SHEEP AND GOATS SCRAPIE SURVEILLANCE 2010
JOINT DESCRIPTIVE REPORT FOR GREAT BRITAIN

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Table of contents

Table of contents 2
List of Tables 3
List of Figures 4
1. Sheep scrapie surveillance 6
1.1 Background 6
1.2 Passive surveillance: Scrapie Notification Database (SND) 8
1.3 Fallen Stock Survey (FS) 14
1.4 Dead in transit (DIT) survey 21
1.5 Abattoir survey (AS) 24
1.5.1 Estimation of the prevalence of infection of classical scrapie in the GB national flock 28
1.6 Eradication measures: Compulsory Scrapie Flocks Scheme (CSFS) 29
1.7 All sources 34
1.7.1 Cases and genotypes 34
1.7.3 Unsuitable samples 38
1.8 Conclusions of the GB sheep scrapie surveillance in 2010 39
2.Goat scrapie surveillance 41
2.1 Background 41
2.2 Passive surveillance 42
2.3 Fallen stock 43
2.4 Abattoir survey 45
2.5 Compulsory eradication measures (CSFS) 45
2.5.1 Initial Cull 45
2.5.2 Fallen Stock 45
2.5.3 Annual Cull 46
2.6 Conclusions of the GB goat scrapie surveillance in 2010 47

List of Tables

Table 1 Number of cases reported, tested and confirmed by SND in sheep from 2002 to 2010 8
Table 2 Genotype distribution of the classical scrapie confirmed cases by SND in sheep from 2002 to 2010 12
Table 3 Genotype distribution of the atypical scrapie confirmed cases by SND in sheep from 2002 to 2010 13
Table 4 FS data summary from sheep for the period 2002-2010 14
Table 5 Sheep FS samples summary per country from sheep for the period 2002-2010 15
Table 6 FS holdings summary per country from sheep for the period 2002-2010 16
Table 7 Distribution of holdings by number of sheep submitted to the FS survey for the period 2008-2010 17
Table 8 Genotype distribution of the classical scrapie confirmed cases by the sheep FS survey from 2002 to 2010 19
Table 9 Genotype distribution of the atypical scrapie confirmed cases by the sheep FS survey from 2002 to 2010 20
Table 10 DIT data summary in sheep for the period 2002-2009 (no sampling in DIT in 2010) 21
Table 11 Genotype distributions of the classical scrapie confirmed cases by the sheep DIT survey from 2002 to 2009 22
Table 12 Genotype distribution of the atypical scrapie confirmed cases by the sheep DIT survey from 2002 to 2009 23
Table 13 AS data summary in sheep for the period 2002-2010 24
Table 14 Genotype distribution of the classical scrapie confirmed cases by the sheep AS survey from 2002 to 2010 25
Table 15 Genotype distribution of the atypical scrapie confirmed cases by the sheep AS survey from 2002 to 2010 27
Table 16 Estimates of prevalence of infection of classical scrapie in the sheep population for the period 2002-2010 with 95% confidence intervals 28
Table 17 Number of samples submitted and tested by CSFS testing route in sheep and positive cases 30
Table 18 Genotype distribution of the classical scrapie cases confirmed by the 31
Table 19 Genotype distribution of the atypical scrapie cases confirmed by the CSFS in sheep from 2005 to 2010 32
Table 20 Genotype distribution of selected negative sheep by surveillance source in 2010 37
Table 21 Number of cases reported, tested and confirmed by SND in goats from 2002 to 2010 42
Table 22 FS data summary in goats for the period 2002-2010. DIT figures are shown in brackets and not included in the FS figures 43
Table 23 FS sample summary in goats per country for the period 2002-2010 44
Table 24 FS goat holding summary per country for the period 2002-2010 44
Table 25 AS data summary in goats for the period 2002-2010 45
Table 26 Number of submitted, tested and positive fallen goats from scrapie affected herds in GB 2005 - 2010 46
Table 27 Summary data of the FS testing route of the CSFS in goat holdings for the period 2005-2010 (counts by slaughter date) 46
Table 28 Summary data of the AC testing route of the CSFS in goat holdings for the period 2005-2010 (counts by slaughter date) 47

List of Figures

Figure 1 Counts per month of reported and confirmed classical cases by SND in GB for the period 2002-2010 9
Figure 2 Counts per month of confirmed and reported cases and percentage of reported not confirmed cases in GB for the period Jan-2002 to Dec-2010. 9
Figure 3 Percentage of reported not confirmed cases in SND for the period 2002-2010 with 95% confidence intervals 10
Figure 4 % Tested/Reported, % Positive/Reported, %Positive/Tested (left Y axis) and number of reported suspects (right Y axis) in SND from 2002 to 2010 by country. 11
Figure 5 Percentage genotype distribution of NSP types of classical scrapie confirmed by SND in sheep from 2002 to 2010 12
Figure 6 Percentage genotype distribution of NSP types of atypical scrapie confirmed by SND in sheep from 2002 to 2010 13
Figure 7 Prevalence estimates of scrapie in GB from the FS survey with 95% confidence intervals. Period 2002-2010. 18
Figure 8 Percentage genotype distributions of NSP types of classical scrapie confirmed by the sheep FS survey from 2002 to 2010 19
Figure 9 Percentage genotype distributions of NSP types of atypical scrapie confirmed by the sheep FS survey from 2002 to 2010 20
Figure 10 Prevalence estimates of scrapie in GB from the DIT survey with 95% confidence intervals. Period 2002-2009. Left: classical. Right: atypical. 21
Figure 11 Percentage genotype distributions of NSP types 22
Figure 12 Percentage genotype distribution of NSP types 23
Figure 13 Prevalence estimates of scrapie in GB from the sheep AS with 95% confidence intervals. Period: 2002-2010. Left: classical. Right: atypical. 25
Figure 14 Percentage genotype distributions of NSP types of classical scrapie confirmed by the sheep AS survey from 2002 to 2010. 26
Figure 15 Percentage genotype distributions of NSP types of atypical scrapie confirmed by the sheep AS survey from 2002 to 2010. 27
Figure 16 Estimates of prevalence of infection of classical scrapie in the sheep population for the period 2002-2010 with 95% confidence intervals 28
Figure 17 Number of declared sheep CSFS holdings per month for the period August 2004 to December 2010 29
Figure 18 Percentage genotype distributions of NSP types of classical scrapie confirmed by the CSFS in sheep from 2005 to 2010 32
Figure 19 Percentage genotype distributions of NSP types of atypical scrapie confirmed by the CSFS in sheep from 2005 to 2010 33
Figure 20 Percentage contribution of the five surveillance sources to the number of tested samples and cases in 2010 34
Figure 21 Percentage contribution of the five surveillance sources to the number of cases of classical scrapie for the period 2002-2010 35
Figure 22 Percentage contribution of the five surveillance sources to the number of cases of atypical scrapie for the period 2002-2010 35
Figure 23 Percentage contribution of the five NSP types to the selected negatives for genotyping for the period 2004-2010 38
Figure 24 Counts per month of confirmed and reported goat cases in GB for the period Jan-1993 - 2010. 42

List of acronyms and abbreviations

AC	Annual Cull
AH	Animal Health
AHVLA	Animal Health and Veterinary Laboratories Agency
AS	Abattoir Survey
BSE	Bovine Spongiform Encephalopathy
CSFS	Compulsory Scrapie Flocks Scheme
DA	Devolved Administrations
Defra	Department of Environment, Food and Rural Affairs
DIT	Dead In Transit
EC	European Commission
EFSA	European Food Safety Authority
EU	European Union
EURL	European Union Reference Laboratory
FS	Fallen Stock
GB	Great Britain
IC	Initial Cull
NSPAC	National Scrapie Plan Administration Centre
SEAC	Spongiform Encephalopathy Advisory Committee
SND	Scrapie Notification Database
TSE	Transmissible Spongiform Encephalopathy
VLA	Veterinary Laboratories Agency

1. Sheep scrapie surveillance

1.1 Background

Scrapie became a notifiable disease on January 1st 1993, as required by Council Directive 91/68/EEC. With the implementation in July 1998 of the Sheep and Goat Spongiform Encephalopathy Order and the Sheep and Goat Spongiform Encephalopathy Regulations, epidemiological investigations started on all premises in Great Britain (GB) where a suspect case of scrapie was reported. Recording of data started in a new database, the Scrapie Notifications Database (SND), held at the Veterinary Laboratories Agency (VLA), since 1 April 2011 known as Animal Health and Veterinary Laboratories Agency (AHVLA).

In January 2002 Defra, on behalf of England and Wales, and Scotland began a programme of active surveillance for sheep scrapie. This arose as a result of Regulation (EC) No. 999/2001 and the recommendation of the Spongiform Encephalopathy Advisory Committee (SEAC) to estimate the prevalence of sheep scrapie in the British sheep flock. Surveys on the slaughtered population, i.e. the abattoir survey (AS), and the fallen stock on farm, i.e. the Fallen Stock survey (FS), were conducted throughout each year as per required EU quotas. Following Commission Regulation (EC) 1915/2003 amending Regulation (EC) 999/2001, Defra and the Devolved Administrations (DAs) in Scotland and Wales launched the Compulsory Scrapie Flocks Scheme (CSFS) respectively in England and Scotland on July 20th 2004 and in Wales on November 1st 2004. The scheme introduced compulsory eradication measures in sheep flocks and goat herds in which classical scrapie was confirmed, to meet European law requirements.

During 2010 Animal Health (AH), since 1 April 2011 known as the Animal Health and Veterinary Laboratories Agency (AHVLA) implemented one of two options in scrapie flocks where a scrapie case could be traced or linked to that flock: genotyping with killing and destruction of Type 3 and Type 5 genotypes in rams and ewes, with Type 2 and Type 4 genotype rams and ewes allowed/directed to be slaughtered for human consumption[1], or killing and destruction of the entire flock without official genotyping. In both options, a sample of the culled sheep over 18 months of age population was tested for Transmissible Spongiform Encephalopathies (TSEs) (Initial Cull). Flocks then entered a three year (later reduced to two-year) restriction period during which all fallen stock (Fallen Stock) over 18 months of age had to be submitted for TSE rapid testing, and re-stocking was only permitted with animals of resistant genotypes. A sample of all animals over 18 months of age slaughtered for human consumption was tested annually for TSEs during the restriction period (Annual Cull).

This 2010 report includes the individual descriptive analysis of the five available testing routes of scrapie in sheep in GB: passive surveillance (via the Scrapie Notification Database; SND), Fallen Stock (FS), Dead in Transit (DIT; results to 2009), Abattoir survey (AS) and the

[1] There is no compulsion to slaughter Type 2 ewes immediately: they can be retained for breeding before going to slaughter, or sold to other CSFS flocks.

Compulsory Scrapie Flocks Scheme (CSFS) with its three testing options (over 12 months from the initial cull, over 18 month annual cull, fallen stock). Classical and atypical scrapie figures are provided at the individual sheep level for the passive and three active surveillance sources, namely, SND, FS, DIT (2002 – 2009) and AS, and for the three testing routes of the CSFS. Where possible, accounting for the lack of traceability of some active cases, this information is also shown for holdings.

The report includes for the second year a descriptive analysis of the testing routes in goats (Section 2).

The results of the 2010 data are presented for each source including samples, holdings in GB and by country and the description of cases by type and genotype. When possible, figures for 2010 have been compared with those of previous years, with a focus on the period 2002-2010 for comparative analysis and detection of trends. A further section describes jointly the results of all sources where comparisons allow. Two final sections for sheep and goats report the main conclusions of the descriptive analysis and evolution of scrapie in GB based on surveillance data.

1.2 Passive surveillance: Scrapie Notification Database (SND)

The numbers of reported, tested and confirmed cases in sheep from 2002 to 2010 as reported by SND are shown in Table 1. The total number of clinical suspects reported during 2010 was 3, one from each of 3 different identified holdings, one farm in England, one farm in Wales and one abattoir in England. Two were declared clinical suspects by AH and tested but neither was confirmed as classical or atypical scrapie.. Since scrapie became a notifiable disease in 1993, 2010 is the first year in which no cases of classical scrapie have been confirmed from passive surveillance. As recorded by SND, the counts per month of reported and confirmed cases in GB for the period 2002-2010 are shown in Figure 1.

Figure 2 displays numbers of reported and confirmed cases in GB for the nine-year period, 2002 – 2010. The six-month moving average series has also been plotted for a better visualization of the general trends. Where no suspect cases are reported in a month the '% Reported not Confirmed' ratio is given a default value of 100%.

Table 1 Number of cases reported, tested and confirmed by SND in sheep from 2002 to 2010

Year	Reported	Tested	Confirmed	% Reported not confirmed (95% CI)[2]	% Tested not confirmed (95% CI)	Classical	% Classical (95% CI)	Atypical	% Atypical (95% CI)
2002	549	508	403	26.59 (23.07 – 30.45)	20.67 (17.37 - 24.42)	403	79.33 (75.57 – 82.62)	0	0.00 (0.00 – 0.7)
2003	519	479	379	26.97 (23.33 – 30.96)	20.87 (17.47 - 24.75)	379	79.12 (75.2 4– 82.52)	0	0.00 (0.00 – 0.77)
2004	487	425	307	36.96 (32.79 – 41.33)	27.77 (23.72 - 32.21)	307	72.23 (67.78 – 76.27)	0	0.00 (0.00 – 0.86)
2005	412	331	179	56.55 (51.72 – 61.25)	45.92 (40.63 - 51.30)	176	53.17 (47.79 –58.47)	3	0.90 (0.19 – 2.79)
2006	264	205	100	62.12 (56.12 – 67.75)	51.22 (44.41 – 57.97)	97	47.31 (40.59 – 54.13)	3	1.46 (0.32 – 4.46)
2007	69	45	13	81.16 (70.18 – 88.72)	71.11 (56.48 – 82.29)	11	24.44 (14.16 – 38.89)	2	4.44 (0.5 – 15)
2008	15	8	1	93.3 (68.16-99.99)	87.5 (50.78 – 99.89)	1	12.5 (0.11-49.22)	0	0.00 (0.00- 37)
2009	14	9	3	78.5 (49.2 – 95.3)	66.6 (29.93 – 92.51)	3	33.3 (7.5 – 70)	0	0 (0.00 – 33.6)
2010	3	2	0	100.0 (29.2 – 100.0)	100.0 (15.8 – 100.0)	0	0.0 (0.0 – 84.2)	0	0 (0.0 – 84.2)

[2] All confidence intervals included in this report were calculated following the method as described in: Agresti A and Coull B.A. Approximate is better than "Exact" for interval estimation of binomial proportions. The American Statistician 1998 52:119-126.

