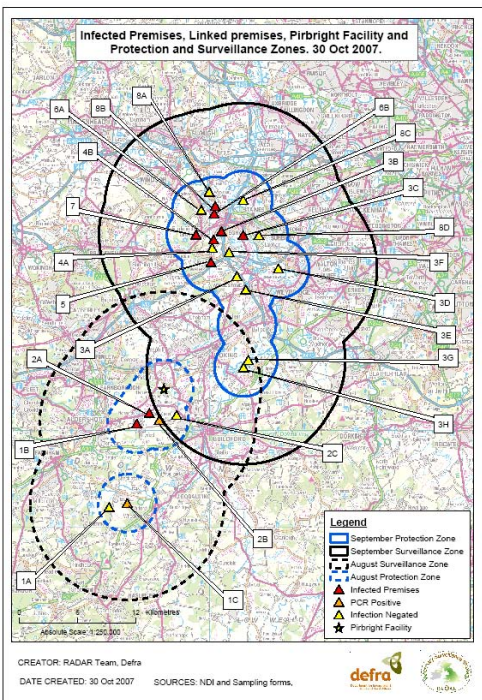
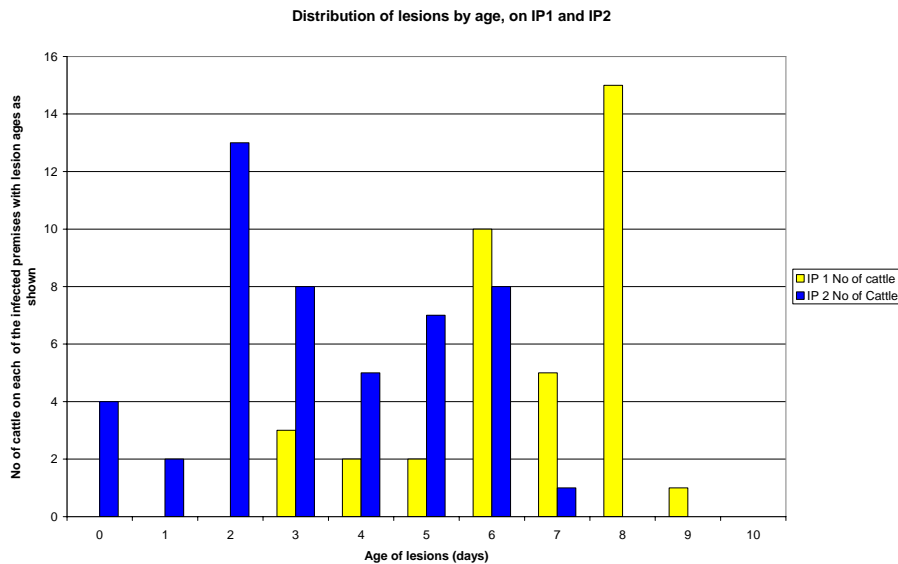
Figure 2. Approximate distances between IP and the Pirbright site



The most likely scenario for infection of IP1 is considered to be via fomite transmission resulting from environmental contamination at the Pirbright site. The evidence for infection of cattle on IP2 suggests windborne transmission from IP1.

Veterinarians experienced in ageing FMD lesions assessed all slaughtered animals on the majority of IPs. The distribution of the ages of lesions detected on IP1 and IP2 (see Figure 3) suggest that IP2 was detected more quickly after infection than the index case; indicating the effectiveness of the active PZ surveillance.

Figure 3: Distribution of lesions by age, on IP1 and IP2



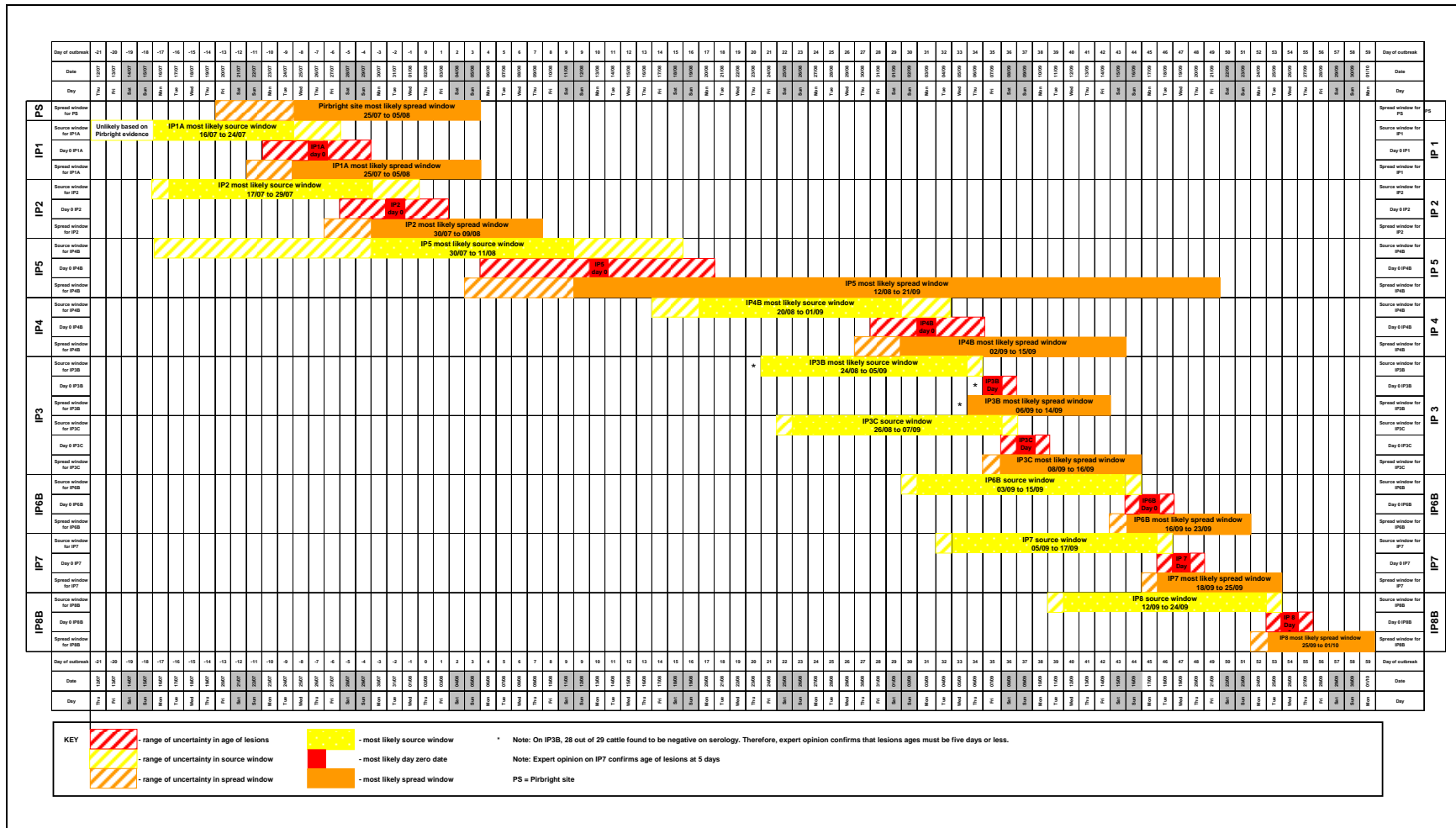
On 12, 13 and 17 September 2007, three further cases (IP3, IP4 and IP5) of FMD were confirmed in Surrey, some 16km north of the Pirbright site and some 20km north of IP1.

On 21, 24 and 30 September 2007, three further FMD cases (IP6, IP7 and IP8) were confirmed within the PZ established around the IPs 3-5, in Surrey.

Five premises (DC4 – DC8) in the immediate vicinity of the IP8 were destroyed as an additional control measure following an epidemiological assessment. No infection was detected in the cattle culled on these five premises.

The location of these premises and their temporal relationship are shown in the map on the left and in Figure 4 below.

Figure 4: Estimated infection timeline



The six IPs that occurred in September were all contained within a small geographic area approximately 16 km north of the Pirbright site, and within an area of approximately 6km in diameter. This shows that the September cases were geographically confined and clustered similar to the two cases in August.

The age of lesions on IP5 provided a temporal link between the August phase of the outbreak and the cases discovered in September. That is, IP5 became infected during the period in August when live virus is known to have been in the environment, and was infectious during the time period when IPs 3 and 4 became infected. The means by which infection was introduced to the cattle on IP5 remains uncertain and data is still being analysed. Nevertheless, the most important fact is that extensive surveillance activities (see section 4. FMD surveillance) demonstrated that no virus was present in the susceptible population outside the eight confirmed infected premises in England (Surrey).

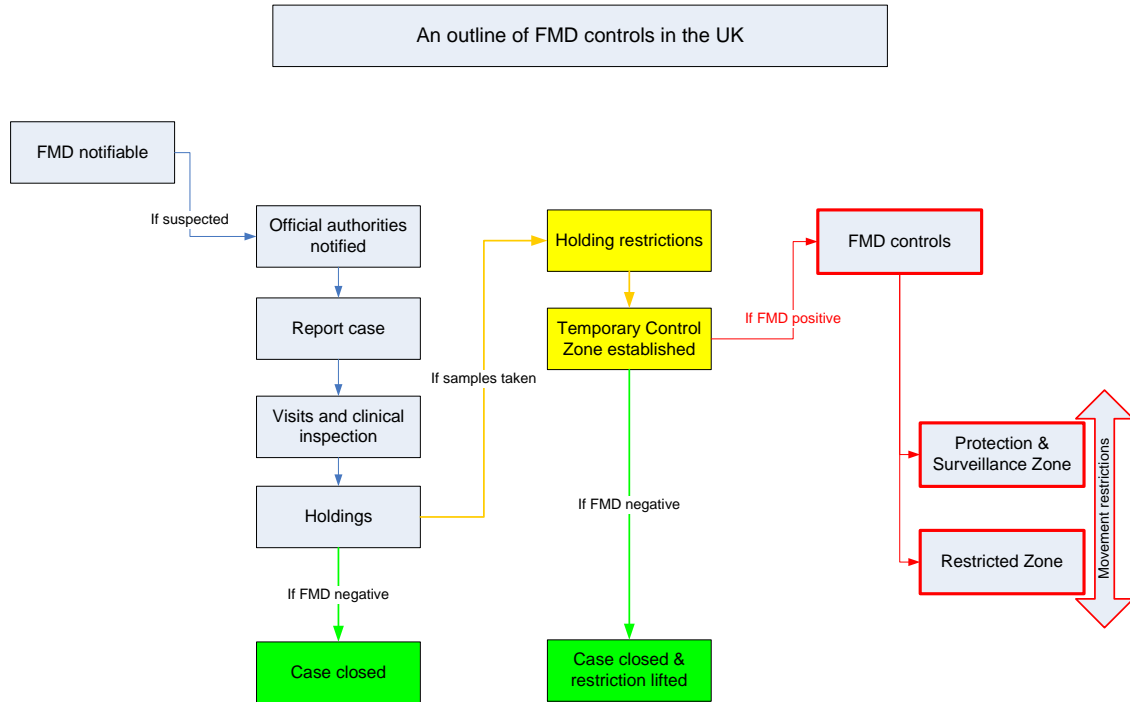
The epidemiological evidence to date for the other five cases in September, including the last three cases, is consistent with secondary local spread from IP5 and/or each other. Local spread is defined as occurring within 3km of an IP and the precise mechanisms of transmission are frequently impossible to establish with any certainty. The IPs are situated in a semi-urban area in which there are relatively frequent movements of people and a number of the farms are made up of separate parcels of land with the owners and keepers travelling between them.

Whole genome sequence comparisons of viruses obtained from each of the infected premises reveal a genealogy consistent with transmission from the Pirbright site to IP1B, from IP1B to IP2B and IP2C, and from IP2B to IP5. In the second phase the predicted transmission is from IP5 to IP4B, from IP4B to IP3C and IP3B, from IP3B to IP6B and IP7 and from IP7 to IP8B. This sequence of events is compatible with the timing of infection and infectiousness on putative donor and recipient farms, and largely supported by the epidemiological evidence. However the epidemiological evidence is more consistent with transmission from IP6B to IP8B. Similarly, although the sequencing suggested that the virus found in the sheep on IP5 was descended from that recovered from cattle at IP2B, epidemiological investigations have only found a potential link between IP5 and the Pirbright site. Investigations are continuing.

3.2 FMD control strategy (Section 3.3 of the OIE questionnaire)

3.2.1 Legal basis

An outline of FMD controls is broadly outlined in the diagram below.



The UK is a Member State of the European Union. EU law for disease control and regulation of imports is fully implemented in the domestic legislation. This is based on OIE standards.

Legal measures of particular relevance to this incident include:

- FMD is a notifiable disease in the UK – it is a legal obligation to notify suspected FMD to official veterinary authorities and for temporary restrictions (Temporary Control Zone) to be applied while it is investigated;
- Animal identification and recording of movements so that they may be traced quickly and efficiently;
- Powers to restrict animal movements (Protection Zone, Surveillance Zone, Restricted Zone) during a disease outbreak and to reduce the frequency of animal movements;
- Powers to stamp out disease in both infected herds and those likely to have been exposed to infection with compensation for animals culled;
- Emergency vaccination if necessary;
- Prohibition of exports of animals and products which may present an animal health risk in line with EU rules and OIE standards;
- Strict controls at all times on the use and disposal of animal by-products including a ban on waste food (swill) feeding;
- Rapid implementation of EU emergency safeguard Decisions.

Council Directive 2003/85/EC requires immediate action to be taken as soon as disease is suspected, including movement controls. It also sets out minimum control measures that EU Member States must take in a case of an FMD outbreak and allows stricter measures to be taken if the disease situation requires it. An emergency EC Decision (2007/554) in response to this FMD incident introduced additional measures including:

- Bans on intra-community trade and exports of live animals and products likely to present a risk of transmitting FMD;
- A ban on personal exports of food products derived from FMD susceptible animals;
- Disinfection at ports;
- Additional Official veterinary certification of products which would normally be traded with commercial documents.

Import controls are enforced at Border Inspection Posts for imports from Third countries and at destination in accordance with EU law. The origin of these two FMD incidents has not been attributed to any failure of import controls.

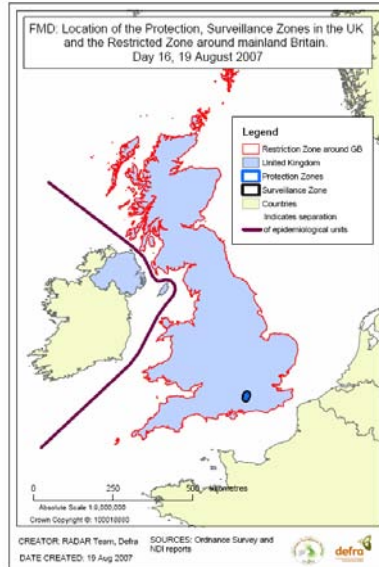
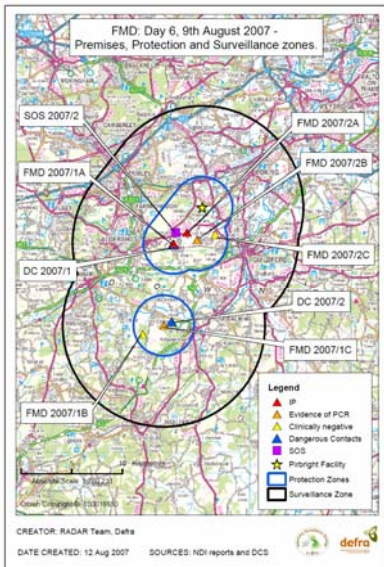
On confirmation of disease all certification for susceptible animals and their products was withdrawn as a precautionary measure. Exporters were immediately informed and officials at ports were instructed to block non-eligible exports.

Movements of animals, and in some cases products, within and from zones subject to restrictions are controlled by licensing. A specific licence must be completed and signed by a Veterinary Inspector before each movement is allowed. If the animal or product meets the conditions of the general licence, the licence can be used. A complete list of specific and general licences issued, and the conditions attached to them, are available at the Defra website: <http://defraweb/animalh/diseases/fmd/movements/index.htm>.

3.2.2 Containment/Control Zones

3.2.2.1 August 2007 cluster

When disease was first confirmed on 3 August, a Protection Zone and Surveillance Zone around the infected premises (see map below left) and a Restriction Zone throughout the whole of Great Britain were imposed. On 9 August, the UK Chief Veterinary Officer also advised the European Commission that Northern Ireland (a region of the United Kingdom considered to be epidemiologically separated from Great Britain) has been free from FMD since 2001 and remains free from this disease (see map below right).



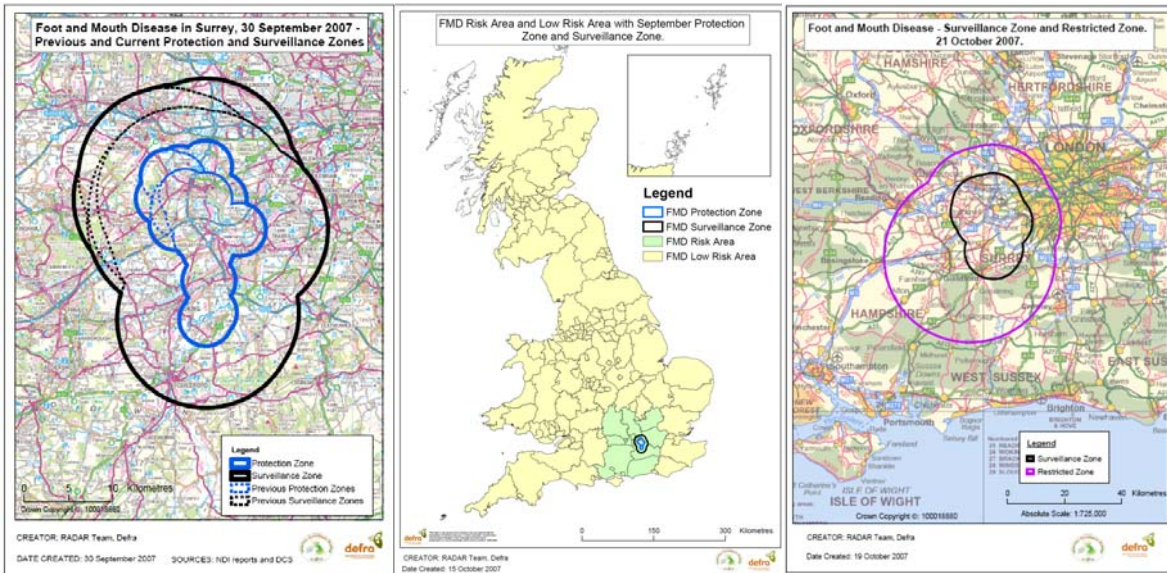
The EU Decision 2007/552/EC concerning safeguard measures against the FMD disease outbreak in Great Britain in August confirmed this position. This Decision exempted Northern Ireland from the restrictions on trade that the European Commission imposed on Great Britain.

Following a veterinary risk assessment, movements within the RZ first for essential welfare purposes, then to slaughter and then farm to farm were progressively licensed. All restrictions were lifted on 7 September in accordance with Community law.

3.2.2.2 September 2007 cluster

When disease was confirmed again on 12 September, these control and restriction zones were immediately re-imposed and followed a similar staged process but with added protections in the affected area. They were subsequently extended following the identification of new IPs (map below left). On 25 September the Restricted Zone was split into an FMD “Low Risk” Area and an FMD “Risk” Area, the latter having a higher level of restrictions (map below centre). The Risk Area comprised the counties within which boundaries the vast majority of movements from Surrey historically occurred.

Following the last case on 30 September, the PZ was lifted on 17 October. The FMD Restricted Zone was reduced on 21 October, based on an updated veterinary risk assessment (map below right). The RZ incorporated the Surveillance zone (SZ), additional areas of surveillance and a buffer of 10km radius. The SZ has been lifted on 5 November when surveillance in the SZ was completed with negative results. However, the RZ remained and was kept under active review.



3.2.3 Eradication

Table 4 below broadly summarise some major facts relevant to confirmed infected premises:

Table 4. Disease eradication measures applied in the outbreak

Initial Actions	Applicable measures
Holding restrictions	✓
Census	✓
Culling of animals	✓
Sampling & Aging of lesions	✓
Disposal	✓
Preliminary C&D	✓
Tracings (live animals)	✓
Tracings (animal products)	✓
Tracings (other)	✓

3.2.3.1 Stamping out, cleansing and disinfection

Table 5 below summarises these activities. In total, 2160 animals have been destroyed during this outbreak.