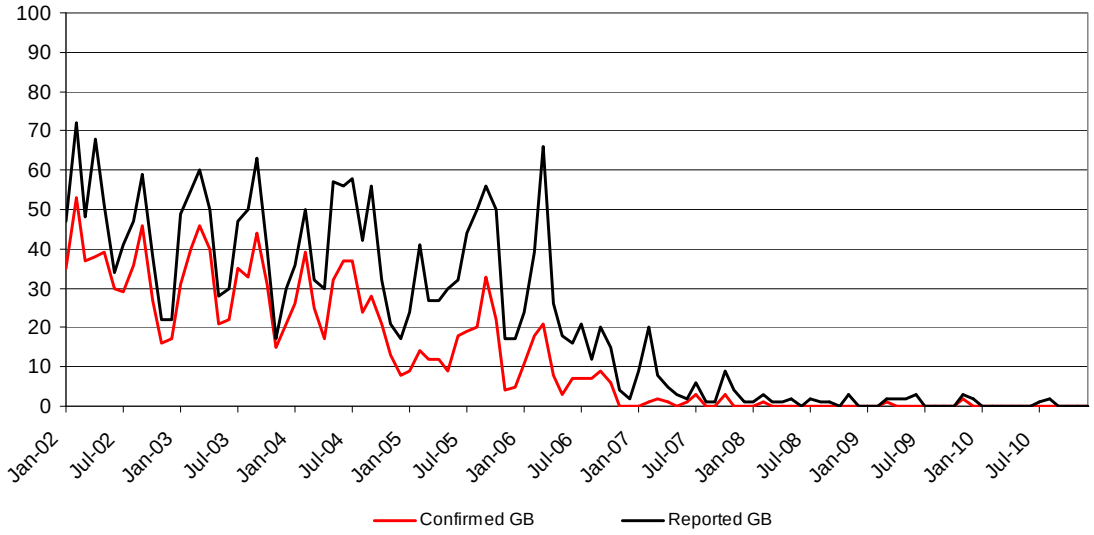

Figure 1 Counts per month of reported and confirmed classical cases by SND in GB for the period 2002-2010

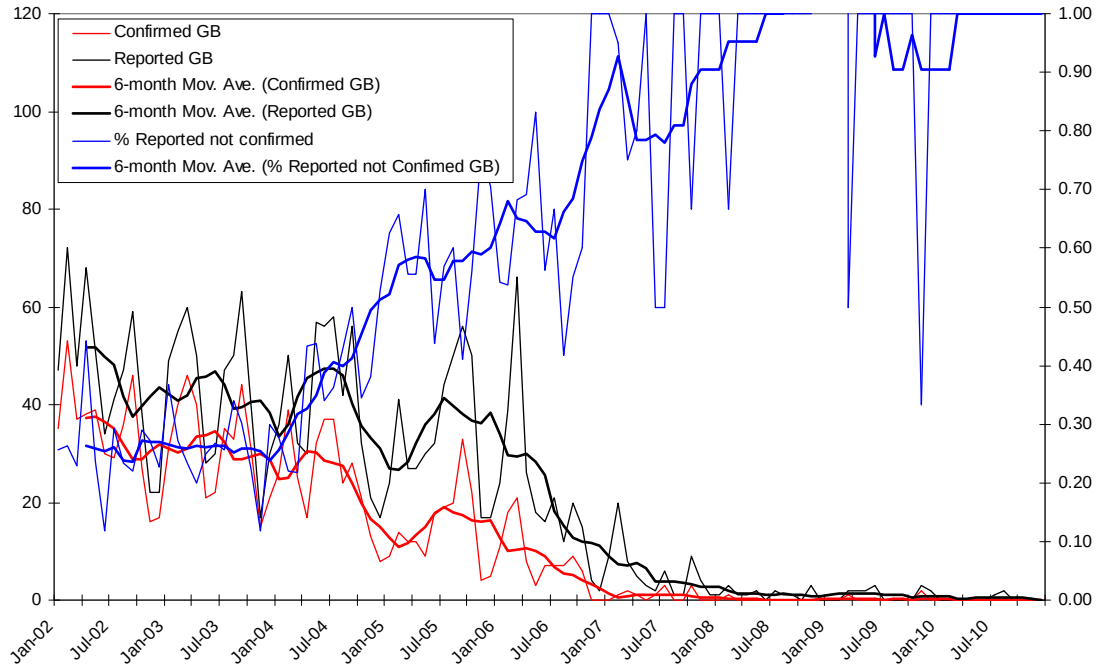

Figure 2 Counts per month of confirmed and reported cases and percentage of reported not confirmed cases in GB for the period Jan-2002 to Dec-2010.

The 6-month moving average curves are shown to help to appreciate longer trends. The left Y axis corresponds to counts and the right Y axis to percentages (0-1)

The pattern of reporting and confirmation of clinical suspects in 2010 remained as in previous years. None of the reported and tested sheep were confirmed positive in 2010 (Figure 3). The low incidence of disease and the lack of reporting of clinical suspects by farmers are the two underlying reasons for this finding. Equally, the positive predictive value of the clinical assessment (proportion of reported cases declared suspects by AH that are actually confirmed) was 0% since neither of the two tested clinical suspects was confirmed positive.

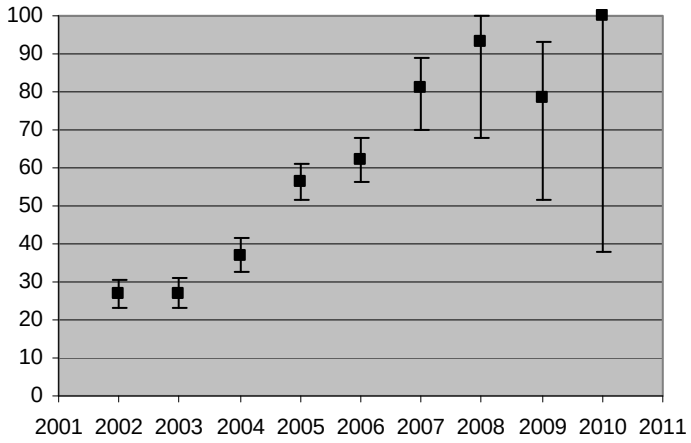

Figure 3 Percentage of reported not confirmed cases in SND for the period 2002-2010 with 95% confidence intervals

The low number of reported clinical suspects (only 3 in 2010) reinforces the low profile that scrapie seems to have in the farming community. The observed trend may reflect the reduction of the disease incidence in excess of the true decline. The low reporting is consistent across countries and is not affected any more by the different reporting pattern in England observed in previous years (Figure 4). Please note that if no animals were reported in a particular year, the '% Tested/Reported', '% Positive/Reported' and '% Positive/ Tested' ratios are presented as 0 (zero) percent.

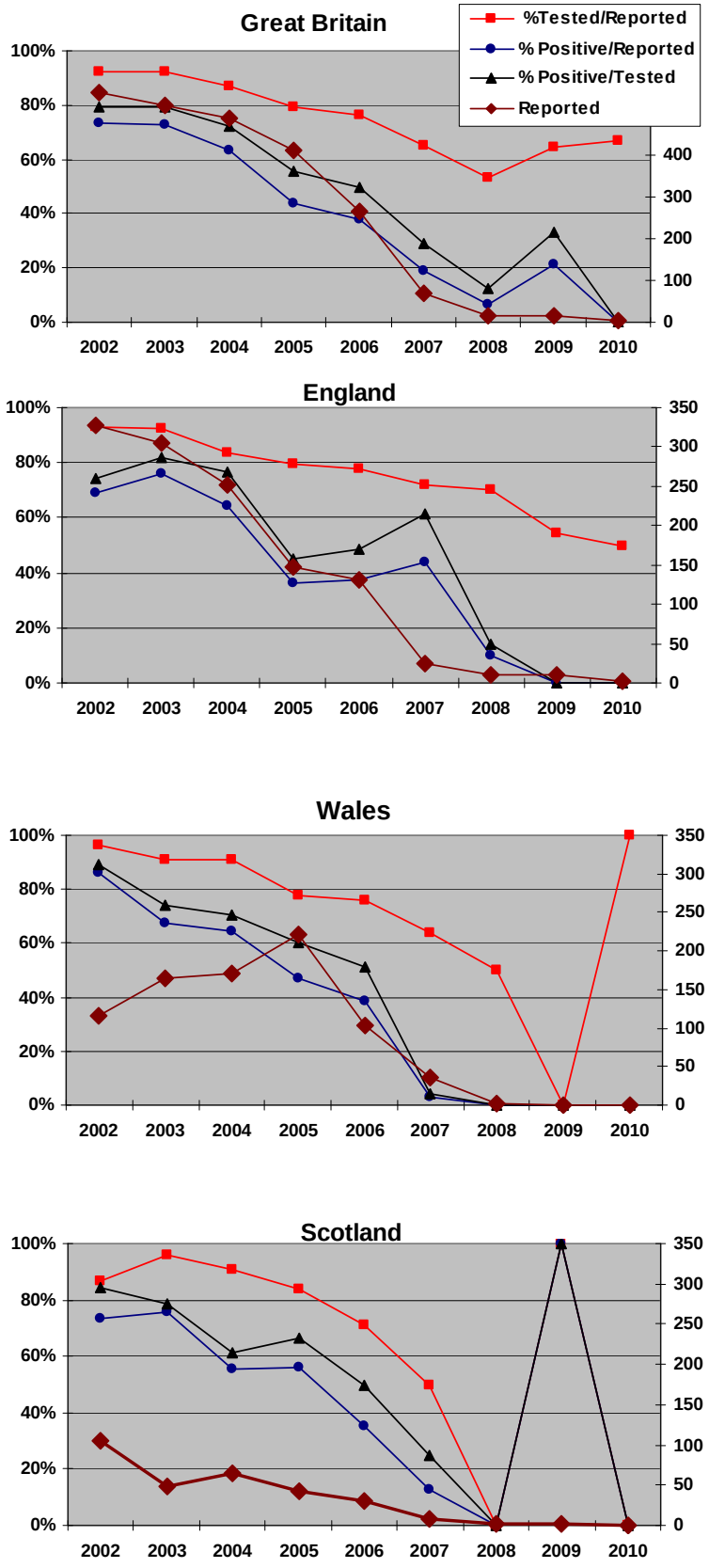

Figure 4 % Tested/Reported, % Positive/Reported, %Positive/Tested (left Y axis) and number of reported suspects (right Y axis) in SND from 2002 to 2010 by country.

The genotype distributions of classical scrapie cases confirmed in sheep within the SND in the period 2002 – 2010 are displayed by individual genotype and NSP type[3] in Table 2 and Figure 5. Allelic variation at codons 136, 141, 154 and 171 gives rise to 21 different genotypes (ARQ denoting the wildtype genotype ALRQ).

Table 2 Genotype distribution of the classical scrapie confirmed cases by SND in sheep from 2002 to 2010[4]

Genotype	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
ARR/ARR										
ARR/AHQ										
ARR/ARH										
ARR/AFRQ										
ARR/ARQ	1 0.2%	1 0.3%		1 0.6%						3 0.22%
AHQ/AHQ		1 0.3%	4 1.3%							5 0.4%
AHQ/ARH										
AHQ/AFRQ										
AHQ/ARQ	7 1.7%	7 1.8%	2 0.7%	6 3.4%	4 4.1%					26 1.9%
ARH/ARH	2 0.5%	7 1.8%	3 1.0%		2 2.1%					14 1.0%
ARH/AFRQ										
ARH/ARQ	3 0.7%	4 1.1%	11 3.6%	4 2.3%	4 4.1%	1 9.1%				27 2.0%
AFRQ/AFRQ										
AFRQ/ARQ										
ARQ/ARQ	86 0.5%	95 25.1%	45 14.7%	28 15.8%	8 8.2%	3 27.3%				265 19.2%
ARR/VRQ	12 3.0%	12 3.2%	15 4.9%	14 7.9%	3 3.1%					56 4.1%
AHQ/VRQ	1 0.2%			1 0.6%						2 0.1%
ARH/VRQ	144 4.5%	14 3.7%	14 4.6%	8 4.5%	13 13.4%	1 9.1%	1 100%			69 5%
AFRQ/VRQ										
ARQ/VRQ	18 35.7%	170 44.9%	136 44.3%	93 52.5%	45 46.4%	1 9.1%		1 33.3%		590 42.8%
VRQ/VRQ	60 14.9%	55 14.5%	48 15.6%	14 7.9%	16 16.5%	1 9.1%		2 66.6%		196 14.2%
Unknown	69 17.1%	13 3.4%	29 9.4%	8 4.5%	2 2.1%	4 36.4%				125 9.1%
Total	403 100%	379 100%	307 100%	177 100%	97 100%	11 100%	1 100%	3 100%		1378 100%

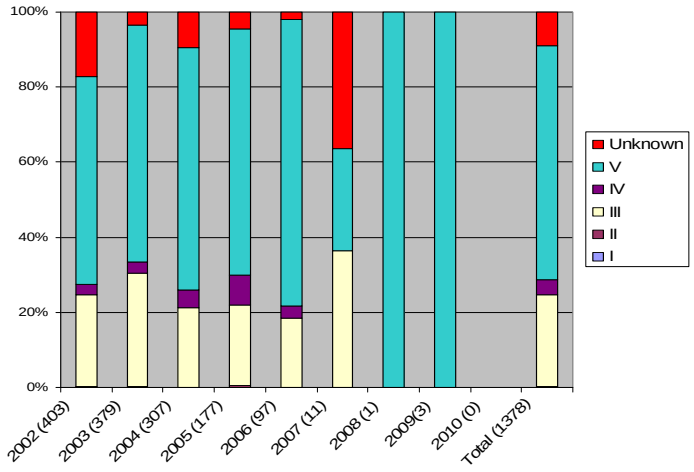

Figure 5 Percentage genotype distribution of NSP types of classical scrapie confirmed by SND in sheep from 2002 to 2010

[3] NSP types: Type 1 (ARR/ARR), Type 2 (ARR/AHQ, ARR/ARH, ARR/AFRQ, ARR/ARQ), Type 3 (AHQ/AHQ, AHQ/ARH, AHQ/AFRQ, AHQ/ARQ, ARH/ARH, ARH/AFRQ, ARH/ARQ, AFRQ/AFRQ, AFRQ/ARQ, ARQ/ARQ), Type 4 (ARR/VRQ) and Type 5 (AHQ/VRQ, ARH/VRQ, AFRQ/VRQ, ARQ/VRQ, VRQ/VRQ)

[4] Please note that ALRQ (ARQ) and AFRQ alleles were not discriminated in testing of all surveillance routes before 2007

No atypical cases were confirmed by SND in 2010. The genotype distributions of atypical scrapie by individual genotype and NSP type for the period 2002-2010 are displayed in Table 3 and Figure 6.