Table 5. Summary of field operations at cull sites

Ref	DCS Ref	Cattle	Pigs	Sheep	Goats	Total	Date Destroyed	Date preliminary C&D	Date final C&D
IP 1A	FMD2007/0101	4				4	04/08/2007	05/08/2007	30/08/2007
IP 1B	FMD2007/0102	38				38	04/08/2007	05/08/2007	31/08/2007
IP 1C	FMD2007/0103	22				22	04/08/2007	05/08/2007	31/08/2007
DC 1	DCF2007/0001		9	8	2	19	04/08/2007	06/08/2007	04/09/2007
DC 2	DCF2007/0002	14				14	06/08/2007	07/08/2007	04/09/2007
IP 2A	FMD2007/0201	49				49	07/08/2007	08/08/2007	08/12/2007
IP 2B	FMD2007/0202	58				58	07/08/2007	08/08/2007	04/09/2007
IP 2C	FMD2007/0203	12				12	07/08/2007	09/08/2007	31/08/2007
SOS 2	SOS2007/0002	6	342	3	2	363	09/08/2007	10/08/2007	Not required
IP 3A	FMD 2007/0301	13	8			21	12/09/2007	14/09/2007	19/11/2007
IP 3B	FMD 2007/0302	47				47	12/09/2007	14/09/2007	Ongoing*
IP 3C	FMD 2007/0303	29				29	14/09/2007	16/09/2007	Ongoing*
IP 3D	FMD 2007/0304	44				44	14/09/2007	15/09/2007	22/10/2007
IP 3E	FMD 2007/0305	70				70	13/09/2007	15/09/2007	20/10/2007
IP 3F	FMD 2007/0306	17				17	14/09/2007	15/09/2007	21/10/2007
IP 3G	FMD 2007/0307	68				68	16/09/2007	17/09/2007	21/10/2007
IP 3H	FMD 2007/0308	59				59	14/09/2007	16/09/2007	20/10/2007
IP 4A	FMD 2007/0401		743		2	745	14/09/2007	16/09/2007	Ongoing
IP 4B	FMD 2007/0402	54				54	13/09/2007	15/09/2007	Ongoing*
SOS 5	SOS 2007/5		24			24	15/09/2007	16/09/2007	Not required
IP 5	FMD 2007/0501	22	2	16		40	17/09/2007	21/09/2007	03/12/2007
IP 6A	FMD 2007/0601	2				2	22/09/2007	23/09/2007	21/10/2007
IP 6B	FMD 2007/0602	32				32	22/09/2007	23/09/2007	Ongoing*
IP7	FMD 2007/0701	16				16	24/09/2007	26/09/2007	Ongoing*
IP8A	FMD 2007/0801			16		16	30/09/2007	01/10/2007	Ongoing*
IP8B	FMD 2007/0802	54				54	30/09/2007	01/10/2007	Ongoing*
IP8C	FMD 2007/0803	17				17	30/09/2007	01/10/2007	Ongoing*
IP8D	FMD 2007/0804	64				64	30/09/2007	01/10/2007	01/11/2007
DC4	DCF 2007/4	6				6	01/10/2007	02/10/2007	02/11/2007
DC5	DCF 2007/5	3				3	01/10/2007	03/10/2007	15/12/2007
DC6	DCF 2007/6	119				119	01/10/2007	03/10/2007	03/12/2007
DC7	DCF 2007/7	33				33	01/10/2007	02/10/2007	02/12/2007
DC8	DCF 2007/8				1	1	30/09/2007	01/10/2007	Ongoing*
TOTAL (IPs)		791	753	32	2	1578			
TOTAL (DCs, SOS)		191	375	11	5	582			
GRAND TOTAL		982	1128	43	7	2160			

Note: Cattle and sheep (in one case) were the only species infected. * Buildings under restriction until secondary C&D completed. Data correct as of 15/12/2007. Figures subject to change following audit of paperwork

3.2.4 Government reviews and action

Laboratory tests revealed that there was a possible link between the outbreak of FMD and the research and commercial FMD vaccine manufacture establishments co-located at the Pirbright site. Immediate steps were taken to suspend work with live virus and vaccine production at the site and an official investigation by the Health and Safety Executive (HSE) was started.

The most likely explanation is of accidental release from the drainage system, which was found to be no longer in good repair. A period of heavy rainfall caused localised flooding which may have resulted in effluent escaping and gaining access to surface soil. It is likely that soil contaminated by the virus was then transported off the site on the wheel and wheel arches of construction vehicles which left the site and drove past the track leading to the first farm to be infected.

In addition to the official investigation, an independent review was commissioned on the safety of UK facilities handling FMD virus. Both reports have been published. The Government has accepted all the recommendations. The research and commercial FMD vaccine manufacture establishments were instructed to address all the risks identified in these reports, and their progress has been closely monitored and assessed through documentary evidence, together with a series of inspections conducted jointly by Defra and the HSE.

The following key actions have been taken in relation to biosecurity:

- a) The contained drainage system on the Pirbright site was tested in early November 2007 by two accredited independent engineering companies and found to be fully contained following the extensive remedial work undertaken since August 2007;
- b) A heat treatment system has been installed within the vaccine production plant, to ensure that any waste potentially contaminated with FMD virus, is heat inactivated at source, so that the risk of viable virus being discharged into the contained drains is as low as practicably possible;
- c) All procedures conducted at the Research facility have been internally reviewed both, to minimise risk of generating aerosols within the contained laboratories, and to ensure inactivation of virus waste, prior to its discharge to the contained drains. A peer review of this work by independent experts is due to report in early 2008;
- d) All effluent from the contained drains is subject to further chemical treatment, which is monitored on a daily basis;

- e) All HEPA filters (in both organisations) have been tested by accredited, independent specialists, to confirm their integrity;
- f) Site security has been strengthened, including the erection of secure fencing to separate the vaccine and Research organisations.

Licence authority to handle live FMD virus at the Pirbright site, was suspended in all relevant areas of the Pirbright site, as soon as the possible link between the site and the outbreak of FMD became apparent. Licence permissions to restart work were given incrementally, as soon as the Government was satisfied that the necessary measures were in place to eliminate the risk of further virus release as far as practically possible.

Licence authority for vaccine production at the site was restored on 6 November 2007, but had to be suspended on 20 November, when the company reported suspicion of an unintended release of virus into the contained drainage system. An inspection team visited the site on 21 November, and they were assured that live Foot and Mouth virus had not been released into the environment. On 22 November 2007, the Secretary of State made a Written Statement to Parliament regarding the incident, which was believed to have involved a leaking valve within the vaccine production system. The incident was contained by the rigorous biosecurity safety mechanisms in place.

In addition to the extensive work on strengthening the current bio-security at the Pirbright site, an independently-led review of bio-security considerations relating to the proposed new development at the research facility, is also underway, together with a separate review of proposed future management and governance arrangements.

All other veterinary and medical high containment laboratory facilities in the UK were advised of all relevant issues arising from the Pirbright investigation, through a Safety Alert, issued jointly by Defra and the HSE on 7 September 2007. The alert required laboratories to ensure that their facilities and procedures addressed these issues adequately. It also announced a programme of inspections to these laboratories. The first phase of the inspection programme focused on Containment level 4 facilities and was completed in November 2007 and found no breaches of legislation. A 12 month programme of inspections of Containment level 3 laboratories will start in January 2008.

3.3 Vaccines and vaccination (Section 3.3 of the OIE questionnaire)

No vaccination of susceptible species was carried out during this outbreak. Vaccination against FMD has never been carried out in the UK.

Immediately following confirmation of disease on the evening of 3 August, the UK mobilised its contingency contract with a commercial company to be prepared to carry out vaccination if required. The commercial company established themselves in premises just outside the Surveillance Zone with 50 teams of veterinarians and support staff and the necessary equipment to carry out a vaccination programme. Full preparations had been made by 8 August.

Also once the precise strain of the circulating virus had been identified on Saturday 4 August, we initially made enquiries of the EU vaccine bank and placed an order for 300,000 doses of existing antigen from the UK vaccine bank to be made into finished vaccine. This was completed by 9 August. Full readiness to vaccinate was maintained until 15 August when vaccination teams were stood down following further epidemiological evidence suggesting that the risk of further spread was very low.

When a further infected premises was confirmed in Surrey on 12 September, vaccination teams were fully mobilised and ready to vaccinate by 17 September. They were stood down on 1 October.

Three epidemiological groups external to Defra were asked to consider possible vaccination scenarios. They all agreed that none of these scenarios indicated any benefit of vaccination in terms of reducing the number of infected premises in these circumstances.

4 FMD surveillance (Section 5.2 of the OIE questionnaire)

4.1 Laboratory testing

4.1.1 Diagnosis

Serology has been used as an adjunct to virological detection in the diagnosis of FMD, from cases where suspicions have arisen due to clinical signs or epidemiological links (Table 6). Sensitivity for detection of early seroconversion has been important in these investigations. Initially, the test used was the Ceditest FMDV-NS for antibodies to the non-structural proteins (NSP) of FMDV. This test was selected as it is not affected by the serotype or the subtype of virus involved. The sera from the cattle on IP1 were used to validate the World Reference Laboratory FMD in-house solid phase competition ELISA for type O

antibodies (SPCE type O test). This test was then used as it was more sensitive than Cedi NSP test in detecting early seroconversion. Later on, the SPCE type O test was replaced with an equivalent but quicker and commercially available test (the Ceditest FMDV type O or 'Cedi-O'), once it had been shown that the two assays have very similar performance characteristics. We consider that this was logical progression any country would have to go through, especially when essentially reliant on serological surveillance to prove a case of freedom from infection.

Table 6. Summary of laboratory tests employed

Test	Specificity ¹	Sensitivity
The WRLFMD in-house SPCE and the VNT	Prescribed tests in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (2006).	
The Ceditest FMDV type O (Cedi-O)	Specificity of 96% based on testing 2664 sera from non-infected cattle, pigs and sheep	Sensitivity relative to VNT of >99% based on testing 148 positive cattle, goat and sheep sera collected from FMDV-infected Dutch farms Sensitivity of 97% based on detection of antibodies in 409 experimentally derived positive sera Sensitivity of 100% compared to OIE Prescribed SPCE-O test based on testing serial bleeds from 20 sheep experimentally infected with FMDV type O
The Ceditest FMDV-NS (Cedi-NS)	The specificity of the test, estimated on sera from 118 FMD free sheep from Greece was 100%.	Sensitivity of 96% based on testing sera from 135 sheep in Greece in 1994.
The Ceditest FMDV-NS (Cedi-NS) (unvaccinated sheep)	Specificity of 100% based on testing 431 sera from non-infected and non-vaccinated sheep	Sensitivity of 100% based on testing 9 sera collected 25-28 days post infection with FMD virus from non-vaccinated sheep.

When used in conjunction with clinical surveillance and other control measures, all of the above tests are considered suitable for providing evidence to help substantiate absence of infection by O₁ BFS 1860 virus in sheep and goats, when exposure is expected to have been at least 21 days before sampling and when vaccination has not been used.

4.1.2 Serological testing

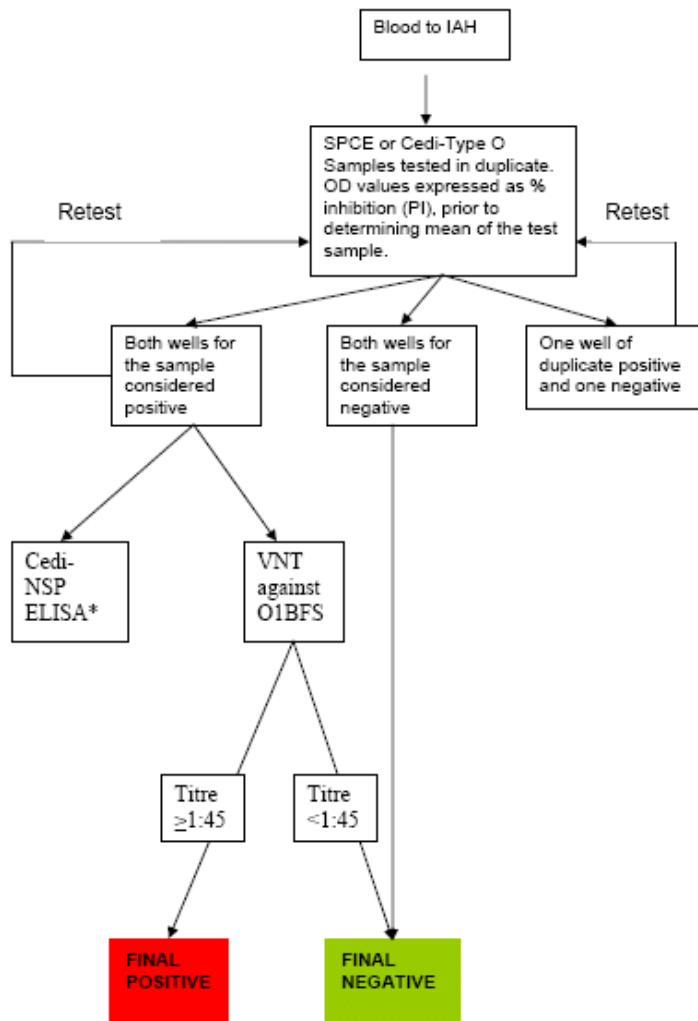
The recommended test regime was to use the SPCE-O or Cedi-O test for screening and initial retesting and then the Cedi-NS test for confirmation. Any animal found positive on both SPCE-O/Cedi-O and Cedi-NS tests was considered highly likely to be a true positive, and this was further confirmed by

¹ Based on recent testing of approximately 10,000 sheep sera from Surrey in 2007 at IAH-Pirbright, the specificity of Cedi-O was 99.5% after the first screening test and 99.7% after confirming positives by a second Cedi-O repeat. After final NSP or VNT confirmation the final specificity was 99.97% .