Table 3 Genotype distribution of the atypical scrapie confirmed cases by SND in sheep from 2002 to 2010

Genotype	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
ARR/ARR										
ARR/AHQ				2 66.7%						2 25%
ARR/ARH										
ARR/AFRQ										
ARR/ARQ										
AHQ/AHQ					1 33.3%					1 12.5%
AHQ/ARH										
AHQ/AFRQ										
AHQ/ARQ				1 33.3%	2 66.7%	1 50%				4 50%
ARH/ARH										
ARH/AFRQ										
ARH/ARQ										
AFRQ/AFRQ										
AFRQ/ARQ										
ARQ/ARQ										
ARR/VRQ										
AHQ/VRQ										
ARH/VRQ										
AFRQ/VRQ										
ARQ/VRQ										
VRQ/VRQ										
Unknown						1 50%				1 12.5%
Total				3 100%	3 100%	2 100%				8 100%

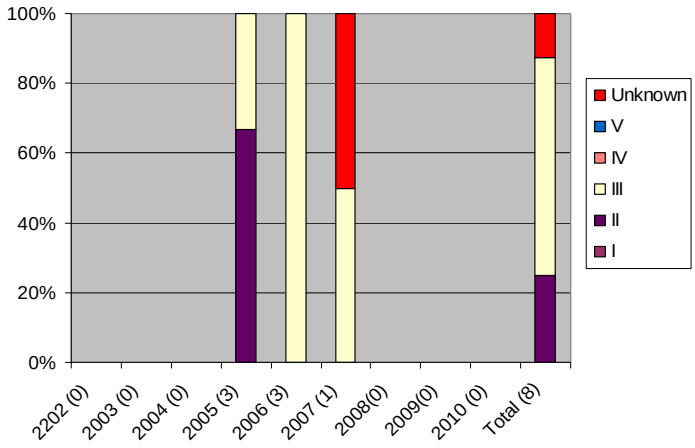

Figure 6 Percentage genotype distribution of NSP types of atypical scrapie confirmed by SND in sheep from 2002 to 2010

1.3 Fallen Stock Survey (FS)

In 2010 the EU requirement for testing fallen sheep over 18 months of age was set at 10,000 for the UK (with internal targets of 9,300 from GB and 700 from Northern Ireland). During 2010, the GB survey relied on voluntary carcase submissions from farmers to the TSE Helpline operated by the Rural Payments Agency.

As the survey progressed, sampling rates (animals accepted per week) were regularly reviewed, with rates varying from a weekly restriction of 120/week at the start of the year, falling to 27 per week between September and December. Volumes were typically at their highest in the first half of the year coincident with lambing and as hill sheep are brought to lower ground.

A total of 10,268 samples from fallen sheep were submitted during 2010, 10,044 (97.8%) of them suitable for testing (Table 4), i.e. exceeding 11.2% the EU target figure for GB. The survey confirmed 6 atypical scrapie cases (five between February and May, and one in December), the same proportion (0.08%) as detected in 2009. For the first time since the launch of the FS survey, no cases of classical scrapie were confirmed.

Table 4 FS data summary from sheep for the period 2002-2010

Year	Samples	Tested	Unsuitable	Clas.	% Clas. (95% CI)	Atyp.	% Atyp. (95%CI)	Ratio clas./aty.
2002	1066	903	163 (15.3%)	7	0.77 (0.99 – 0.34)	0	0.00 (0.00 – 0.52)	
2003	4282	3529	753 (17.6%)	8	0.22 (0.10 – 0.45)	3	0.08 (0.01 – 0.26)	2.6:1
2004	5018	3919	1099 (21.9%)	8	0.20 (0.09 – 0.41)	4	0.10 (0.03 – 0.27)	2:1
2005	9208	7644	1564 (17%)	25	0.32 (0.22 – 0.48)	5	0.06 (0.03 – 0.11)	5:1
2006	25804	17989	7815 (30.3%)	31	0.17 (0.12 – 0.24)	11	0.06 (0.03 – 0.11)	2.8:1
2007	18532	12670	5862 (31.6%)	17	0.13 (0.08 – 0.21)	10	0.08 (0.04 – 0.14)	1.7:1
2008	12377	10128	2249 (18.2%)	4[1]	0.04 (0.01 – 0.1)	4	0.04 (0.01 – 0.1)	1:1
2009	10478	9941	537 (5.1%)	2	0.02 (0.00 – 0.07)	8	0.08 (0.03 – 0.16)	1:4
2010	10268	10044	224 (2.2%)	0	0.00 (0.00 – 0.04)	6	0.08 (0.03 – 0.13)	-

[1]Two inconclusive results were not included

By country the contribution of samples from holdings in England was 54.1%, an absolute reduction of 10% from 2009 (Table 5). The largest variation occurred in the contribution of samples from Wales, up from 26.5 to 38.4%, with the proportion from Scotland decreasing by 1.5% to 7.5% of all submitted samples. The one-way test for proportions showed there is still a significant over-representation of samples submitted from English holdings ($P<0.05$) and Wales ($p<0.05$). Scotland was significantly under-represented ($p<0.05$). The calculation was based on the total sheep population in each country using as reference the proportion of sheep in England in the Sheep and Goat Inventory 2010 (www.defra.gog.uk).

Table 5 Sheep FS samples summary per country from sheep for the period 2002-2010

Year	Samples	England	%	Scotland	%	Wales	%
2002	1066	762	71.5%	172	16.1%	121	11.4%
2003	4282	3373	78.8%	623	14.5%	270	6.3%
2004	5018	3536	70.5%	388	7.7%	1083	21.6%
2005	9208	5390	58.5%	1751	19.0%	2065	22.4%
2006	25804	17100	66.3%	2496	9.7%	6153	23.8%
2007	18532	12304	66.4%	1791	9.7%	4384	23.7%
2008	12377*	8856	71.5%	1077	8.7%	2430	19.6%
2009	10478	6753	64.4%	945	9%	2780	26.5%
2010	10268	5555	54.1%	774	7.5%	3939	38.4%
Total	97033	63629	65.6%	10017	10.3%	23225	23.9%

*CPHs from 14 samples submitted could not be ascertained

The historical decline in the number of holdings submitting samples to the FS (Table 6) was maintained in 2010, with a 4% reduction on the number of holdings represented in the survey in 2009.

The distribution of submitting holdings by country in 2010 showed a change of pattern compared to 2009, with a substantial decrease in the number of submitting holdings from England (down from 74.6% in 2009 to 63.3% in 2010) and an increase from Welsh holdings to nearly 30% of the total compared to 17.5% in the previous year. A total of 121 holdings in Scotland were represented in the 2010 survey (6.9% of submitting holdings), down from 146 (7.9%) in the previous year.

Comparisons of national proportions of sheep holdings in the three countries were made using data from the Sheep and Goat Inventory 2010 (58.7%, 20.5% and 20.8% of the holdings in England, Wales and Scotland, respectively). The one-way test for proportions holdings from showed that holdings in England were over-represented ($p<0.05$) with 63.3% of the submitting holdings in the survey. Holdings in Wales were equally over-represented ($p<0.05$), and. Scotland was severely under-represented with 6.9% of submitting holdings.

Table 6 FS holdings summary per country from sheep for the period 2002-2010

Year	Holdings	England	%	Scotland	%	Wales	%
2002	785	557	71.0%	136	17.3%	92	11.7%
2003	1455	1100	75.6%	241	16.6%	114	7.8%
2004	1501	1035	69.0%	191	12.7%	275	18.3%
2005	2441	1643	67.3%	368	15.1%	427	17.5%
2006	5405	3808	70.5%	488	9.0%	1109	20.5%
2007	4580	3188	69.6%	454	9.9%	922	20.1%
2008	2853	2153	75.5%	228	8%	472	16.5%
2009	1843	1375	74.6%	146	7.9%	322	17.5%
2010	1765	1118	63.3%	121	6.9%	526	29.8%
Total	22628	15977	70.6%	2373	10.5%	4259	18.8%

The average number of submitted samples per holding in England was 5 (median: 3, range: 1-64), lower than in Wales (mean: 7.5, median: 4, range: 1-89) and Scotland (mean: 6.4, median: 3, range: 1-49). The mean number of submitted fallen sheep in England was significantly lower than in Wales and Scotland (Independent t-tests for unequal variances ($p<0.05$). While the mean numbers of samples submitted from holdings in England and Scotland were comparable to figures for 2009, Welsh holdings in the survey submitted on average one sheep less in 2010 than in 2009.

The overall number of holdings participating in the survey has declined despite the quota assigned to GB remaining the same for the last five years. The proportion of holdings that submitted a single sheep to the FS survey has progressively declined, from 40.3% of holdings in 2008 to 35.3% in 2009 and 31.4% in 2010. At the other extreme, the proportion of holdings with more than 50 sheep tested during the year increased from 0.24% in 2008 to 0.49% in 2009 and 0.79% in 2010. If this trend continues in the next few years, there will be a risk of a few holdings contributing excessively to the FS survey with the consequent reduction in the ability of the survey to detect new cases of scrapie, should they still persist in the sheep population. Table 7 shows the distribution of holdings by number of sheep submitted to the survey in the last three years.

Table 7 Distribution of holdings by number of sheep submitted to the FS survey for the period 2008-2010

Number of sheep submitted	Number of holdings		
	2010	2009	2008
1	555	651	1150
2	249	257	487
3	173	175	283
4	147	145	188
5	92	91	139
6	77	68	96
7	61	68	81
8	54	56	71
9	45	42	45
10	46	33	32
11-20	175	161	194
21-30	54	44	57
31-40	17	26	21
41-50	6	17	3
>50	14	9	7

The proportions of positive cases of classical and atypical scrapie in the FS survey (as fractions of all tested samples) in the years 2002 – 2010 are shown in Figure 7. The proportion of classical scrapie cases showed a marginal decrease in 2010 compared to 2009, with the confidence intervals overlapping. Following a doubling in the proportion of positive atypical scrapie cases between 2008 and 2009, the fraction declined slightly in 2010, although the change was not statistically significant. Note that the 95% confidence intervals overlap between all consecutive years. The six atypical cases confirmed in 2010 came from five holdings in England and one in Wales.

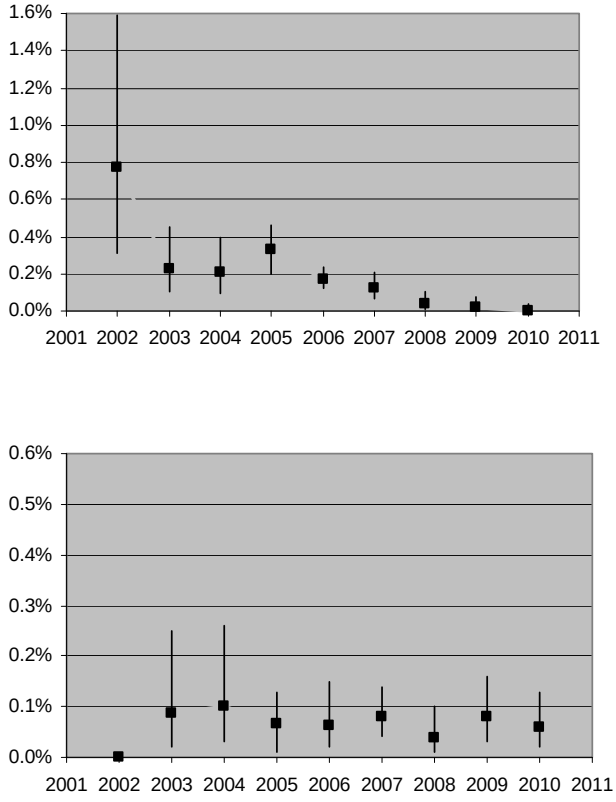

Figure 7 Prevalence estimates of scrapie in GB from the FS survey with 95% confidence intervals. Period 2002-2010.

Above: classical. Below: atypical. Note: the range in the Y-axis is different in the two graphs.

The genotype distributions of classical scrapie by individual genotype and NSP type for the period 2002-2010 are displayed in Table 8 and Figure 8.

Table 8 Genotype distribution of the classical scrapie confirmed cases by the sheep FS survey from 2002 to 2010

Genotype	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
ARR/ARR										
ARR/AHQ										
ARR/ARH										
ARR/AFRQ										
ARR/ARQ										
AHQ/AHQ										
AHQ/ARH										
AHQ/AFRQ										
AHQ/ARQ				1 4.0%	1 3.2%					2 2%
ARH/ARH						1 5.9%				1 1%
ARH/AFRQ										
ARH/ARQ		1 12.5%			1 3.2%					2 2%
AFRQ/AFRQ										
AFRQ/ARQ										
ARQ/ARQ			3 37.5%	7 28.0%	5 16.1%	4 23.5%				19 18.8%
ARR/VRQ				2 8.0%	4 12.9%	3 17.6%	1 25%			10 9.9%
AHQ/VRQ										
ARH/VRQ		1 12.5%	1 12.5%	1 4.0%	3 9.7%	1 5.9%	1 25%			8 7.9%
AFRQ/VRQ										
ARQ/VRQ	5 83.3%	4 50.0%	4 50.0%	10 40.0%	16 51.6%	6 35.3%	2 50%	1 50%		48 47.5%
VRQ/VRQ	1 16.7%	2 25.0%		4 16.0%	1 3.2%	1 5.9%				9 8.9%
Unknown						1 5.9%		1 50%		2 2%
Total	6 100%	8 100%	8 100%	25 100%	31 100%	17 100%	4 100%	2 100%		101 100%

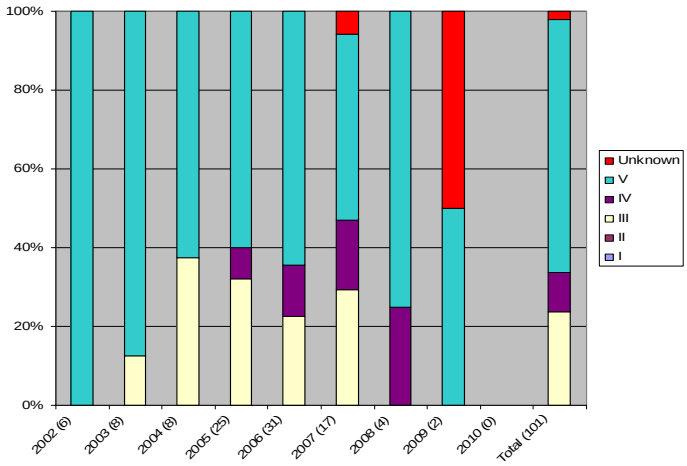

Figure 8 Percentage genotype distributions of NSP types of classical scrapie confirmed by the sheep FS survey from 2002 to 2010

All six confirmed atypical scrapie cases were suitable for genotype testing. The genotype distributions of atypical scrapie by individual genotype and NSP type for the period 2002-2010 are displayed in Table 9 and Figure 9. Three of the six confirmed cases in 2010 had the ARR/AHQ genotype, with two other cases being AFRQ/AFRQ and one AHQ/AFRQ.

Table 9 Genotype distribution of the atypical scrapie confirmed cases by the sheep FS survey from 2002 to 2010

Genotype	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
ARR/ARR			1 20%							1 2%
ARR/AHQ			1 20%	1 20%	2 18.2%	4 40%	2 50%	3 37.5%	3 50%	16 31.4%
ARR/ARH		1 33.3%								1 2%
ARR/AFRQ										
ARR/ARQ					1 9.1%	1 10%				2 3.9%
AHQ/AHQ		1 33.3%	1 20%	2 40%	3 27.3%	2 20%	1 25%	1 12.5%		11 21.6%
AHQ/ARH					1 9.1%					1 2%
AHQ/AFRQ									1 16.7%	1 2%
AHQ/ARQ		1 3.3%		1 20%	2 18.2%	2 20%	1 25%	1 12.5%		8 15.7%
ARH/ARH										
ARH/AFRQ										
ARH/ARQ										
AFRQ/AFRQ									2 33.3%	2 3.9%
AFRQ/ARQ								2 25%		2 3.9%
ARQ/ARQ			1 20%	1 20%	2 18.2%	1 10%				5 9.8%
ARR/VRQ										
AHQ/VRQ										
ARH/VRQ										
AFRQ/VRQ										
ARQ/VRQ										
VRQ/VRQ										
Unknown			1 20%					1 12.5%		2 3.9%
Total		3 100%	5 100%	5 100%	11 100%	10 100%	4 100%	8 100%	6 100%	52 100%

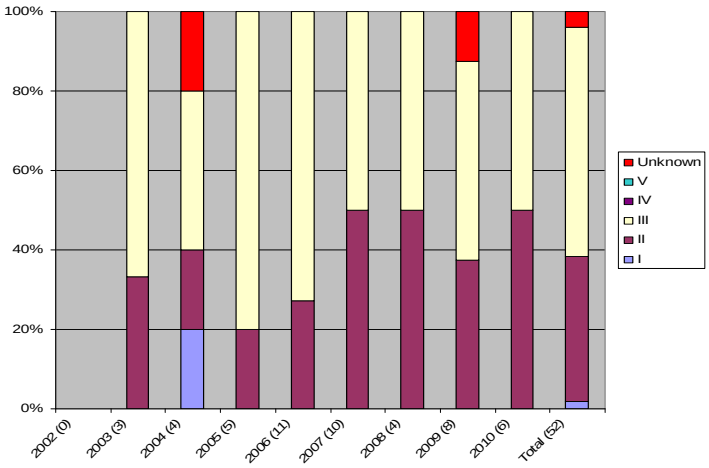

Figure 9 Percentage genotype distributions of NSP types of atypical scrapie confirmed by the sheep FS survey from 2002 to 2010

1.4 Dead in transit (DIT) survey

Sampling for the Dead in Transit (DIT) survey was discontinued in 2010 however figures for numbers of samples tested, unsuitability rates, and the numbers and genotypes of classical and atypical scrapie cases detected in earlier years (2002 – 2009) are presented below in Table 10. Figure 10 displays the prevalence estimates for both types of scrapie, with 95% confidence intervals.

Table 10 DIT data summary in sheep for the period 2002-2009 (no sampling in DIT in 2010)

Year	Samples	Tested	Unsuitable	Clas.	% Clas. (95% CI)	Atyp.	% Atyp. (95%CI)
2002	10	10	0 (0.0%)	0	0.00 (0.00 – 32.6)	0	0.00 (0.00 – 32.6)
2003	550	530	20 (3.6%)	4	0.75 (0.22 – 2.01)	4	0.75 (0.22 – 2.01)
2004	480	452	28 (5.8%)	4	0.88 (0.26 – 2.36)	0	0.00 (0.00 – 1.04)
2005	676	634	42 (6.2%)	1	0.15 (0.00 – 1.00)	1	0.15 (0.00 – 1.00)
2006	941	892	49 (5.2%)	2	0.22 (0.01 – 0.88)	1	0.11 (0.00 – 0.71)
2007	884	822	62 (7.0%)	1	0.12 (0.00 – 0.68)	4	0.48 (0.14 – 1.30)
2008	876	792	84 (9.6%)	1	0.13 (0.00 – 0.7)	1	0.13 (0.00 – 0.7)
2009	663	650	13 (2%)	0	0.00 (0.00 - 0.57)	1	0.15 (0.00 – 0.85)
2010	-	-	-	-	-	-	-

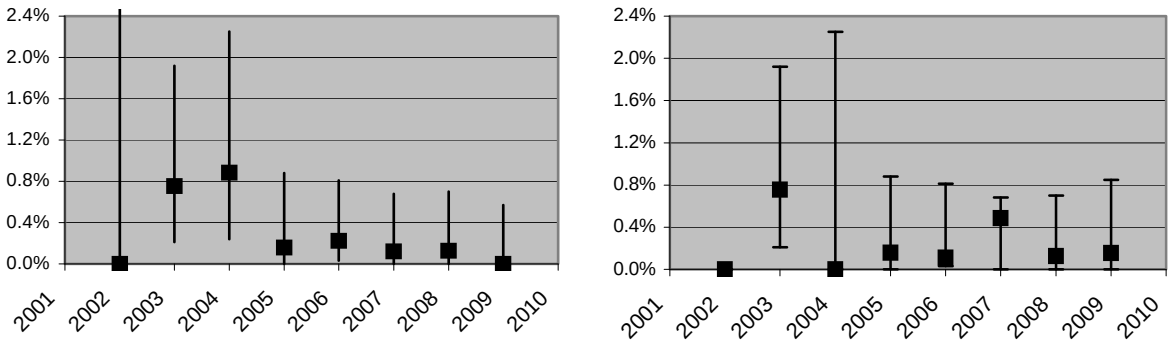

Figure 10 Prevalence estimates of scrapie in GB from the DIT survey with 95% confidence intervals. Period 2002-2009. Left: classical. Right: atypical.

Table 11 and Figure 11 display the genotype distributions of the classical scrapie cases disclosed in the DIT for the period 2002-2009.

Table 11 Genotype distributions of the classical scrapie confirmed cases by the sheep DIT survey from 2002 to 2009

Genotype	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
ARR/ARR										
ARR/AHQ										
ARR/ARH										
ARR/AFRQ										
ARR/ARQ										
AHQ/AHQ										
AHQ/ARH										
AHQ/AFRQ										
AHQ/ARQ										
ARH/ARH										
ARH/AFRQ										
ARH/ARQ										
AFRQ/AFRQ										
AFRQ/ARQ										
ARQ/ARQ										
ARR/VRQ		1 25%	1 25%							2 15.4%
AHQ/VRQ										
ARH/VRQ				1 100%	1 50%		1 100%			3 23.1%
AFRQ/VRQ										
ARQ/VRQ		3 75%	3 75%		1 50%	1 100%				8 61.5%
VRQ/VRQ										
Unknown										
Total		4 100%	4 100%	1 100%	2 100%	1 100%	1 100%	0 100%	- -	13 100%

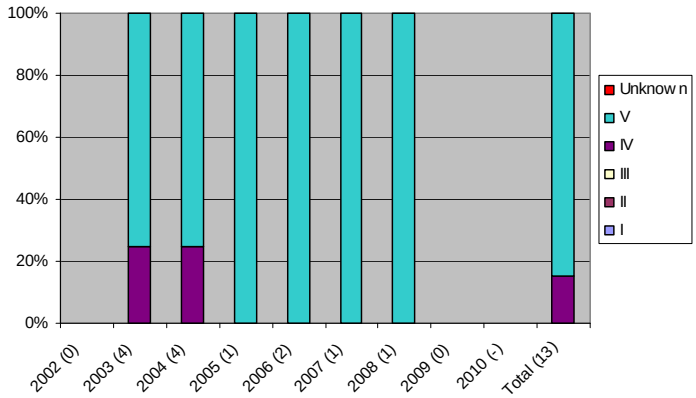

Figure 11 Percentage genotype distributions of NSP types of classical scrapie confirmed by the sheep DIT survey from 2002 to 2009

The genotype distributions of atypical scrapie according to individual genotype and NSP type for the period 2002-2009 are displayed in Table 12 and Figure 12.

Table 12 Genotype distribution of the atypical scrapie confirmed cases by the sheep DIT survey from 2002 to 2009

Genotype	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
ARR/ARR					1 100%					1 8.3%
ARR/AHQ		1 25%		1 100%		3 75%	1 100%			6 50%
ARR/ARH										
ARR/AFRQ										
ARR/ARQ										
AHQ/AHQ										
AHQ/ARH								1 100%		1 8.3%
AHQ/AFRQ										
AHQ/ARQ		2 50%								2 16.6%
ARH/ARH										
ARH/AFRQ										
ARH/ARQ										
AFRQ/AFRQ										
AFRQ/ARQ										
ARQ/ARQ		1 25%				1 25%				2 16.6%
ARR/VRQ										
AHQ/VRQ										
ARH/VRQ										
AFRQ/VRQ										
ARQ/VRQ										
VRQ/VRQ										
Unknown										
Total		4 100		1 100%	1 100%	4 100%	1 100%	1 100%	- -	12 100%

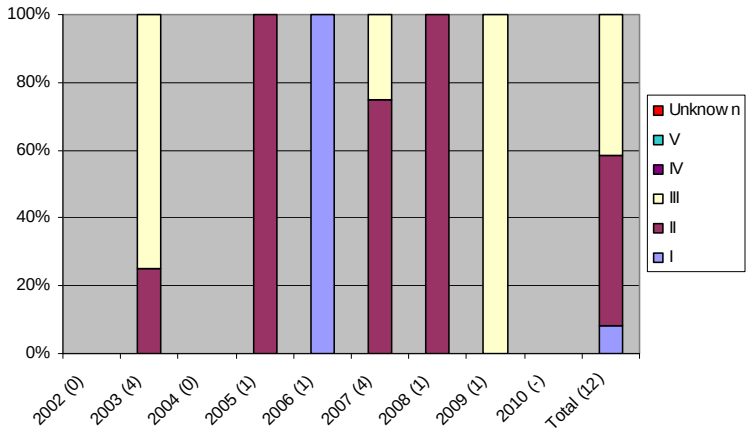

Figure 12 Percentage genotype distribution of NSP types of atypical scrapie confirmed by the sheep DIT survey from 2002 to 2009

1.5 Abattoir survey (AS)

In 2010 the EU requirement for testing abattoir sheep over 18 months of age was set at 10,000 for the UK (with internal targets of 9,400 from GB and 600 from Northern Ireland). To achieve a seasonally adjusted sample, participating abattoirs were required to randomly select and sample a percentage of their total weekly throughput. As the FS survey, abattoir throughputs varied through the year showing a peak in Feb – April. The sampling rate started at 1% in January, but was subsequently lowered to 0.5% from May to the end of the year.

By the end of 2010, 7,960 samples had been submitted, of which 7,823 were suitable for testing, 83.2% of the allocated quota for GB. While short of the target for this survey, the reduced numbers were compensated for in part by the collection of more samples within the FS survey.

The AS survey confirmed a single classical case and 13 atypical cases (0.013% and 0.17% of suitable samples, respectively) (Table 13). The ratio of classical/atypical cases continues the shift towards atypical scrapie, with the 2010 ratio the highest measured in the nine-year reporting period.

There was no significant change in the prevalence of either classical or atypical scrapie in 2010 compared to the previous year, despite a 50% reduction in the prevalence of classical scrapie in the reporting year compared to 2009. The estimate of prevalence of atypical cases in 2010, at 0.17% of samples suitable for testing, is comparable to values recorded in years with similar quota but much higher than the prevalence observed in 2006 and 2007 when the number of sheep tested was substantially larger. It should be noted that the confidence intervals around annual estimates have overlapped in all consecutive years of the survey.

The number of animals tested in 2010 was the lowest since active surveillance was implemented on a large scale, increasing the uncertainty of the estimated prevalence values for classical and atypical cases (e.g. 95% upper limit = 0.28% for atypical scrapie).