VNT. Figure 6 below shows what was done at the Institute for Animal Health (IAH), Pirbright.

Figure 6. An outline of the testing protocol (IAH)

FMD Serology Flowchart in IAH for 2007 FMD Outbreak



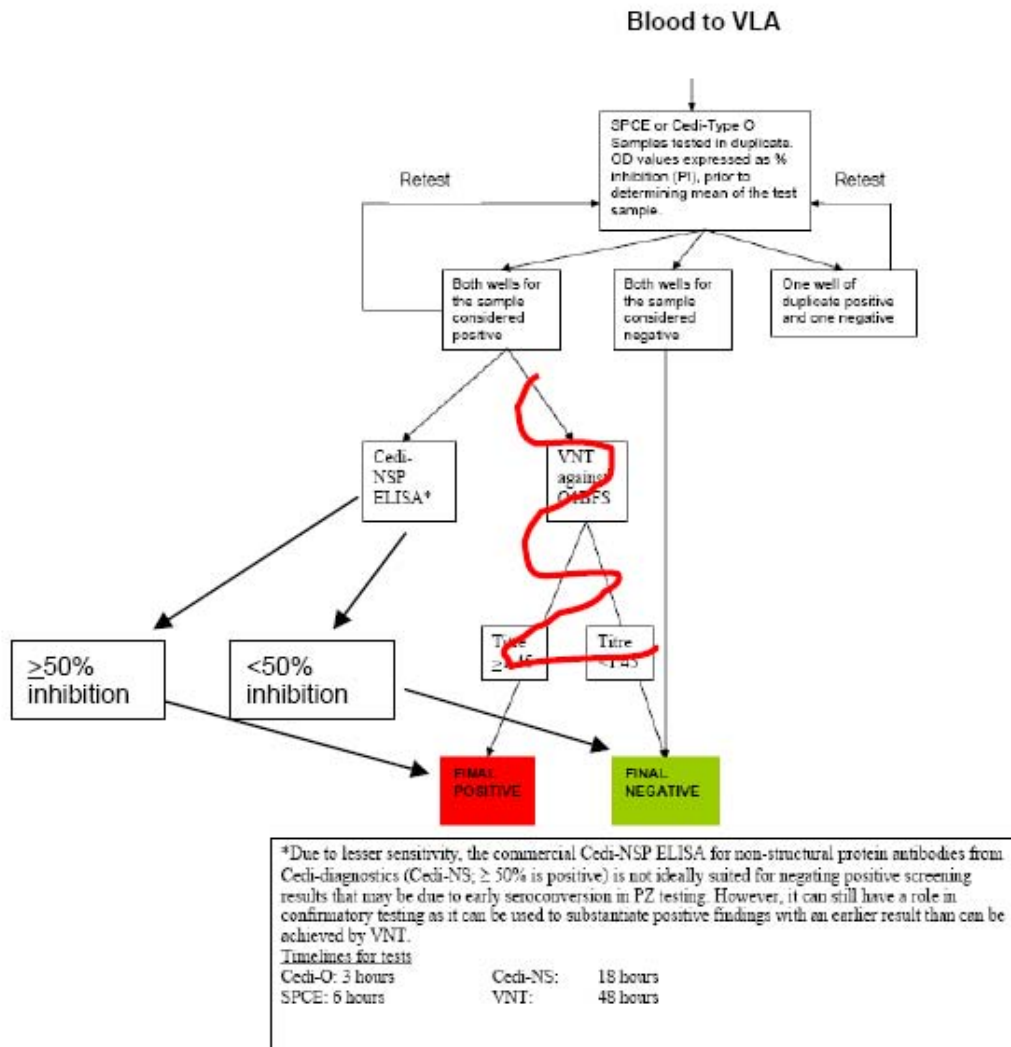
*Due to lesser sensitivity, the commercial Cedi-NSP ELISA for non-structural protein antibodies from Cedi-diagnostics (Cedi-NS; $\geq 50\%$ is positive) is not ideally suited for negating positive screening results that may be due to early seroconversion in PZ testing. However, it can still have a role in confirmatory testing as it can be used to substantiate positive findings with an earlier result than can be achieved by VNT.

Timelines for tests

Cedi-O: 3 hours	Cedi-NS: 18 hours
SPCE: 6 hours	VNT: 48 hours

For all the testing done at Veterinary Laboratories Agency (VLA), the Cedi-NS was used as the final confirmatory test without recourse to VNT. Figure 6a below shows what was done at VLA.

Figure 6. An outline of the testing protocol (VLA)*



Note: - not done

Table 7 summarises the total number of premises which were visited and number of blood samples tested during the August and September cluster. Table 8 summarises the grand total number of samples tested during the August and September cluster.

Table 7. Total number of blood samples tested during the August and September cluster

Zone/ Area	Number of known premises which were visited	Number of Sheep samples tested	Number of Goat samples tested	Number of Cattle samples tested
August 2007 cluster				
PZ	82	1,606*		0
SZ	372	4,161		0
Total	454	5,767		0
September 2007 cluster				
PZ	88	10,455	323	10,778
SZ until 3/11/07	343	4,281	481	4,873
ESA 1	57			1,777
ESA 2	17			681
ESA 3a	68			1,957
ESA 3b	88			1,660
ESA 4**	8*	400	10	265
IPA	8			1,900
AAA1	4			67
AAA2	7			403
AAA3 until 2/11/07	60			2,021
AAA4	3			130
Total	751	15,136	814	26,512
Grand Total	1,205	20,903	814	26,512

**Also includes > 120 samples from goats from PZ; **In ESA 4 sheep were also bled as this area was not previously part of the August PZ so had not been visited.*

Table 8. Total number of samples tested

Cluster	Blood samples tested
August	5,767
September	42,462
Total	48,229

4.1.3 Interpretation and follow-up for seropositive

From 23 September 2007, the screening test was the FMD type O ELISA from Cedi-diagnostics (Cedi-O; $\geq 50\%$ is positive) and the confirmatory test is the virus neutralisation test (VNT; ≥ 1 in 45 is positive).

4.1.3.1 Interpretation of preliminary Cedi-O screening

If many animals (i.e. ≥ 6) show highly positive results ($>60\%$) with the primary Cedi-O screening test, the results were to be reported immediately to Defra by telephone as highly suspicious. The epidemiology of the case was re-evaluated and a repeat visit made to check for clinical signs. If immediate slaughter of the herd/flock was indicated, blood samples and probang samples were to be obtained at the time of slaughter in such cases.

4.1.3.2 Follow-up testing - samples positive by preliminary Cedi-O screening

- a) Retest all Cedi-O inconclusive samples by Cedi-O only;
- b) Set-up confirmatory tests on initial Cedi-O positive, using Cedi-NS and VNT
- c) Retest all initial Cedi-O positives by Cedi-O.
- d) If found positive after repeat testing with either Cedi-O or Cedi-NS, interpret as follows whilst awaiting VNT results:
 - Level of suspicion correlates to number and strength of positive results and epidemiological information on level of risk on farm.
 - If high suspicion, a repeat visit may be made to check for clinical signs. Further sampling with or without immediate slaughter of the flock may be indicated.
 - If low suspicion, either await VNT results or combine with a repeat visit to evaluate status of the herd.
- e) VN test gives definitive laboratory result. If positive, a decision must then be taken by Defra on course of action with respect to need for further examination and sampling or immediate slaughter and sampling.

4.2 Survey design

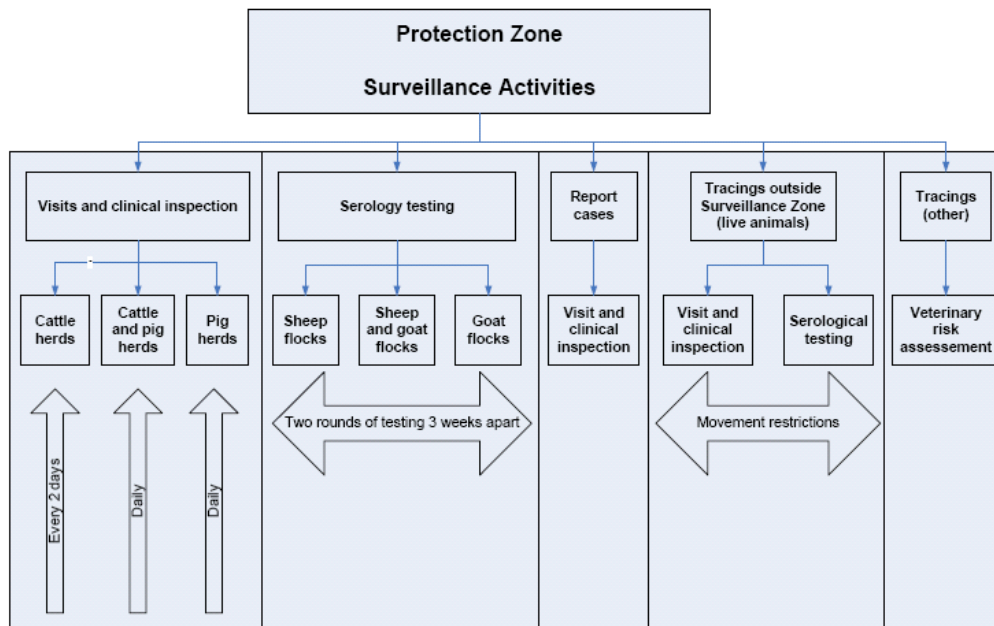
Surveillance and investigation to detect FMD infection and spread was undertaken based on the following strategic priorities:

- Full compliance with Council Directive 2003/85/EC
- Risk based prioritisation, looking for disease where investigations suggest it is most likely to exist
- Details based on advice from expert group including virologists from WRL, epidemiologists and operational experts from Animal Health
- Full compliance with OIE Chapter 2.2.10, in particular with Appendix 3.8.7.

4.2.1 August 2007 cluster

4.2.1.1 Protection Zone

The diagram below outlines the surveillance activities that took place in the Protection Zone following the initial confirmation of FMD in August. All disease control measures remained in place until 24 August when the Protection Zone was lifted following completion of the required surveillance with no detection of disease.