Table 13 AS data summary in sheep for the period 2002-2010

Year	Samples	Tested	Unsuitable	Clas.	% Clas. (95% CI)	Atyp.	% Atyp. (95%CI)	Ratio clas./aty.
2002	31847	30115	1732 (5.4%)	34	0.11 (0.08 – 0.15)	18	0.06 (0.03 – 0.09)	1.8:1
2003	76852	71250	5602 (7.2%)	46	0.06 (0.04 – 0.08)	45	0.06 (0.04 – 0.08)	1:1
2004	11481	10588	893 (7.7%)	9	0.08 (0.04 – 0.16)	12	0.11 (0.06 – 0.20)	1:1.3
2005	11629	11106	523 (4.5%)	12	0.10 (0.06 – 0.19)	16	0.14 (0.08 –0.23)	1:1.3
2006	48645	46259	2386 (4.9%)	8	0.017 (0.01 – 0.03)	35	0.075 (0.05 – 0.10)	1:4.3
2007	26059	24908	1151 (4.4%)	5	0.02 (0.01 – 0.04)	17	0.068 (0.04 – 0.11)	1:3.4
2008	10927	10158	769 (7%)	2	0.02 (0.00 – 0.07)	5	0.05 (0.02 – 0.12)	1:2.5
2009	10966	10652	314 (2.9%)	3	0.028 (0.01 – 0.08)	16	0.15 (0.09 – 0.24)	1:5.3
2010	7960	7823	137 (1.7%)	1	0.013 (0.00 – 0.07)	13	0.17 (0.09 – 0.28)	1:13

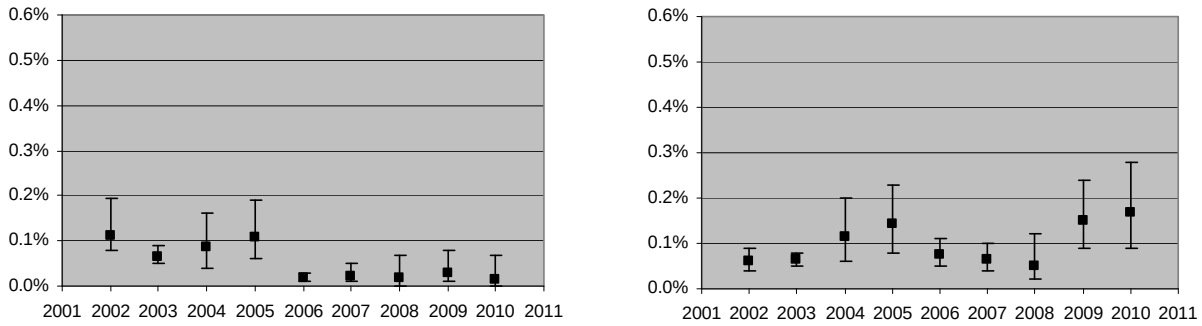

Figure 13 Prevalence estimates of scrapie in GB from the sheep AS with 95% confidence intervals. Period: 2002-2010. Left: classical. Right: atypical.

Most of the AS cases cannot be traced back to the holdings of origin. They remain linked to the abattoir where they were sampled or the market where they were sourced, but not to the holding of origin, unless until further epidemiological investigations conclude with the confirmation of the cases in a particular holding/s.

All 14 of the scrapie cases confirmed in 2010 were suitable for genotype testing. The genotype distributions for classical scrapie cases in the AS, by individual genotype and NSP type, for the whole period 2002-2010 are displayed in Table 14 and Figure 14. The 2010 single classical case was genotype ARR/VRQ.

Table 14 Genotype distribution of the classical scrapie confirmed cases by the sheep AS survey from 2002 to 2010

Genotype	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
ARR/ARR										
ARR/AHQ										
ARR/ARH										
ARR/AFRQ										
ARR/ARQ				1 8.3%						1 0.8%
AHQ/AHQ	1 2.9%									1 0.8%
AHQ/ARH										
AHQ/AFRQ										
AHQ/ARQ	1 2.9%		1 11.1%							2 1.7%
ARH/ARH										
ARH/AFRQ										
ARH/ARQ										
AFRQ/AFRQ										
AFRQ/ARQ										
ARQ/ARQ	2 5.9%	7 15.2%	1 11.1%	2 16.7%						12 10%
ARR/VRQ	8 23.5%	13 28.3%	3 33.3%	3 25%	6 75%	1 20%	2 100%		1 100%	37 30.8%
AHQ/VRQ										
ARH/VRQ	1 2.9%	2 4.3%	2 22.2%	2 16.7%		1 20%				8 6.7%
AFRQ/VRQ										
ARQ/VRQ	19 55.9%	20 43.5%	1 11.1%	4 33.3%	2 25%	2 40%		2 66.6%		50 41.7%
VRQ/VRQ	2 5.9%	4 8.7%	1 11.1%			1 20%				8 6.7%
Unknown								1 33.3%		1 0.8%
Total	34 100%	46 100%	9 100%	12 100%	8 100%	5 100%	2 100%	3 100%	1 100%	120 100%

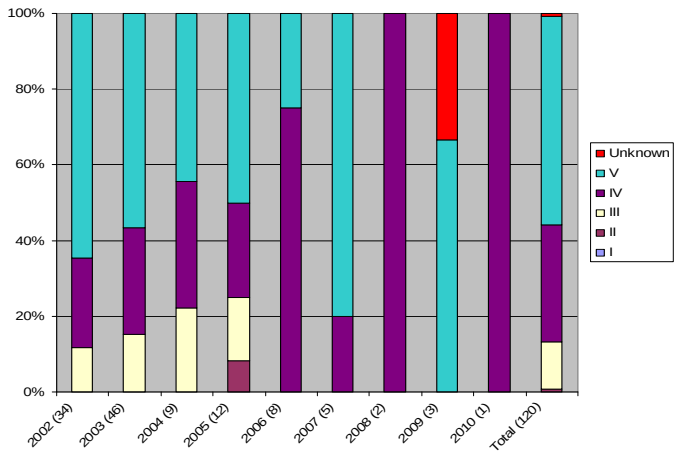

Figure 14 Percentage genotype distributions of NSP types of classical scrapie confirmed by the sheep AS survey from 2002 to 2010.

The genotype and NSP type distributions of atypical scrapie cases detected by the AS between 2002 and 2010 are shown in Table 15 and Figure 15. The most frequent allele among cases confirmed in 2010 is ARR (38.5%), followed by AHQ (26.9%), AFRQ (23.1%) and ARQ (11.5%). Four atypical cases had the ARR/AHQ genotype, the most common genotype among atypical scrapie cases in all surveillance sources. Five of the 13 atypical cases carried the AFRQ allele: one of them homozygous and the other four heterozygous with the ARR allele (1), the ALRQ allele (1) and the AHQ allele (2). Three cases were homozygous, of ARR (2) and AFRQ (1) respectively, and 10 cases were heterozygous genotypes distributed as follows: ARR/AHQ (4), ARR/AFRQ (1), ARR/ARQ (1), AHQ/AFRQ (2), AHQ/ARQ (1) and AFRQ/ARQ (1).

Table 15 Genotype distribution of the atypical scrapie confirmed cases by the sheep AS survey from 2002 to 2010

Genotype	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
ARR/ARR	3 16.7%	7 15.6%	3 25%	1 6.3%	1 2.9%			1 6.25%	2 15.4%	18 10.2%
ARR/AHQ	4 22.2%	10 22.2%	3 25%	8 50%	11 31.4%	6 35.3%	3 60%	4 25%	4 30.7%	53 29.9%
ARR/ARH										
ARR/AFRQ								3 18.7%	1 7.7%	4 2.3%
ARR/ARQ	2 11.1%	7 15.6%	1 8.3%	3 18.8%	6 17.1%	4 23.5%			1 7.7%	24 13.6%
AHQ/AHQ	4 22.2%	5 1.1%			3 8.6%			3 18.7%		15 8.5%
AHQ/ARH			1 8.3%		1 2.9%	1 5.9%				3 1.7%
AHQ/AFRQ						1 5.9%	1 20%	1 6.25%	2 15.4%	5 2.8%
AHQ/ARQ	3 16.7%	11 24.4%	2 16.7%	1 6.3%	8 22.9%	5 29.4%		1 6.25%	1 7.7%	32 18.1%
ARH/ARH										
ARH/AFRQ										
ARH/ARQ				1 6.3%						1 0.6%
AFRQ/AFRQ							1 20%	1 6.25%	1 7.7%	3 1.7%
AFRQ/ARQ								2 12.5%	1 7.7%	3 1.7%
ARQ/ARQ	2 11.1%	4 8.9%	2 16.7%	2 12.5%	5 14.3%					15 8.5%
ARR/VRQ										
AHQ/VRQ										
ARH/VRQ										
AFRQ/VRQ										
ARQ/VRQ		1 2.2%								1 0.6%
VRQ/VRQ										
Unknown										
Total	18 100%	45 100%	12 100%	16 00%	35 100%	17 100%	5 100%	16 100%	13 100%	177 100%

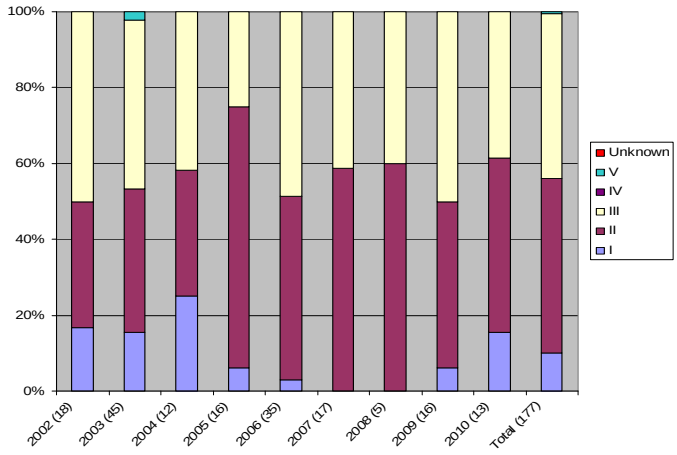

Figure 15 Percentage genotype distributions of NSP types of atypical scrapie confirmed by the sheep AS survey from 2002 to 2010.

1.5.1 Estimation of the prevalence of infection of classical scrapie in the GB national flock

The abattoir survey data allow the least biased estimation of the prevalence of scrapie since it is the closest to a random sampling of healthy animals over 18 months of age. The prevalence of classical scrapie was estimated applying the back-calculation model as described by Gubbins et al. (2003)[5] and using data from the 2010 AS data (total number of classical cases and total number of tested samples). Input parameters of the model include estimates of the incubation period distribution, the survivorship of sheep, and the sensitivity of the diagnostic tests. The output of the model is the number of infected sheep in the population required to produce the observed number of positives in the abattoir survey. According to the results of the model, the prevalence of infection in 2010 was 0.061% (95% CI: 0.046% – 0.27%), lower than the estimate for 2009, but not significantly different (Figure 16 and Table 16).

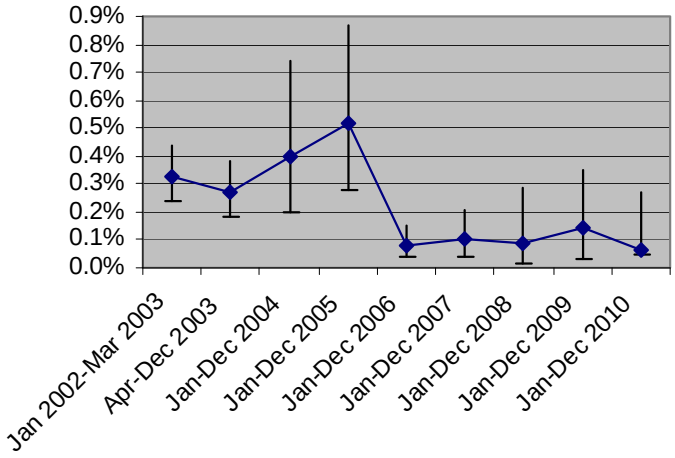

Figure 16 Estimates of prevalence of infection of classical scrapie in the sheep population for the period 2002-2010 with 95% confidence intervals

Table 16 Estimates of prevalence of infection of classical scrapie in the sheep population for the period 2002-2010 with 95% confidence intervals

Survey	Estimated prevalence	95% CI
Jan 2002-Mar 2003	0.33%	0.24 – 0.44
Apr-Dec 2003	0.27%	0.18 – 0.38
Jan-Dec 2004	0.4%	0.20 – 0.74
Jan-Dec 2005	0.52%	0.28 – 0.87
Jan-Dec 2006	0.08%	0.04 – 0.15
Jan-Dec 2007	0.1%	0.04 – 0.21
Jan-Dec 2008	0.09%	0.017– 0.29
Jan-Dec 2009	0.14%	0.035 –0.35
Jan–Dec 2010	0.06%	0.046 – 0.27

[5] Gubbins S, Simmons MM, Sivam K, Webb CR, Hoinville LJ. 2003. Prevalence of scrapie infection in Great Britain: interpreting the results of the 1997-1998-abattoir survey. Proc Biol Sci 270, 1919-1924.

1.6 Eradication measures: Compulsory Scrapie Flocks Scheme (CSFS)

According to the CSFS registration date as in ARCADIA, the NSPAC Information System, a single new holding was recruited in 2010 (Figure 17) following confirmation of classical scrapie in an animal from a farm in Wales sampled and tested by the AS.

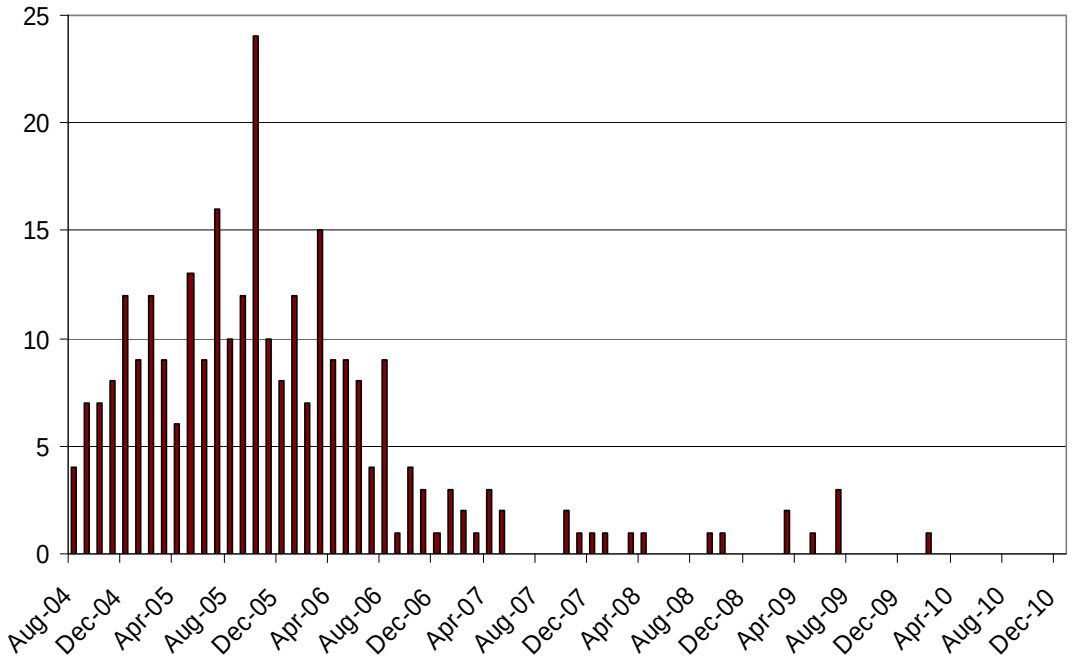

Figure 17 Number of declared sheep CSFS holdings per month for the period August 2004 to December 2010

The total number of samples sampled under the CSFS in 2010 (164) was less than one-fifth of the total number tested in the previous year (936), in a consolidation of the trend observed in the six years of implementation of the CSFS (Table 17). Four main reasons explained the continued reduction in the number of samples tested in the CSFS: the lower number of flocks joining the scheme every year, the reduction of the restriction period from 3 to 2 years, the lower number of holdings under restrictions with these submitting less fallen sheep and the poor compliance of most of the CSFS holding owners with the Annual Cull testing requirements.