4.2.1.1.1 Census

In the Protection Zone 82 premises were identified with susceptible livestock (see Table 9)

Table 9. Number of premises and species present within the Protection Zone

Species Present on Premises	Number of Premises	Number of Sheep	Number of Goats	Number of Cattle	Number of Pigs	Number of Other Species
Susceptible species present except sheep and goats	27	0	0	972	116	32
Sheep and/or Goats plus other susceptible species	55	988	129	0	0	0
Total	82	988	129	972	116	32

4.2.1.1.2 Veterinary visits

The clinical inspection visits took place between 4 and 16 August 2007 and a total of 270 visits were made, including repeat visits. No clinical signs were observed in any of the animals. In addition to the clinical inspections, sheep and goats had blood samples taken which were examined for the presence of FMD antibodies.

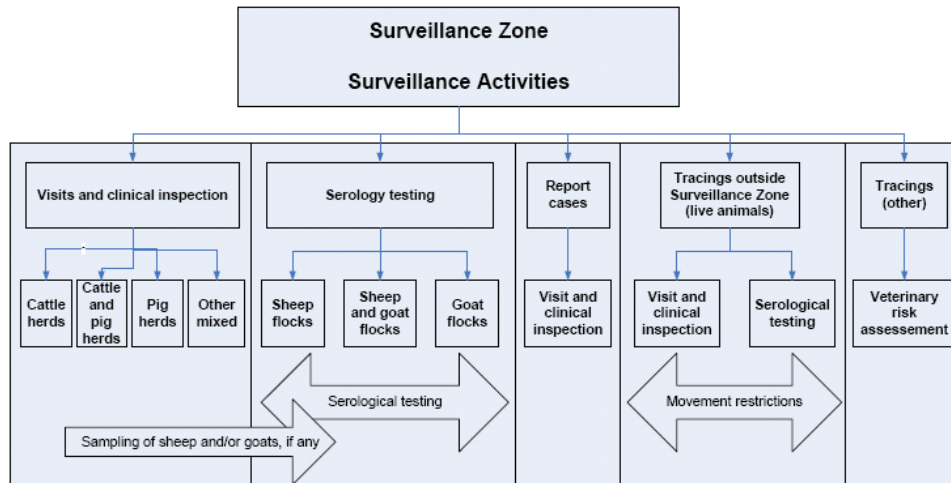
4.2.1.1.3 Serological surveillance

This involved all 55 premises with sheep and/or goats where clotted blood samples were taken from a randomly selected group of sheep or goats selected within each epidemiological group on the premises. An epidemiological group was defined as one group where the animals are able to mix freely with each other, but not with other groups on the same holding.

The sampling was carried out at a level sufficient to detect a 5 % prevalence within the flocks and herds with at least a 95 % level of confidence. The last serological test results were received in the week commencing 12 August and a final clinical inspection visit was made to all premises with susceptible stock by 23 August.

4.2.1.2 Surveillance Zone

The following diagram broadly outlines surveillance activities that took place in the Surveillance Zone resulting in no new detections of infection or disease spread.



4.2.1.2.1 Census

In the Surveillance Zone, three hundred and seventy-two premises with susceptible stock were identified from the available records and from a local census using foot patrols (Table 10). This is an unusual “farming” community with a high proportion of small premises and hobby collections of animals and the average sheep flock/ goat herd size was only 40.

The distribution of these premises by species present is given in table below. It also includes premises that once were a part of surveillance activities within the Protection Zone which was lifted on 24 August.

Table 10. Number of premises and species present within the Surveillance Zone

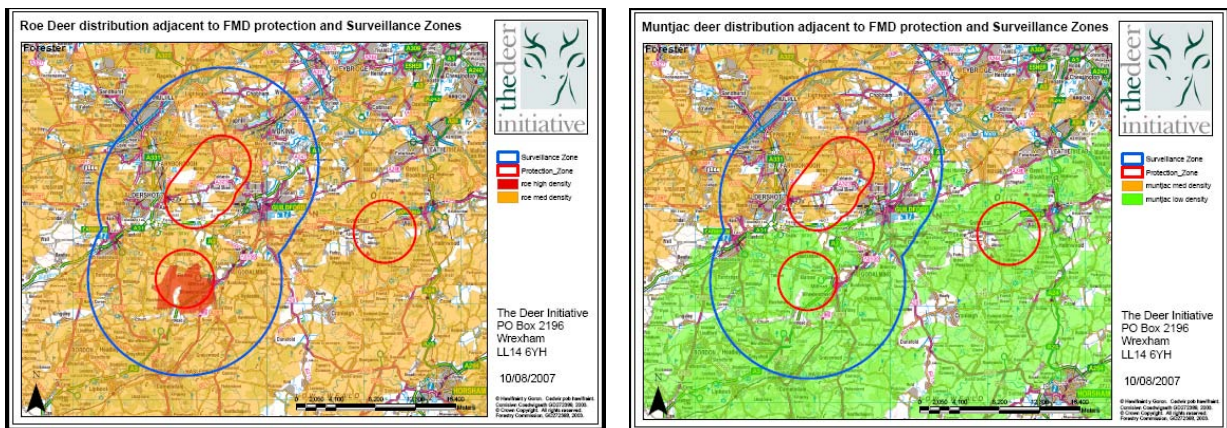
Species Present on Premises	Number of Premises	Number of Sheep	Number of Goats	Number of Cattle	Number of Pigs	Number of Other Species
Susceptible species present except sheep and goats	127	0	0	5,027	3,199	104
Sheep and/or Goats plus other susceptible species	61	4,176	158	1,559	169	271
Sheep-Goats only	184	5,146	212	0	0	0
Total	372	9,322	370	6,586	3,368	375

4.2.1.2.2 Veterinary visits

The surveillance protocol was necessarily defined before all of the patrols and activities had been completed to identify all premises with susceptible species, especially those with sheep and goats. The protocol required all susceptible species to be inspected clinically. With respect to sampling sheep and goats for serological testing, in view of the likely number of premises with sheep and/or goats, the requirement was to sample all such premises, rather than a sample to detect a 2% prevalence of sero-positive flocks and herds. A random sample was therefore taken from all sheep flocks and goat herds sufficient to detect a 5% prevalence of serologically positive animals with 95% certainty using the usual application of the hypergeometric distribution to determine the sample sizes. Where relevant the flocks and herds were subdivided into epidemiological/management groups to form a within flock/herd sampling frame. Lambs less than 6 months of age were excluded from these sampling frames and were not sampled. The visits and sampling were carried out between 30 August and 4 September 2007.

4.2.1.2.3 Wildlife

No wild boar population is present in the affected area. Wildlife (i.e. deer) have not been included in serology testing on the basis of the epidemiological evidence that during the 2001 FMD outbreak in the UK deer were not infected from any of the normally farmed susceptible species, or played a role in the transmission. There was no evidence to suggest they were involved in the transmission of FMD in the August cluster. See also section 4.2.2.2.3.



Deer distribution data suggests that Fallow deer are not found in the SZ. Maps above show that the predominant deer species in the affected area is the Roe deer which primarily inhabits woodland and woodland edge and thus contacts between Roe deer and other susceptible animals would be limited. This is also

applicable to Muntjac deer. These two species are either solitary or in very small groups and remain in a small home range.

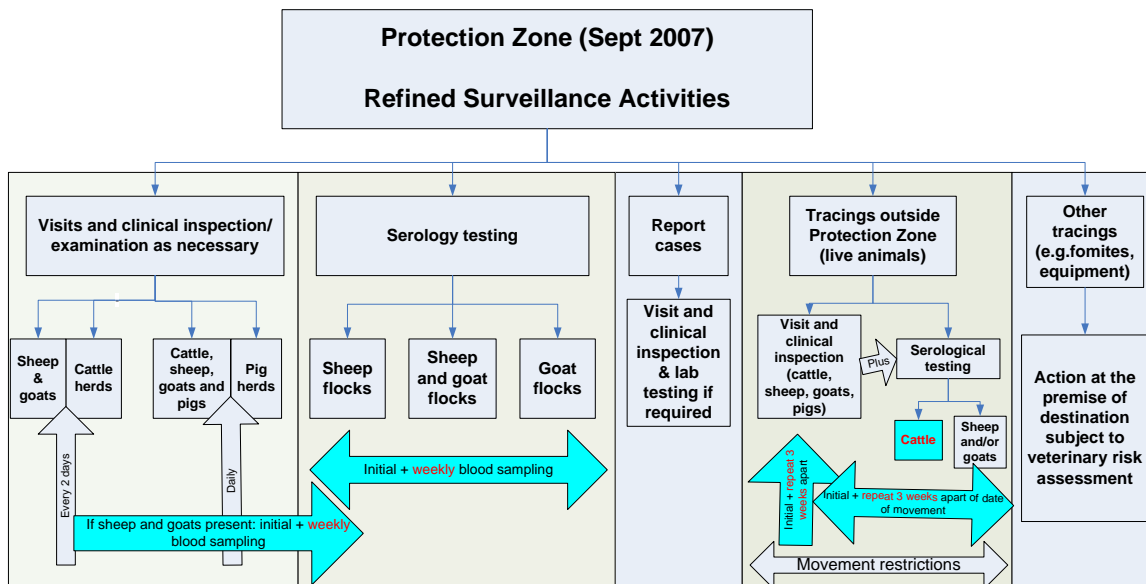
The Protection and Surveillance Zones around the August cluster were lifted on 24 August and 8 September, respectively.

4.2.2 September 2007 cluster

4.2.2.1 Protection Zone

Following the detection of a new IP (IP3) on 12 September, a new Protection and Surveillance Zone was established around the infected holding. These zones were adjusted accordingly following confirmation of the disease at IP4 to IP8 and surveillance activities were started in line with the protocol as described for the August control zones.

The diagram below broadly outlines surveillance activities that took place in the Protection Zone. In addition, to identify possible infection in cattle, specific emphasis was placed on targeted and intensive veterinary investigations and sampling of cattle within the PZ north of the M3 motorway to detect undisclosed disease. This area is known as the Intensive Patrol Area (IPA) (Note: not presented in the diagram below). In this area, cattle were clinically inspected every day and sampled for PCR testing every second day.



Note:
 - Looking for current disease
 - Clustering
 - Tracings from 3 August
 - Aqua and blue colour (with red colour inside) indicates modifications to previous activities in PZ (August 2007)

4.2.2.1.1 Census

Table 11 gives the number of premises and total number of animals present in the Protection Zone.

Table 11. Number of premises and species present within the September Protection Zone

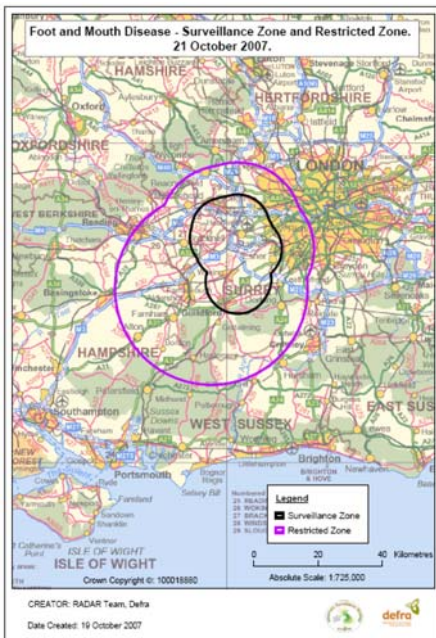
Number of premises with susceptible stock	Number of animals				
	Sheep	Goats	Cattle	Pigs	Deer
88	4,322	91	1,616	1,429	0

Source: NEEG, 17 October

4.2.2.1.2 Serological testing

Serological testing of sheep and goats on all premises in the PZ (September cluster) was conducted from 13 September to 17 October, at weekly intervals. Apart from one flock of sheep (IP5), all others tested negative. All premises with cattle were visited every other day for the clinical inspection of cattle. All premises with pigs were visited every day for clinical inspection and no evidence of clinical disease was identified. This was all complete on 17 October with no other cases detected.

4.2.2.2 Surveillance Zone



On 17 October the Protection Zone was lifted and incorporated into the wider Surveillance Zone and at the same time, the domestic Restricted Zone (RZ) of strict animal movement controls was reduced from the whole of GB to an area of several counties around Surrey. On 21 October, the RZ was further reduced to an area 10km around the surveillance zone and all areas where additional surveillance is taking place. This was based on a veterinary risk assessment (<http://defraweb/animalh/diseases/fmd/pdf/vra-rz191007.pdf>). The control zones at this time are shown in the map on the left.

Surveillance work in the SZ, again as described above for the August zones, commenced on the 24 October and was completed on 4 November with negative results.

4.2.2.2.1 Census

Tables 12 and 13 give the population of the September surveillance zone.

Table 12. Population of the SZ

Surveillance Zone	Number of premises
Known premises in SZ*	1,285
- confirmed as having stock	343
Only stock is pigs, camelids & farmed deer	31
Confirmed as having Cattle, Sheep or Goats**	312
- of these, number which had clinical inspection since 24 October 2007	312
- of these, number which had a blood samples taken***	311

* Including premises merged from PZ; ** Data as of 4 November 2007 – confirmed by LDCC at 19.00hrs; *** One premise had young goats (all confirmed as less than 6 months of age) which were ineligible for sampling.

Table 13. Number of premises and species present

Number of premises with susceptible stock	Numbers of stock					
	Sheep	Goats	Cattle	Pigs	Deer	Other
343	9,159	600	6,239	1,736	1,804	98

Source: LDCC, 4 November 2007 at 19.00hrs

4.2.2.2.2 Additional (Enhanced) surveillance

Enhanced surveillance was carried out in addition to the level of surveillance required by the EU Directive 2003/85. All this was completed on 4 November 2007 with negative results.

Epidemiological investigations into the September cluster indicated that due to the nature of farming in this area, early disease is not easy to diagnose by clinical inspection of cattle. Confinement and examination was required with blood sampling to increase the expected detection rate.

4.2.2.2.2.1 Intensive Patrol and Enhanced Surveillance Areas

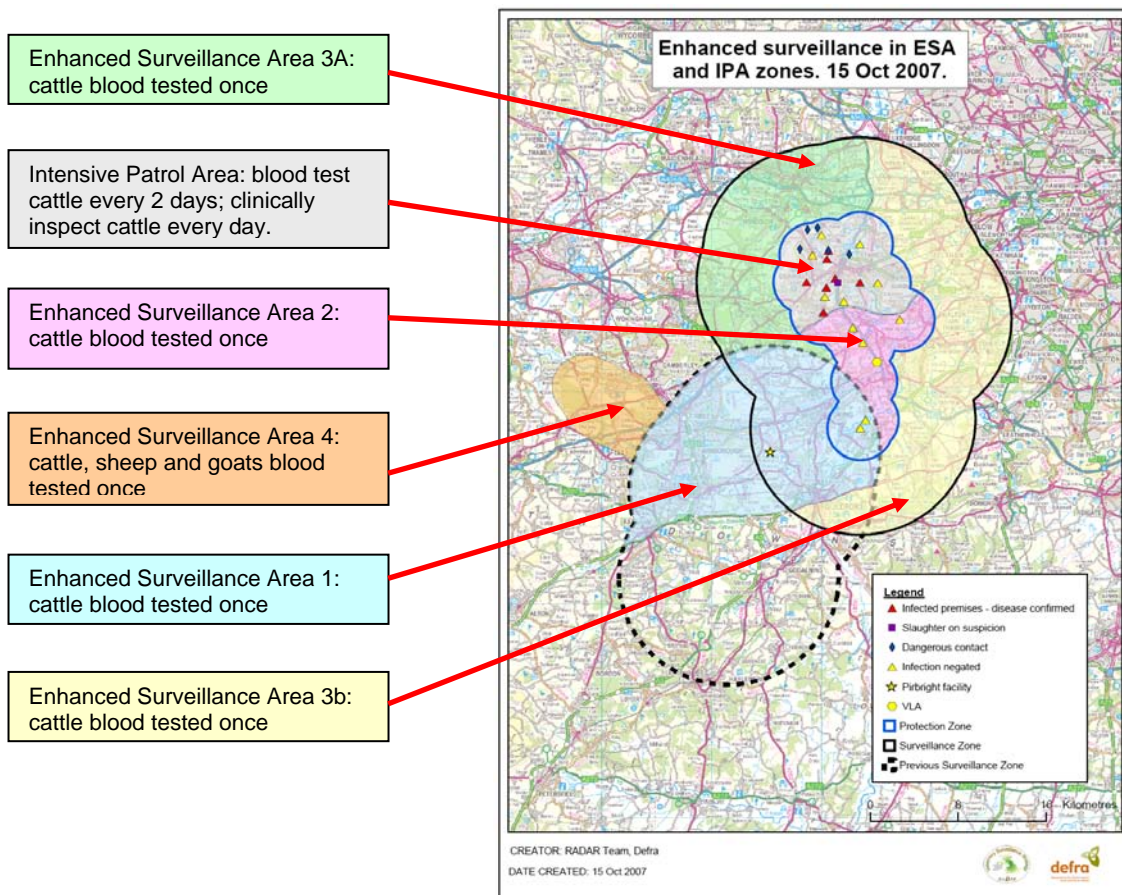
This additional surveillance was implemented by means of an Intensive Patrol Area (IPA) and Enhanced Surveillance Areas (ESAs) which are shown on the map below.

These areas were established on the basis of epidemiological investigations which have shown that there have been challenges in detecting early disease in

cattle due to the nature of farming in this area. The first objective of the additional surveillance was to reduce the time to detection of recently infected cattle herds and reduce the risk of further spread. This was addressed by implementing the Intensive Patrol Area where cattle have been being visited every day for clinical examinations and blood sampled every other day. The samples from the first sampling were examined serologically for antibody detection and by PCR for antigen detection. The samples from the subsequent visits were examined by PCR only. This work involved 8 identified premises in total.

The identification of IP5 highlighted challenges in the detection of clinical disease in cattle in this area and raised the concerns that there may be other cattle herds in the area with undetected disease. This was addressed by enhanced surveillance in cattle herds in the identified Enhanced Surveillance Areas. In ESAs 1, 2 and 3, additional surveillance consisted of serological testing of cattle on all premises.

Investigation of movements of lorries from the Pirbright site in July indicated a further possible risk area which was designated as ESA 4. In this area surveillance for potentially undetected disease was carried out by serological testing of cattle, sheep and goats.

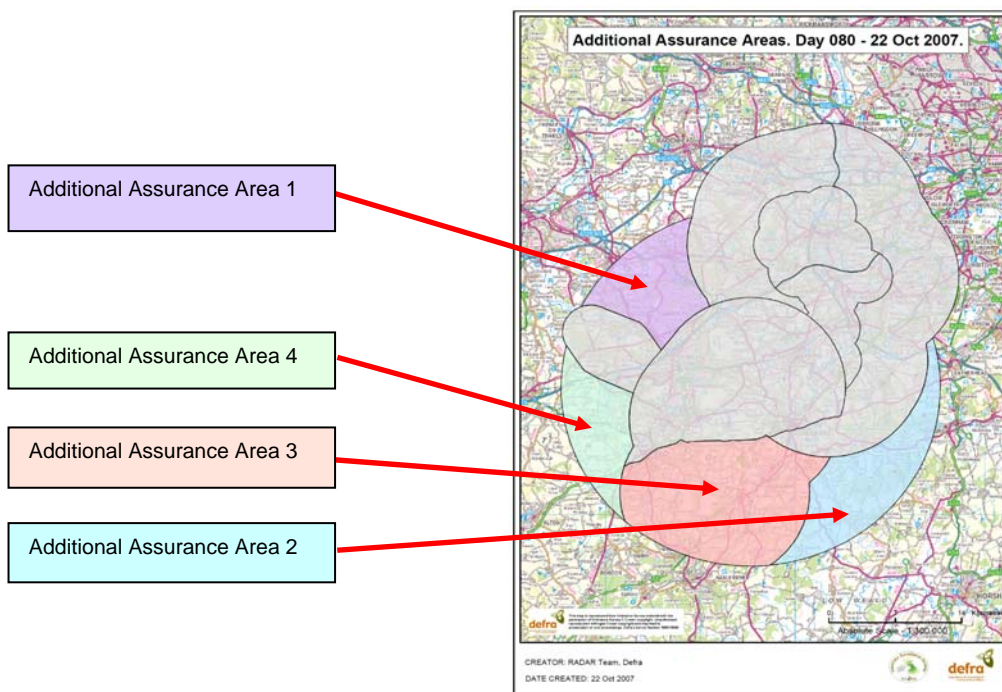


Sampling in the ESAs commenced on 3 October 2007 and was completed on 18 October 2007 with negative results.

4.2.2.2.2 Additional Assurance Areas (AAAs)

Again on the basis of epidemiological advice, in addition to ongoing surveillance activities in the SZ, four more areas (AAA1 – AAA4) were selected for further surveillance work which commenced on 19 October. These were referred to as Additional Assurance Areas (AAAs) which covered the remaining areas within a 20km radius of the Pirbright site that were not part of any previous or current control zone. These areas are shown on the map below.

In three AAAs (AAA1, AAA2 and AAA4), cattle were blood sampled for serological testing in order to rule out the presence of undetected disease. The premises selected were beef herds that were similar to IP5, i.e. beef premises with no neighbouring cattle premises that would ultimately disclose disease if it were present.



AAA3 was the southern part of the August SZ where sheep had been blood sampled but the cattle had only been inspected. These cattle were revisited and blood sampled for serological testing (each epidemiological group being sampled in order to detect a 5 % prevalence with 95 % confidence). This was completed on 4 November 2007 with negative results.

4.2.2.2.3 Wildlife Survey

No wild boar population is present in the affected area.

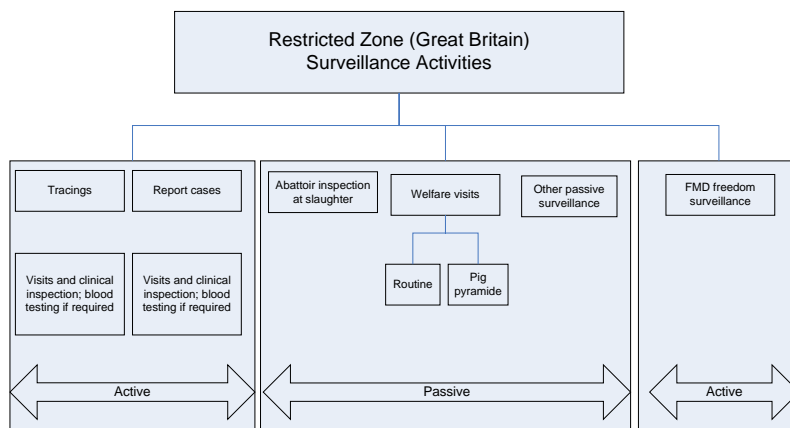
Preliminary analysis of the evolution of the UK 2007 outbreak virus based upon a comparison of whole genome sequences from viruses obtained from each IP is consistent with transmission between the identified IPs without the need for wildlife intermediates (see also section 4.2.1.2.3). The case-control study initiated during the outbreak did include the presence of wildlife as a possible risk factor. More specifically information on the presence or absence of foxes, deer and badgers was sought. In addition the unusual occurrence of wildlife including wild birds was considered as a risk factor. The results of the preliminary analyses did not provide any evidence of an association with the presence of these wildlife species nor with unusual occurrences of wildlife or birds.