Apart from the index case that triggered the recruitment to the CSFS, no positive classical cases were confirmed in sheep in the CSFS in 2010. A single positive atypical case was identified in a fallen sheep from a holding in Wales, representing 0.81% of tested animals in the fallen stock category. No positive cases were identified in either the Annual Cull (AC) or Initial Cull (IC) components of the CSFS.

Table 17 Number of samples submitted and tested by CSFS testing route in sheep and positive cases

Year	Source	Sampled	Tested (% suitable)	Clas.	% Classical (95% CI)	Atyp.	% Atypical (95% CI)
2005	IC	15158	14963 (99%)	95[1]	0.63 (0.51-0.78)	4	0.02 (0.01–0.07)
	FS	383	288 (75.2%)	7	2.43 (0.98-4.94)	1	0.35 (0.01–1.92)
	AC	0	0	0		0	
	TOTAL	**15541**	**15251 (98%)**	**102**	**0.67 (0.55-0.81)**	**5**	**0.03 (0.01-0.08)**
2006	IC	9364	9364 (100%)	76	0.81 (0.064-1.01)	8	0.08 (0.04-0.17)
	FS	2297	1611 (70.1%)	9	0.55 (0.28-1.01)	1	0.06 (0.0-0.39)
	AC	351	350 (99.7%)	0	0.0 (0.0 –0.13)	1	0.28 (0.0-0.18)
	TOTAL	**12012**	**11325 94.3%)**	**85**	**0.75 (0.6-0.93)**	**10**	**0.09 (0.04-0.16)**
2007	IC	1353	1353 (100%)	3	0.22 0.04-0.69)	0	0.0 (0.0 – 0.35)
	FS	2428	1738 (71.6%)	2	0.11 (0.05-0.45)	3	0.17 (0.03-0.53)
	AC	510	510 (100%)	0	0.0 (0.0 –0.92)	0	0.0 (0.0 – 0.92)
	TOTAL	**4291**	**3601 (83.9%)**	**5**	**0.14 (0.05-0.32)**	**3**	**0.08 (0.02-0.24)**
2008	IC	471	468 (99.36%)	0	0.0 (0.00-0.79)	0	0.00 (0.00-0.79)
	FS	1350	1085 (80.4%)	0	0.00 (0.00-0.34)	2	0.18 (0.02-0.66)
	AC	390	390 (100%)	0	0.00 (0.00-0.94)	0	0.00 (0.00-0.94)
	TOTAL	**2211**	**1943 (87.9%)**	**0**	**0.00 (0.00-0.19%)**	**2**	**0.1 (0.01-0.37%)**
2009	IC	570	569 (99.8%)	1	0.18 (0.00-0.98%)	0	0.00 (0.00-0.65%)
	FS	293	270 (92.1%)	1	0.37 (0.01-2.05%)	0	(0.00-1.36%)
	AC	73	73 (100%)	0	0.00 (0.00-4.93%)	0	0.00 (0.00-4.93%)
	TOTAL	**936**	**912 (97.4%)**	**2**	**0.22 (0.03-0.79%)**	**0**	**0.00 (0.00-0.4%)**
2010	IC	**26**	**26** (100%)	0	0.00% (0.00-13.23%)	0	0.00% (0.00 - 13.23%)
	FS	**126**	**123** (97.6%)	0	0.00% (0.00-2.95%)	1	0.81% (0.02-4.45%)
	AC	**12**	**12** (100%)	0	0.00% (0.00-26.47%)	0	0.00% (0.00-26.47%)
	TOTAL	**164**	**161 (98.2%)**	0	**0.00% (0.00-2.27%)**	1	**0.62% (0.02-3.41%)**

[1] Three inconclusive results were not included in 2005

Twelve CSFS holdings submitted samples via the FS route with an average of 10.5 samples per holding (median: 5, range: 1-47). Seven of the CSFS holdings were in England and 5 in Wales. The FS returned to providing the largest contribution (76.8%) to the testing figures of the CSFS, more similar to the situation in 2007 and 2008. With 12 samples from 2 holdings in England, the contribution of the Annual Cull (7.3%) was similar to 2009, and less than half of that in 2008. Twenty-six samples were collected from one holding in the Initial cull (IC), representing 15.9% of the CSFS testing volume.

The atypical case confirmed in 2010 was of genotype ARR/AHQ. The genotype distributions of the classical cases confirmed by the CSFS, by individual genotype and NSP type for the period 2005-2010 are displayed in Tables 18 and Figure 18 (classical scrapie) and Table 19 and Figure 19 (atypical scrapie).

Table 18 Genotype distribution of the classical scrapie cases confirmed by the CSFS in sheep from 2005 to 2010

Genotype	2005	2006	2007	2008	2009	2010	Total
ARR/ARR							
ARR/AHQ							
ARR/ARH							
ARR/AFRQ							
ARR/ARQ							
AHQ/AHQ	2 2.1%						2 1.1%
AHQ/ARH							
AHQ/AFRQ							
AHQ/ARQ	2 2.1%						2 1.1%
ARH/ARH		3 3.5%					3 1.6%
ARH/AFRQ							
ARH/ARQ		2 2.4%					2 1.1%
AFRQ/AFRQ							
AFRQ/ARQ							
ARQ/ARQ	11 11.6%	5 5.9%					16 8.5%
ARR/VRQ	1 1%	3 3.5%					4 2.1%
AHQ/VRQ							
ARH/VRQ	9 9.5%	15 17.6%	1 20%		1 50%		26 13.9%
AFRQ/VRQ							
ARQ/VRQ	60 63.1%	50 58.8%	3 60%				113 60.4%
VRQ/VRQ	8 8.4%	6 7.1%	1 20%		1 50%		16 8.5
Unknown	2 2.1%	1 1.2%					3 1.6%
Total	95[1] 100%	85 100%	5 100%	0 100%	2 100%		187 100%

[1] Three inconclusive results were not included

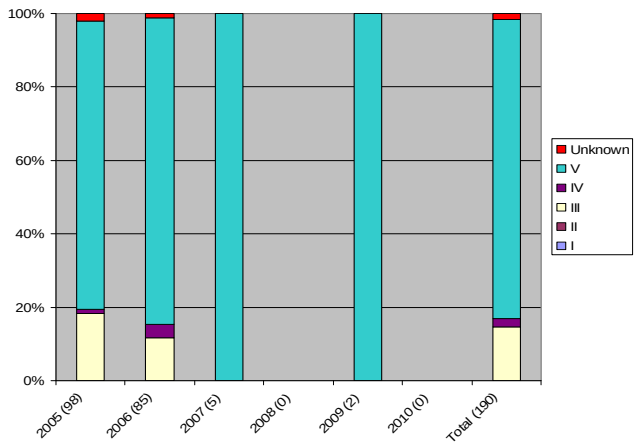

Figure 18 Percentage genotype distributions of NSP types of classical scrapie confirmed by the CSFS in sheep from 2005 to 2010

Table 19 Genotype distribution of the atypical scrapie cases confirmed by the CSFS in sheep from 2005 to 2010

Genotype	2005	2006	2007	2008	2009	2010
ARR/ARR						
ARR/AHQ		3 30%	3 100%	1 50%		1 100%
ARR/ARH						
ARR/AFRQ				1 50%		
ARR/ARQ	1 20%					
AHQ/AHQ		2 20%				
AHQ/ARH						
AHQ/AFRQ						
AHQ/ARQ	3 60%	3 30%				
ARH/ARH						
ARH/AFRQ						
ARH/ARQ						
AFRQ/AFRQ						
AFRQ/ARQ						
ARQ/ARQ	1 20%	2 20%				
ARR/VRQ						
AHQ/VRQ						
ARH/VRQ						
AFRQ/VRQ						
ARQ/VRQ						
VRQ/VRQ						
Unknown						
Total	5 100%	10 100%	3 100%	2 100%		1 100%

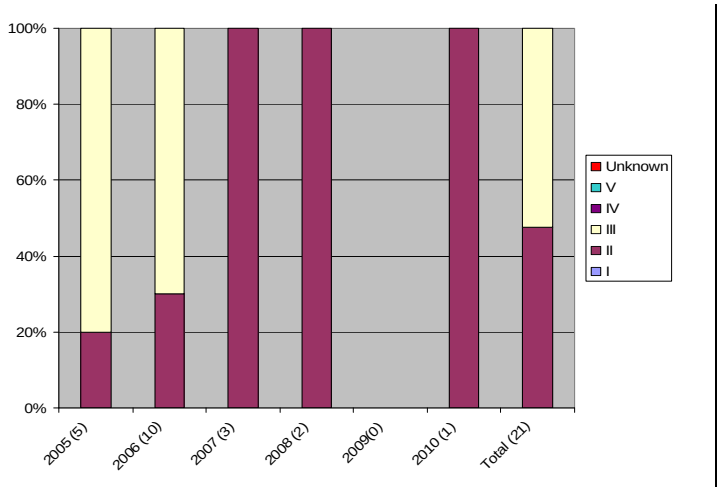

Figure 19 Percentage genotype distributions of NSP types of atypical scrapie confirmed by the CSFS in sheep from 2005 to 2010

1.7 All sources

1.7.1 Cases and genotypes

Unlike in previous years, there were no instances of multiple scrapie cases confirmed in the same holding by different or the same surveillance sources.

For active surveillance streams, the proportion of samples confirmed positive provides an estimate of the prevalence of scrapie in the sampled population of each source. For example, in the FS survey in 2010, 0% (95% CI: 0 – 0.04%) of suitable samples from submitted dead sheep were confirmed with classical scrapie and 0.08% (95% CI: 0.03 – 0.13%) with atypical. This year, a single case of classical scrapie was confirmed in the Abattoir Survey. The estimate of the prevalence of classical scrapie in the population of sheep covered by the AS is thus 0.013 (0.00 - 0.07%). While the lack of positive classical cases generated in the FS and CSFS yields prevalence estimates of 0.0% for these sources, the confidence intervals for both estimates (0 – 0.04%, and 0 – 2.27%) overlap that of the AS, and so are not significantly different.

The contribution of the different sources to the overall number of samples submitted, samples tested and to the number of cases of both types of scrapie in 2010 is shown in Figure 20.

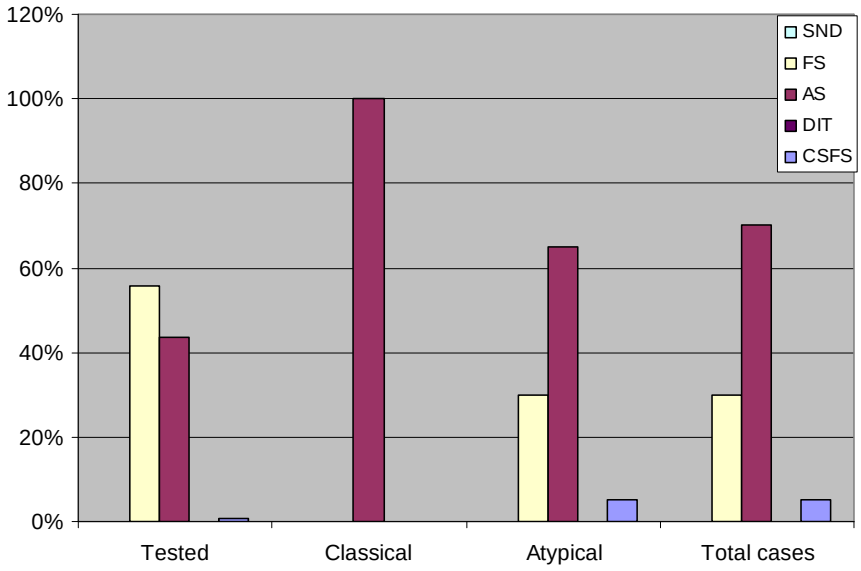

Figure 20 Percentage contribution of the five surveillance sources to the number of tested samples and cases in 2010

The detection of classical scrapie in only one surveillance source contrasts with the pattern in 2009 when SND – passive surveillance, AS, FS and CSFS all contributed a small number of cases. Figure 21 shows the changes in relative contribution to confirmed cases provided by the different surveillance sources since 2002.

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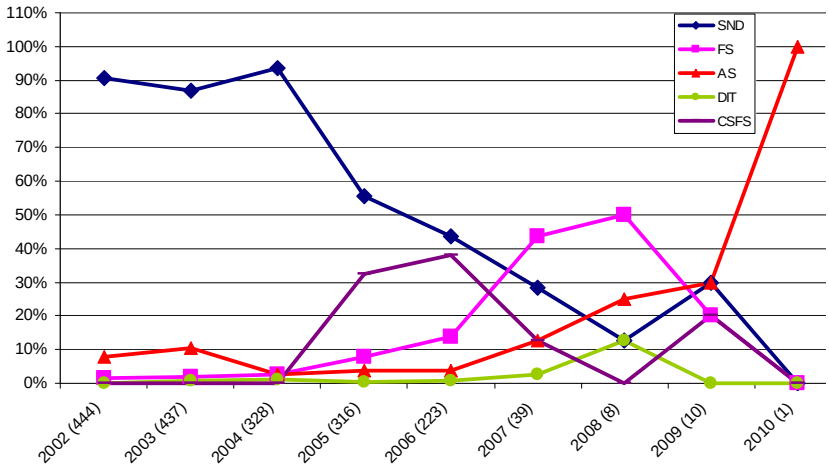

Figure 21 Percentage contribution of the five surveillance sources to the number of cases of classical scrapie for the period 2002-2010

Twenty cases of atypical scrapie were confirmed in 2010. As in 2009, the AS was again the main contributor to the detection of atypical scrapie with 65% of the cases, followed by the FS survey with 30% and the CSFS with 5% (1 case). No atypical cases were identified within passive surveillance (SND) in 2010. The AS was also the most effective surveillance source for detecting atypical cases with thirteen, double the number detected by the FS (6) (Figure 22).