Difficulties in sampling an adequate number of live and dead deer make it very unlikely that such a survey could rule out possible infection of deer. Nevertheless, limited surveillance of deer was targeted at areas close to known infected IPs which covered:

- IPA1 – i.e., the September PZ north of M3;
- Former PZ around Normandy, i.e. the northern PZ of the August phase of outbreak.

No infection of deer was found in the area around the IPs as judged by the absence of deer carcasses being found. Samples collected from one deer carcass tested negative for FMD.

4.2.3 Restricted Zone



The following diagram broadly outlines surveillance activities that took place in the Restricted Zone resulting in no new detections of infection or disease spread.

4.2.3.1 Tracings - August Cluster

The use of the available data, in the form of farm records and national systems of animal movements, revealed that there had been 27 movements of animals out the Surveillance Zone since 15 July and until the national movements ban on 3 August. These premises were initially visited during the period 19 – 24 August. The susceptible species were placed under movement restrictions, clinically examined and the sheep and goats were blood sampled for serological testing. For the latter species the protocol was to take blood samples from the animals moved if they were identifiable. If not, all sheep and goats on the premises were sampled. In the outcome all animals were identifiable. A second round of visiting of these premises was conducted on 4 September, when the above protocol was used with respect to clinical inspections and blood sampling of sheep and goats. The details and locations are given in Table 14 below.

Table 14: Details of animals traced from the Surveillance Zone which had been moved since 15 July 2007

Source of animals (PZ or SZ)	County of recipient premises	Stock moved	No. sampled on both sampling visits	Lab Results*
PZ	West Sussex	1 sheep	1	Negative
PZ	Surrey	1 bovine		NA
PZ	Kent	1 bovine		NA
PZ	Kent	1 bovine		NA
PZ	East Sussex	1 bovine		NA
PZ	West Sussex	1 bovine		NA
PZ	Surrey	1 bovine		NA
PZ	Surrey	2 pigs		NA
PZ	Hampshire	6 bovines		NA
PZ	Buckinghamshire	3 bovines		NA
PZ	Hampshire	1 bovine		NA
SZ	Hampshire	1 bovine		NA
SZ	Hampshire	4 pigs		NA
SZ	Hampshire	2 pigs		NA
SZ	Isle of Wight	1 sheep	1	Negative
SZ	Hampshire	1 bovine		NA
SZ	East Sussex	1 bovine		NA
SZ	West Sussex	2 bovines		NA
SZ	Surrey	3 pigs		NA
SZ	Kent	2 goats; 25 sheep	27	Negative
SZ	Surrey	9 bovines		NA
SZ	Hampshire	2 goats	2	Negative
SZ	West Sussex	1 bovine		NA
SZ	East Sussex	1 pig		NA
SZ	Essex	2 sheep	2	Negative
SZ	Devon	3 sheep	3	Negative
SZ	Gwent	1 sheep	1	Negative

*NA - No samples taken as these species were only subjected to clinical examinations.

4.2.3.2 Tracings - September Cluster

Table 15 summarises high risk tracings from IPs and the Zones.

Table 15. Tracing of animals to slaughter from Infected Premises, Protection and Surveillance Zones (September cluster)

IP/Zone	Total Number of cattle moved	Total Number of sheep moved	Total Number of pigs moved
Infected Premises	12	0	180
Protection Zone	28	3	8
Surveillance Zone	88	157	120
TOTAL	128	160	308

The movements of live animals from IPs were only to slaughter and none were to other premises. A total of 596 animals have been traced from IPs, PZ and SZ and confirmation of death has been obtained from abattoir records.

Table 16 summarises the numbers of low risk tracings (movement of people) from IPs.

Table 16. Summary of other tracings (personnel) associated with Infected Premises

IP1	IP2	IP3	IP4	IP5	IP6	IP7	IP8	TOTAL
24	16	25	17	35	12	9	2	140

Source: LDCC, 30 October

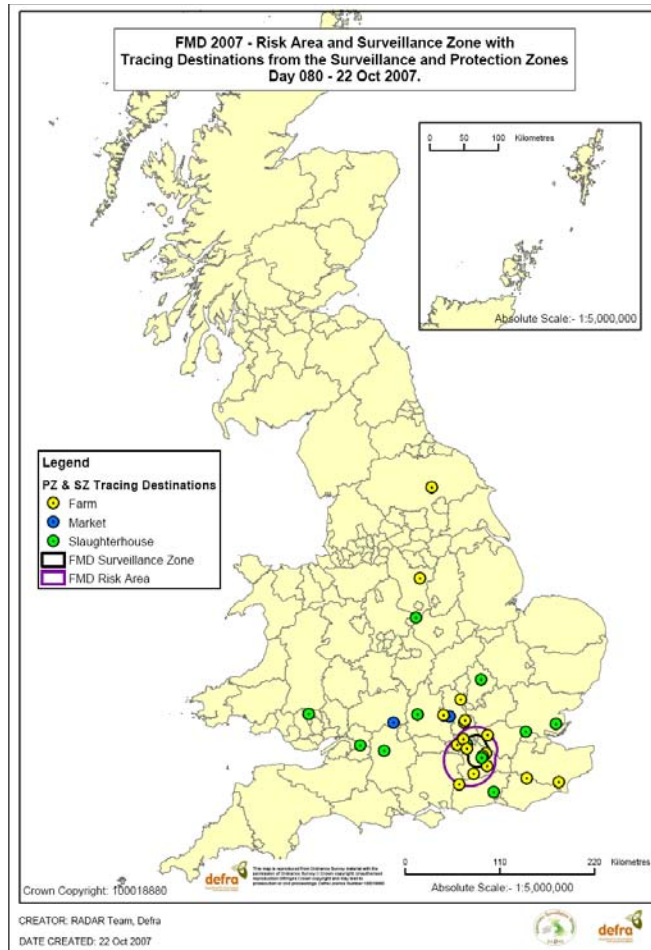
The use of the available data, in the form of farm records and national systems of animal movements, revealed that there had been movements of animals out of the September PZ and SZ between 8 to 12 September when movement control measures were lifted (see Table 17). The requirement was to check movement records not only for this brief period but from the 3 August to ensure that there were no illegal movements following the introduction of national movement ban as a consequence of the detection of the disease at IP1.

Table 17. Animals traced from September PZ and SZ which moved to RZ (movement record checked from 3 August onwards)

Source of animals (PZ or SZ)	County of recipient premises	Stock moved	No. sampled	Lab results
PZ	Oxfordshire	60 sheep	231	Negative
PZ	Surrey	2 sheep	7	Negative
PZ	Merthyr Tydfil	5 cattle	0	<i>slaughter</i>
PZ/SZ	Hampshire	23 cattle, 130 sheep, 131 pigs	0	<i>slaughter</i>
PZ	Essex	280 pigs	0	<i>slaughter</i>
SZ	Surrey	1 sheep	1	Negative
SZ	Oxfordshire	34 sheep	0	NA
SZ	Northampton	17 sheep	0	<i>slaughter</i>
SZ	Northampton	16 sheep	0	<i>slaughter</i>
SZ	Kent	1 sheep	0	<i>slaughter</i>
SZ	Buckinghamshire	9 sheep	9	Negative
SZ	Surrey	25 sheep	124	Negative
SZ	Berkshire	2 cattle	54	Negative
SZ	Yorkshire	6 cattle	6	Negative
SZ	Berkshire	7 cattle	7	Negative
SZ	Buckinghamshire	1 cattle	1	Negative
SZ	Buckinghamshire	2 cattle	2	Negative
SZ	Berkshire	9 cattle	9	Negative
SZ	East Sussex	2 sheep	2	Negative
SZ	Surrey	1 cattle	20	Negative
SZ	London	5 cattle	5	Negative
SZ	West Sussex	1 cattle	1	Negative
SZ	West Sussex	2 cattle, 7 pigs	0	<i>slaughter</i>
SZ	Derbyshire	14 cattle	0	<i>slaughter</i>
SZ	Essex	14 cattle	0	<i>slaughter</i>
SZ	Bedfordshire	5 cattle	0	<i>slaughter</i>
SZ	Oxfordshire	6 cattle, 14 sheep	0	<i>slaughter</i>
SZ	Avon	13 cattle	0	<i>slaughter</i>
SZ	Surrey	110 lambs	110	Negative

The national ban on movements was introduced again on 12 September following the confirmation of disease on IP3. As soon as a movement was identified, the susceptible species were traced, movement restrictions were served and the animals were clinically examined and sheep and goats were blood sampled for serological testing. Where traced sheep and goats could not be individually identified, the whole epidemiological group was sampled.

A second round of visits to these premises was conducted 21 days post movement. All susceptible species received a further clinical inspection and sheep and goats were blood sampled, all with negative results. A summary of animals traced and locations is provided in the map below.

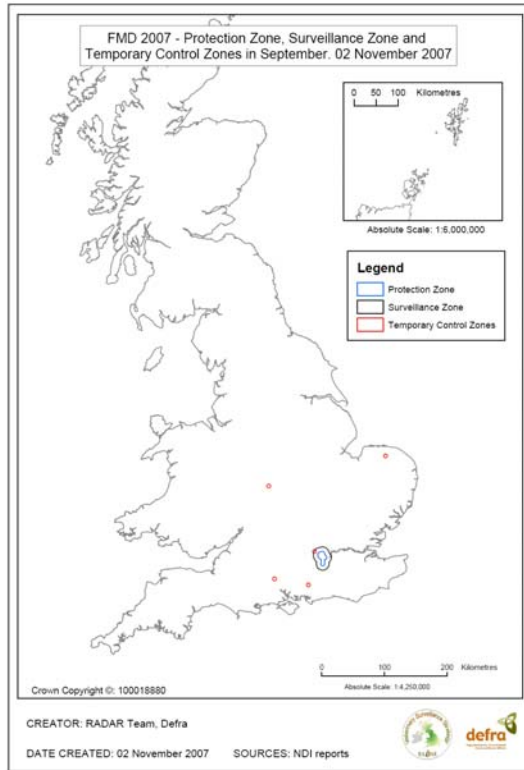


A total of 128 livestock consignments (88 cattle, 38 sheep, 1 goat and 1 pig) were exported into Northern Ireland from Great Britain between 1 July and 3 August 2007. All these consignments were traced to the destination premises and put under movement restrictions. Examinations were carried out on 4 or 5 August by Department of Agriculture veterinarians with negative results. Subsequent revisits were carried out and no FMD was detected in any animals. Restrictions were removed following the completion of the visits.

4.2.3.3 Temporary Control Zones

Three Temporary Control Zones (TCZ) were put in place during August as a precautionary measure during investigations of reported suspect cases of FMD. They all were lifted following negative results obtained by laboratory testing and veterinary risk assessment.

A total of five TCZ were similarly established in September and two in October as precautionary measures. Again, these have been subsequently lifted following negative results obtained by laboratory testing and veterinary risk assessment



4.2.3.4 Report cases

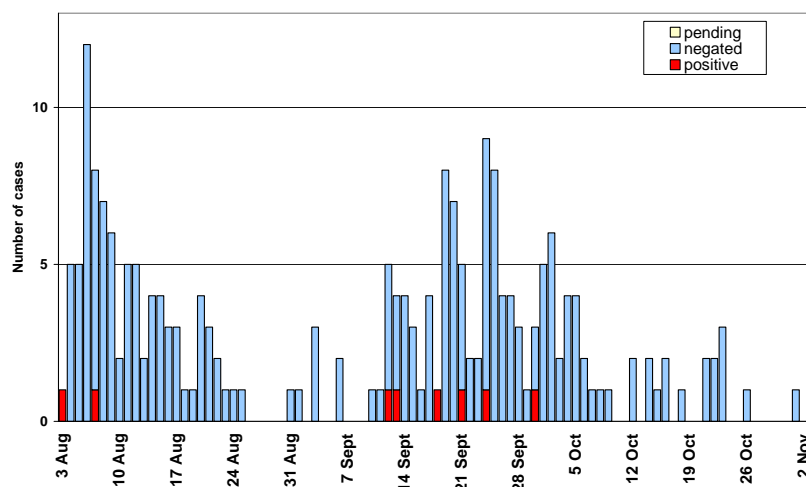


A report case is the notification of suspected disease by an owner or private veterinary practitioner to official veterinary authorities.

As of 09:00, 2 November, a total of 216 report cases have been investigated since the start of the outbreak in August (8 IPs and 208 negated cases) (see map). The map on the left shows the geographical distribution of cases, with the notifications over time displayed in the Figure 7 below.

Until 14 December, 10 more report cases were investigated with negative result. There are no cases currently under investigation.

Figure 7: The number of report cases over time



Note: Of the 8 confirmed cases, 7 were report cases and one (IP5) was detected by sero-surveillance.

4.2.3.5 Abattoirs

There are 360 abattoirs in the UK. Throughout the country, additional checks (Table 18) were put in place at abattoirs for signs of the disease including:

Table 18. Details of abattoir inspections for FMD

Time	Details	Inspector
Ante-mortem	100% inspections, including detailed inspection of any animal showing signs of lameness or unwillingness to move, or any animal demonstrating excessive salivation.	Official Veterinary Surgeon
Post-mortem	100% inspections including detailed inspection of the mouth and feet of all species for signs of FMD lesions	Official Veterinary Surgeon, or Meat Hygiene Inspector

Over 6 million susceptible animals were inspected at slaughter in Great Britain between 30 July and 28 October (see Table 19 and Figure 8 below). No cases of FMD have been identified at abattoirs.

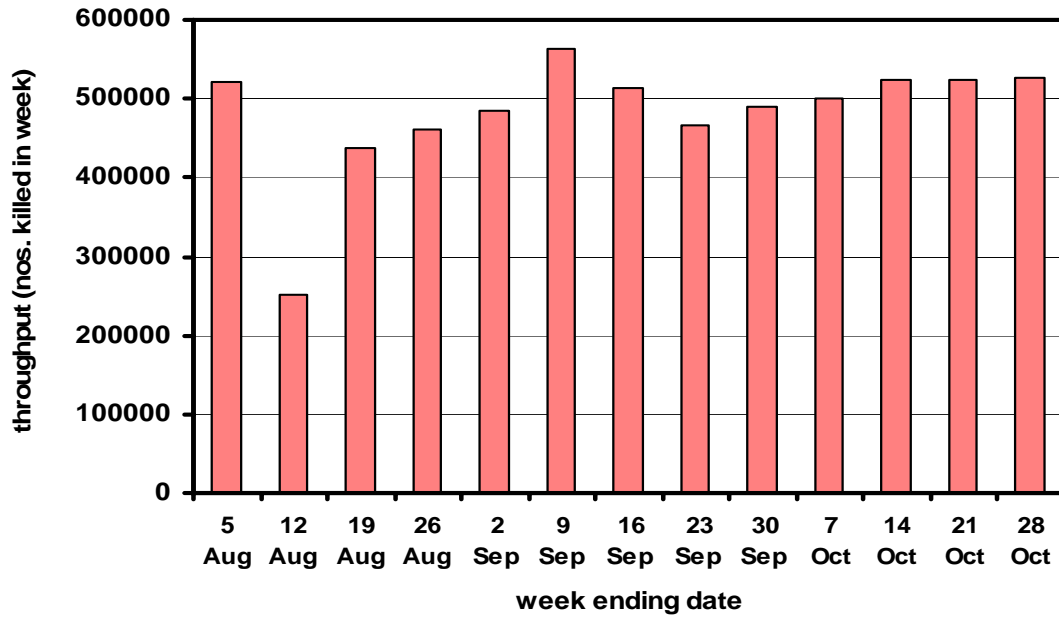
Table 19. Number animals destroyed at GB abattoirs from 30 July to 28 October, by species

Sheep	Goats	Cattle	Pigs	Deer	TOTAL
3,741,760	1,859	529,984	1,968,128	19,378	6,261,109

Source: MHS

The FMD outbreak had only limited affect on abattoir throughput, as highlighted in the Figure 8:

Figure 8: Total number of stock destroyed in GB red meat and game abattoirs by week



4.2.3.6 Welfare visits

4.2.3.6.1 Routine inspections

Staff of Animal Health Agency carry out routine welfare visits to farms and markets. These provide an opportunity to check livestock for signs of notifiable disease. Table 21 show results for On Farm and Market visits and inspections separately for the 10 week period 04/8/07 to 23/11/2007. During this time a total of 506 'On Farm' visits with 1,038 inspections have taken place and 260 market visits with 562 inspections have been completed (table 20). No cases of FMD were detected.

Table 20. Welfare inspections in Great Britain

Week Ending	Farm		Market		Total	
	Visit	Inspections	Visit	Inspections	Visit	Inspections
10/08/2007	26	56	2	4	28	60
17/08/2007	21	44	1	5	22	49
24/08/2007	25	38	2	6	27	44
31/08/2007	38	72	26	49	64	121
07/09/2007	64	151	52	121	116	272
14/09/2007	59	128	32	84	91	212
21/09/2007	43	87	12	22	55	109
28/09/2007	33	64	17	38	50	102
05/10/2007	35	63	10	24	45	87
12/10/2007	18	34	19	27	37	61
19/10/2007	33	73	37	76	70	149
26/10/2007	13	23	11	21	24	44
02/11/2007	17	29	12	30	29	59
09/11/2007	24	56	15	30	39	86
16/11/2007	33	65	4	10	37	75
23/11/2007	24	55	8	15	32	70
Total	506	1038	260	562	766	1600

4.2.3.6.2 Veterinary inspections for movement licensing

See section 3.2.1 – Legal basis for explanation on permitted movements.

Between 16 to 23 August there were 408 certificates issued covering veterinary inspection of approximately 1,127,899 pigs in total. Between 18 to 23 August there were 212 certificates issued covering veterinary inspection of approximately 10,195 cattle, in total.

From 20 September to 18 October, 952 certificates were issued confirming no signs of FMD following veterinary inspection of 1,892,195 pigs. No further inspections were carried out following the reduction of the Restriction Zone.

4.2.3.7 Other passive surveillance

4.2.3.7.1 The Sheep and Goats Directive (91/68/EEC) Annual On-Farm Survey for 2007

This annual survey is required in accordance with the terms set out in Council Directive 91/68/EEC, on animal health conditions governing intra-community trade in sheep and goats, in order to maintain our disease-free status for *B. melitensis*, and to support our claim for freedom from contagious agalactia due to *Mycoplasma agalactiae* and other mycoplasmas.

During the period 14/7/07 to 23/11/07 a total of 16,555 sheep at 953 visits and 358 goats at 77 visits were blood sampled under the survey. No suspected clinical signs were observed at the time of bleeding.

4.2.3.7.2 Bovine TB tests

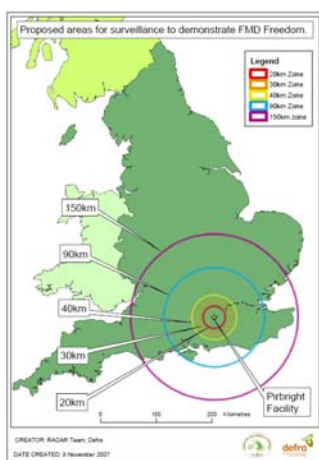
As a general rule all established herds are required to be tested at the interval appropriate for the parish/community in which they are located or graze. Cattle are tested every 1, 2, 3 or 4 years depending on how widespread bovine TB is in a particular region. When cattle are tested, a visual inspection should be carried out on the occasion of every tuberculin test of a herd to identify animals which are showing clinical signs of tuberculosis or any other notifiable disease of cattle.

During the period 14/7/07 to 23/11/07, a total of 1,378,493 cattle received an inspection at 24,864 tests. No suspected clinical signs were observed at the time of testing and inspection.

4.2.3.7.3 National Scrapie Plan (NSP), Ram Genotyping Scheme (RGS) and Welsh Ewe Genotyping Scheme (WEGS) visits

During the period 14/7/07 to 23/11/07, a total of 67,761 sheep were blood sampled at 4,060 visits. NSP confirmed that all sheep (100%) would have received boluses which presented the sampling officer with an opportunity to closely examine the mouths of the animals. No suspected clinical signs were observed.

4.2.3.8 FMD Freedom surveillance



Following the lifting of the Surveillance Zone on 5 November, random surveillance to demonstrate freedom from FMD was carried out. This surveillance was designed on a sample size that will detect 1% prevalence with 95% confidence among beef cattle herds and sheep and goat flocks in an area within 150km of the Pirbright site (see map and tables). This was effectively an infinitely sized population (18,283 premises).

A total of 307 premises were randomly selected and the distribution of these among defined annuli is outlined below and includes a contingency allocation. The minimum number of premises which required sampling as agreed with the EU is shown in red text. This surveillance was completed by 30 November 2007. Of these premises, a total of 305 premises were visited where 11,807 animals were bled and tested with negative results for FMD (see Tables 21 and 22).

Table 21. Total number of premises visited

Premises	Annuli within 150 km from Pirbright site			
	20-30km	30-40km	40-90km	90-150km
Total Number of premises selected includes contingency allocation	51	51	51	154
Minimum number of premises required to be sampled	50	50	50	150
Number of premises sampled	51	52	50	152
Number of premises sampled where results have been received – all results are negative	51	52	50	152
Number of premises sampled with results pending	0	0	0	0

Table 22. Total number of blood samples tested by species

Number of blood samples taken per species	Annuli within 150 km from Pirbright site				Grand total
	20-30km	30-40km	40-90km	90-150km	
Cattle	909	984	693	1881	4,467
Sheep	1152	779	1666	3563	7,160
Goats	60	15	6	99	180
Total	2121	1778	2365	5543	11,807