The prevalence estimates for atypical scrapie afforded by the three surveillance routes (AS, FS and CSFS): 0.17%, 0.08% and 0.62% respectively, were not significantly different to values obtained in 2009, nor (with overlapping confidence intervals) were they significantly different to each other. It is worth emphasising that the number of animals tested under the CSFS is the lowest of the three surveillance sources adding a great degree of uncertainty to the estimation (see 95% CI in Table 17).

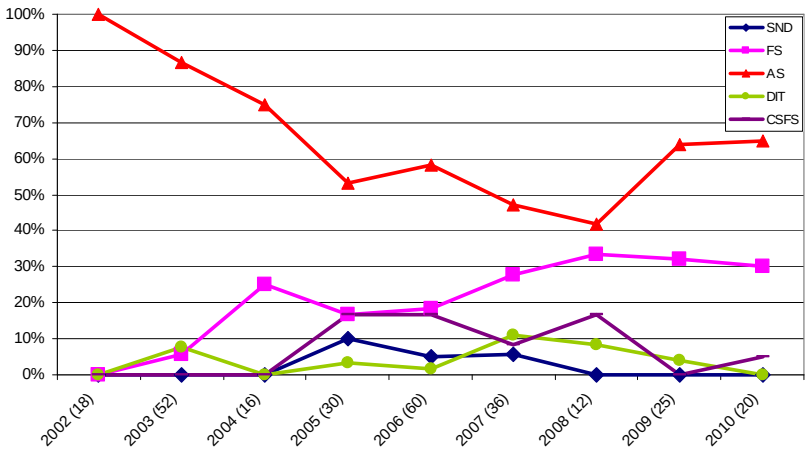

Figure 22 Percentage contribution of the five surveillance sources to the number of cases of atypical scrapie for the period 2002-2010

For both types of scrapie, the CSFS had the highest detection rate in 2010 (0.62%), followed by the AS (0.179%), and the FS with 0.06%, repeating the pattern from the previous year. The AS survey is the largest contributor to the total number of scrapie cases with 66.7%, followed by the FS with 28.6%. For the third year since atypical scrapie was detected in surveillance samples, there have been more cases of atypical than classical scrapie confirmed in GB. Of the 21 cases of scrapie confirmed in 2010 in GB, 20 were atypical and only one classical.

The prevalence estimates recorded by these sources cannot be used to make inferences on the true prevalence in the general population since the number and animals selected for sampling are not based on statistically sound probability sampling. However the detection of variations and trends year by year within the same testing route can be conducted given the consistency of the selection and diagnostic methods applied in the last five years. Comparisons across routes also need to be conducted with caution given to the different sourcing of the animals for testing and the bias introduced in their selection. Whereas the FS survey includes data from holdings of unknown scrapie status and depends on the willingness of farmers to report and be selected for testing (only a small proportion of all reported fallen sheep by farmers is selected for testing), the CSFS testing is driven by statutory requirements and only includes data of testing conducted at cull (IC) and post-cull (FS and AC) in scrapie affected holdings. The AS is supposed to represent a random and representative sample of the over 18 months healthy slaughter population. Passive surveillance (SND) and CSFS are ongoing sources for which the number of animals tested is affected by the prevalence of the disease in the population and farmer's willingness to report disease whereas the FS survey and AS depends on quotas imposed by the EU.

The most frequent genotypes in classical scrapie cases in GB since 2002 (excluding unknown/inconclusive results) have been: ARQ/VRQ (48.3%), ARQ/ARQ (17.9%), VRQ/VRQ (13.7%), ARH/VRQ (6.8%) and ARR/VRQ (6.5%). The single classical case confirmed in 2010 was ARR/VRQ.

For atypical scrapie the most frequent genotypes in GB from 2002 to 2010, again excluding any unknowns, were: ARR/AHQ (31.8%), AHQ/A(F/L)RQ (21.7%), ARR/A(F)RQ (12%), A(F)RQ/A(F)RQ (13%) and AHQ/AHQ (11%). In 2010 the 20 atypical cases had the following genotypes: ARR/AHQ (8), AHQ/AFRQ (3), AFRQ/AFRQ (3), ARR/ARR (2), and AFRQ/ARQ, ARR/AFRQ, ARR/ARQ, AHQ/ARQ with one case each. The only genotype under-represented among the 20 atypical cases confirmed in 2010 was AHQ/AHQ with no cases in the reporting year. The proportions of all other groups were not significantly different in 2010 with respect to the prevalence estimates in the period 2002-2009.

1.7.2. Genotypes of selected negatives

Following Commission Regulation (EC) 1139/2003 amending Regulation (EC) 999/2001, in addition to each positive TSE case in sheep, the prion protein genotype shall be determined for a random subsample of the ovine animals tested under active surveillance. Further

amendment as per Commission Regulation (EC) No 727/2007, requires that the prion protein genotype for the codons 136, 141, 154 and 171 of at least 600 animals shall be determined for a member state with an adult sheep population of more than 750 000 animals, as is the case in the UK. The samples, representative of the entire ovine population, may be chosen from animals slaughtered for human consumption, from animals found dead-on-farm or from live animals.

In 2010, a total of 569 sheep that tested negative in two active surveillance routes were genotyped, 309 in the AS (54.3%) and 260 in the FS (45.7%). The most frequent genotype was ARR/ARR (29.0%), followed by ARR/ARQ (25.3%). Other genotypes were presented by less than 10% of the sheep. The distribution of genotypes in 2010 by surveillance source is displayed in Table 20. The most frequent NSP type was Type II, accounting for 41.7% of the samples (237), followed by Type I (165 samples and 29.0%), Type III (124 samples and 21.8%), Type IV (24 samples and 4.2%) and Type V (19 and 3.3%)

The genotyping of selected negatives has been undertaken since 2004 and the number of sheep sampled every year has remained stable except in 2005 where only 19 negative sheep were genotyped. In 2004, 532 samples were selected for genotyping, and 423, 625, 723 and 579 in 2006, 2007, 2008 and 2009 respectively. The proportion of selected negative sheep testing for each NSP type in each year is displayed in Figure 23.

Table 20 Genotype distribution of selected negative sheep by surveillance source in 2010

Genotype	Abattoir survey		Fallen Stock		Total	
ARR/ARR	82	26.5%	83	31.9%	165	29.0%
ARR/AHQ	34	11.0%	19	7.3%	53	9.3%
ARR/ARH	3	1.0%	15	5.8%	18	3.2%
ARR/AFRQ	13	4.2%	9	3.5%	22	3.9%
ARR/ARQ	78	25.2%	66	25.4%	144	25.3%
AHQ/AHQ	4	1.3%	3	1.2%	7	1.2%
AHQ/ARH	0	0.0%	1	0.4%	1	0.2%
AHQ/AFRQ	2	0.6%	2	0.8%	4	0.7%
AHQ/ARQ	27	8.7%	20	7.7%	47	8.3%
ARH/ARH	0	0.0%	0	0.0%	0	0.0%
ARH/AFRQ	0	0.0%	0	0.0%	0	0.0%
ARH/ARQ	6	1.9%	3	1.2%	9	1.6%
AFRQ/AFRQ	1	0.3%	0	0.0%	1	0.2%
AFRQ/ARQ	7	2.3%	1	0.4%	8	1.4%
ARQ/ARQ	30	9.7%	17	6.5%	47	8.3%
ARR/VRQ	15	4.9%	9	3.5%	24	4.2%
AHQ/VRQ	2	0.6%	4	1.5%	6	1.1%
ARH/VRQ	0	0.0%	1	0.4%	1	0.2%
AFRQ/VRQ	0	0.0%	0	0.0%	0	0.0%
ARQ/VRQ	5	1.6%	6	2.3%	11	1.9%
VRQ/VRQ	0	0.0%	1	0.4%	1	0.2%
Grand Total	309	100.0%	260	100.0%	569	100.0%

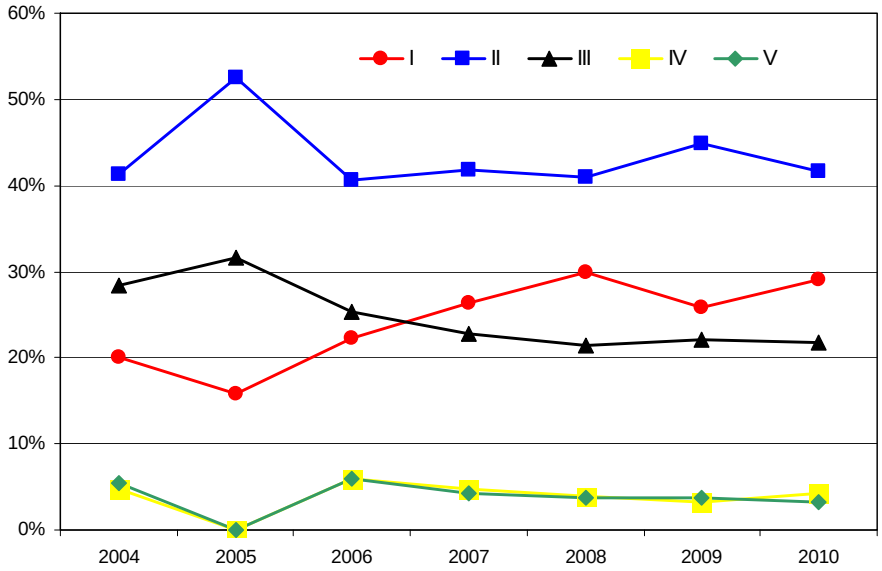

Figure 23 Percentage contribution of the five NSP types to the selected negatives for genotyping for the period 2004-2010

1.7.3 Unsuitable samples

The AS has shown low unsuitability rates historically, given the short time between death of the animal and sample collection, with 1.7% recorded in 2010. Equally the IC and AC of the CSFS show low unsuitability rates given the controlled collection of samples and short time between sampling and testing.

The FS survey reported 2.2% unsuitable samples in 2010, the lowest rate ever recorded by this surveillance source, down from 18.2% in 2008 and 5.1% in 2009. Within the overall rate there were some high individual monthly figures, such as. 8.1% in June. Sample condition remains the most important reason for unsuitability, accounting for 100% of the unsuitable samples collected in the reporting year, and autolysis still affected over half of suitable samples. Sites submitting poor quality samples were informed by AHVLA and RPA.

The overall unsuitability rate in the CSFS, at 1.8%, is comparable to the FS and AS rates and continues the trend towards improved quality observed in recent years (2007: 16.1%; 2008: 12.1%; 2009: 2.6%). The FS of the CSFS (2.4% unsuitable in 2010) has exhibited a continued and marked improvement in recent years from 28.4% in 2007, 19.6% in 2008 and 7.9% in 2009. The other routes (IC and AC of CSFS) both gave nil (0.0%) unsuitability. The transfer of sample collection to the contractor's sites from the beginning of 2009 has proven to be a success in this respect.

1.8 Conclusions of the GB sheep scrapie surveillance in 2010

- The decline in the number of reported clinical suspects by farmers in Great Britain continued in 2010, which was the first year with no clinical cases confirmed since scrapie became notifiable in 1993. However the low number of clinical suspects submitted by farmers (3) prevents us from drawing further conclusions on the eradication of clinical scrapie in GB except to question whether clinical suspects are being reported at all.
- The prevalence of classical scrapie as estimated from the percentage of positives among tested samples in the three remaining surveillance routes, namely, the FS, AS and CSFS, did not change significantly in 2010 compared with 2009.
- The prevalence of atypical scrapie estimated in the AS was comparable to 2009 (0.17% vs. 0.15%) and to years with similar quota. The AS had roughly twice the detection ability of the FS (0.08%) however comparisons across sources should be made with caution given the different sourcing of the animals, and bias in their selection.
- The quota allocated by the EU for the number of active surveillance samples for 2010 was the same as in the previous year while the dead-in-transit testing route was discontinued. It is probable that the decreasing incidence of scrapie in general and of classical scrapie in particular will result in an even lower ability of the current sample size to detect significant changes in the prevalence of scrapie year by year.
- Atypical cases continue to outnumber the number of classical cases confirmed in GB in 2010 for the third year in a row. Out of the 21 cases of scrapie confirmed in 2009 in GB, 20 were atypical and only 1 was classical.
- Using the abattoir survey data and applying a back calculation model, the estimated prevalence of infection of classical scrapie in the GB sheep population in 2010 was 0.06% (95% CI: 0.046-0.27), the lowest since the implementation of the active surveillance system for scrapie in 2002. Though it was lower than in the previous year, the difference is not statistically significant.
- For the FS survey in 2010, England and Wales were significantly over-represented in the proportion of submitted samples and the proportion of submitting holdings. On average England submitted fewer fallen sheep per holding than Wales and Scotland, all significant at the 0.05 level. The proportion of holdings having more than 50 sheep tested in the FS during 2010 increased from 0.24% in 2008 to 0.49% in 2009 and 0.79% in 2010. If this trend continues in the next few years, there will be a risk of few holdings contributing excessively to the FS survey with the consequent reduction in the ability of the survey to detect new cases of scrapie, should they still persist in the sheep population. However, changes to the operation of the FS survey introduced in 2011 and move away from voluntary carcase submissions are expected to reverse this trend and result in a more random survey

- The rate of submission of samples unsuitable for testing in the FS has continued to decline and the figure of 2.2% recorded in 2010 is the lowest rate recorded in this surveillance source, and an eight-fold reduction on 2008.
- Only one new holding was enrolled into the Compulsory Scrapie Flocks Scheme (CSFS) in 2010, the lowest since the scheme began in 2004.
- The 2010 single classical case was genotype ARR/VRQ. The most common genotype among the 20 atypical cases confirmed was ARR/AHQ (8), followed by AHQ/ $AF_{141}RQ$ (3), $AF_{141}RQ/AF_{141}RQ$ (3), ARR/ARR (2), with four other genotypes providing one case each: AFRQ/ARQ, ARR/AFRQ, ARR/ARQ and AHQ/ARQ. The only genotype found in significantly fewer atypical cases than in previous years was AHQ/AHQ, with no cases in the reporting year.

2.Goat scrapie surveillance

2.1 Background

Scrapie became a notifiable disease on January 1st 1993, as required by Council Directive 91/68/EEC. With the implementation in July 1998 of the Sheep and Goat Spongiform Encephalopathy Order and the Sheep and Goat Spongiform Encephalopathy Regulations, comprehensive epidemiological investigations started on all premises in GB where a suspect case of scrapie was reported. Recording of data started in a new database held at the Veterinary Laboratories Agency (VLA), the Scrapie Notifications Database (SND).

BSE has been confirmed in two goats in the EU. The first case was confirmed in January 2005 by the European Union Reference Laboratory (EURL) (formerly Community Reference Laboratory) for TSEs in a goat slaughtered in France in 2002. The goat was disposed of after slaughtering as well as its entire herd and did not enter the food chain. In addition, retrospective testing of a Scottish goat born in 1987 and culled in 1990 gave results indicative of BSE and in May 2009 the EURL concluded that the results were indistinguishable from BSE[6]. Samples from another goat slaughtered in 2008 in GB, in which BSE cannot be excluded, are currently undergoing testing and bioassays and the results were not available at the time of writing this report.

In 2002 Defra and the Devolved Administrations (DAs) in Scotland and Wales began a programme of active surveillance for goat scrapie. Surveys of the slaughtered population, the abattoir survey (AS), and fallen stock on farm, the fallen stock survey (FS), have been conducted throughout each year as per EU quotas. In the former, goats fit for human consumption and older than 18 months of age were sampled randomly at the abattoir. In the latter, dead-on-farm goats, older than 18 months and reported by the farmers, were sampled. The AS was discontinued after 2007.

Before the statutory CSFS came into force in 2004, there had been two confirmed cases of scrapie in goats: one clinical case in 2002 and one goat slaughtered for human consumption in 2003. Since then six holdings have had cases confirmed, all of them classical scrapie.

In March 2008, Defra killed two goat herds in England in which the annual incidences of cases of classical scrapie were increasing. The VLA collected a range of samples from different tissues from a number of animals from both herds for further investigation[7].

[6] http://vla.defra.gov.uk/science/docs/sci_tse_rl_steg0509.pdf

[7] For further information: González L., Martin S., Sisó S., Konold T., Ortiz-Peláez A., Phelan L., Goldmann W., Stuart P., Windl O., Jeffrey M., Hawkins S.A.C., Dawson M., Hope J. High prevalence of scrapie in a dairy goat herd. Veterinary Research 2009, 49:5; and

González L., Martin S., Hawkins S.A., Goldmann W., Jeffrey M., Sisó S.
Pathogenesis of natural goat scrapie: modulation by host PRNP genotype and effect of co-existent conditions. Veterinary Research 2010 ;41:48

2.2 Passive surveillance

No clinical goat suspects were reported in GB in 2010, the first time none have been reported in the last nine years. The numbers of reported, tested and confirmed goat cases by SND from 2002 to 2010 are presented in Table 21 and Figure 24. Please note that in the years 2006 – 2008, 49 positive cases were reported from two holdings previously confirmed as scrapie-affected. Subsequent cases from scrapie-affected herds were recorded and monitored by the Compulsory Scrapie Flocks Scheme (CSFS) (see section 2.5). These 49 cases are not included in the tables.

Table 21 Number of cases reported, tested and confirmed by SND in goats from 2002 to 2010

Year	Reported	Tested	Confirmed	% Reported not confirmed	% Tested not confirmed	Classical	% Classical
2002	2	2	1	50%	50%	1	50%
2003	1	0	0	100%	0%	0	0%
2004	8	7	0	100%	100%	0	0%
2005	6	6	0	100%	100%	0	0%
2006	1	1	0	100%	100%	0	0%
2007	2	1	0	100%	100%	0	0%
2008	3	2	0	100%	100%	0	0%
2009	1	1	1	0%	100%	1	100%
2010	0	0	0	-	-	0	-

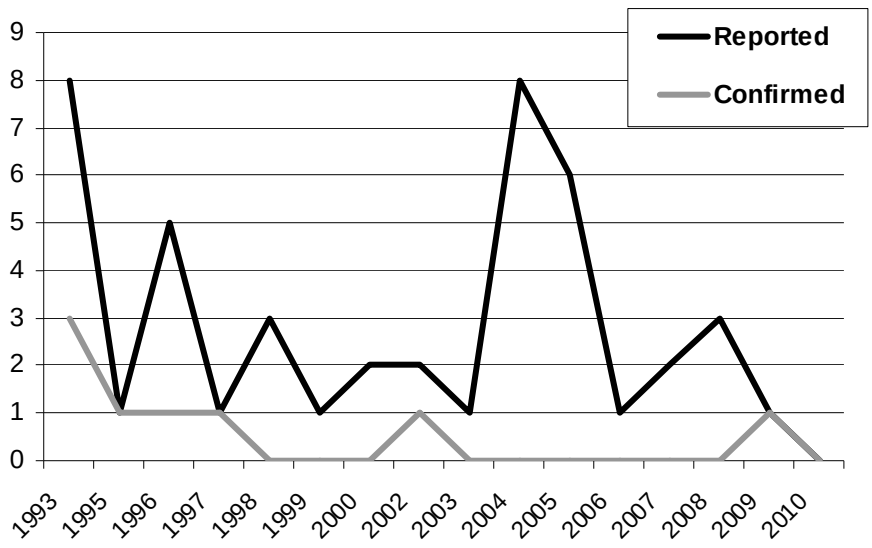

Figure 24 Counts per month of confirmed and reported goat cases in GB for the period Jan-1993 - 2010.

2.3 Fallen stock

In 2010, the annual EU requirement for testing fallen goats over 18 months was set at 500 in the UK (with internal targets of 480 from Great Britain and 20 from Northern Ireland). Farmers were expected to report all goat fallen stock to the TSE Helpline run by the Rural Payments Agency although due to the target only a sample were tested.

A total of 529 samples from fallen goats were submitted during 2010, 507 of them suitable for testing (95.8%). Therefore by the end of the year the survey had exceeded the required quota set by the EU. No submissions from goats Dead in Transit (DIT) were made in 2010.

The FS did not confirm any case of scrapie in 2010. Summary data for the FS and DIT in goats in the period 2002-2010 are shown in Table 22.

Table 22 FS data summary in goats for the period 2002-2010. DIT figures are shown in brackets and not included in the FS figures

Year	Samples	Tested	Unsuitable	Clas.	% Clas. (95% CI)
2002	3 (0)	3 (0)	0 (0)	0	0 (0-70%)
2003	54 (2)	51 (2)	3 (0)	0(0)	0% (0-7%)
2004	59 (0)	51 (0)	8 (0)	0	0% (0-7%)
2005	2001 (3)	1284 (2)	717 (1)	2(0)	0.08% (0.02-0.56%)
2006	3893 (1)	2466 (1)	1427 (1)	1(0)	0.04% (0.00-0.23%)
2007	1583 (1)	1194 (1)	389 (1)	1(0)	0.08% (0.00-0.47%)
2008	870 (1)	715 (1)	155 (1)	1(0)	0.14% (0.03-0.78%)
2009	710(0)	656 (0)	53 (0)	0	0% (0.00-0.56%)
2010	529 (0)	507 (0)	22 (0)	0	0% (0.00-0.73%)

The contribution of submitted samples from holdings in England was 481 (91%), with 16 samples (3%) submitted from holdings in Wales and 31 (5.9%) from Scotland (Table 23). In terms of number of samples and using as reference the total goat population by country as in the Sheep and Goat Inventory 2010, in 2010 England was significantly over-represented in the FS goat survey, Wales was significantly under-represented and Scotland was fairly represented, all at the 0.05 level, in a similar pattern as the previous year.

Table 23 FS sample summary in goats per country for the period 2002-2010

Year	Samples	England	%	Scotland	%	Wales	%
2002	3	3	100%	0	0.0%	0	0.0%
2003	54*	46	85.2%	3	5.6%	3	5.6%
2004	59	53	89.8%	1	1.7%	5	8.5%
2005	2001*	1847	92.3%	67	3.3%	63	3.1%
2006	3893*	3474	89.2%	171	4.4%	159	4.1%
2007	1583*	1404	88.7%	92	5.8%	66	4.2%
2008	870*	792	91.0%	55	6.3%	22	2.5%
2009	710	652	91.8%	38	5.4%	20	2.8%
2010	529*	481	90.9%	31	5.9%	16	3.0%
Total	9702	8752	90.2%	458	4.7%	354	3.6%

*CPHs from 2, 24, 89, 23, 1 and 1 samples submitted in 2003, 2005, 2006, 2007, 2008 and 2010, respectively, could not be ascertained

171 holdings submitted fallen goats in 2010 (Table 24), 148 from England (86.5%), 8 from Wales (4.7%) and 14 from Scotland (8.2%). In terms of number of holdings and using as reference the total goat population by country as in the Sheep and Goat Inventory 2010, England and Wales were fairly represented in the FS goat survey at the 0.05 level. Scottish holdings were under-represented ($P<0.05$) in the FS.

The average number of submitted samples per holding in England was 3.25 (median: 1 range: 1-98), higher than in Wales (mean: 2.0, median: 1, range: 1-6) and in Scotland (mean: 2.2, median: 1, range: 1-15). 15 of the 31 samples submitted from Scottish holdings and 6 of the 16 samples from Welsh holdings originated from a single farm.

Table 24 FS goat holding summary per country for the period 2002-2010

Year	Holdings	England	%	Scotland	%	Wales	%
2002	1	1	100%	0	0.0%	0	0.0%
2003	40	35	87.5%	2	5.0%	3	7.5%
2004	41	37	90.2%	1	2.4%	3	7.3%
2005	628	566	90.1%	31	4.9%	31	4.9%
2006	834	726	87.1%	68	8.2%	40	4.8%
2007	408	338	82.8%	45	11.0%	23	5.6%
2008	278	237	85.3%	26	9.4%	15	5.4%
2009	189	166	87.8%	10	5.3%	13	6.9%
2010	171	148	86.5%	14	8.2%	8	4.7%
Total	2590	2254	87.0%	197	7.6%	136	5.3%

One case in 2008 was submitted from a holding previously confirmed as scrapie-affected. It has been removed for the reported results as shown in Table 22.

2.4 Abattoir survey

The requirement to test adult goats randomly selected at abattoirs was conducted for the last time in 2007. Summary data for the AS survey in goats from 2002 to 2007 are shown in Table 25.

Table 25 AS data summary in goats for the period 2002-2010

Year	Samples	Tested	Unsuitable	Clas.	% Clas. (95% CI)
2002	9	9	0	0	0 (0.00-33.6%)
2003	235	191	44	1	0.52 (0.01-2.88%)
2004	96	90	6	0	0 (0.00-4%)
2005	1344	1282	62	0	0 (0.00-0.29%)
2006	2563	2558	5	1	0.04 (0.00-0.22%)
2007	1467	1466	1	0	0 (0.00-0.25%)
2008	-	-	-	-	-
2009	-	-	-	-	-
2010	-	-	-	-	-

2.5 Compulsory eradication measures (CSFS)

Since the CSFS came into force in 2004 six goat holdings have been put under restrictions for having confirmed cases of scrapie. Four holdings are/were located in England, one in Wales and one in Scotland.

2.5.1 Initial Cull

Two of the holdings under restriction were culled in March 2008 (for further details see section 2.1).

2.5.2 Fallen Stock

Table 26 displays the number of samples submitted and tested and numbers confirmed positive from each of the 6 herds put under restrictions. A total of 530 goats from five holdings under restrictions (3 in England and one each in Wales and Scotland) submitted fallen goats to the CSFS in 2010. Seven confirmed cases of classical scrapie were identified, from 505 suitable for testing (1.4%). This proportion is not significantly different from 2009 (1%) but significantly lower than in 2007 and 2008, when prevalence estimates approached 10%. The reason for the decrease from 2008 to 2009 was the large contribution of one single holding with 126 tested goats (31%) that was culled in 2008 and restocked. So far this holding has not had any other case confirmed.

The proportion of unsuitable samples rose slightly on the previous year (4.7% vs. 2.0% in 2009) but was still considerably lower than in 2008 (13.4% unsuitable). This testing route was characterised by a high unsuitability rate in 2005 and 2006 with over 50% due to one single large holding that only notified multiple accumulated cases of fallen goats and in some occasions as clinical suspects, causing an excessive delay in the sample collection from the dead bodies.

Table 26 Number of submitted, tested and positive fallen goats from scrapie affected herds in GB 2005 - 2010

	Herd A			Herd B			Herd C			Herd D			Herd E			Herd F			Total		
Year	Submitted	Tested	Positive	Submitted	Tested	Positive	Submitted	Tested	Positive	Submitted	Tested	Positive	Submitted	Tested	Positive	Submitted	Tested	Positive	Submitted	Tested	Positive
2005	75	29	3	-	-	-	-	-	-	29>	17>	0>	-	-	-	-	-	-	104	46	3
2006	149	42	4	15	13	3	-	-	-	134>	104>	0>	-	-	-	-	-	-	298	159	7
2007	232	168	25	21	19	3	62	60	3	64	50	0	-	-	-	-	-	-	379	297	31
2008	87	74	10	5	5	0	47	43	2	55#	46	3	-	-	-	-	-	-	194	168	15
2009	129	126	0	-	-	-	62	62	2	130	128	2	89	86	0	-	-	-	410	402	4
2010	114	104	0	-	-	-	79*	78	6	230	218	1	106	104	0	1	1	0	530	505	7
TOTAL	**786**	**543**	**42**	**41**	**37**	**6**	**250**	**243**	**13**	**642**	**474**	**6**	**195**	**190**	**0**	**1**	**1**	**0**	**1915**	**1577**	**67**

…-… Indicates that there were no restrictions on the herd as classical scrapie had not yet been detected
…-… Herd re-stocked following killing and destruction of the whole herd.
* Herd C – single sample collected in 2006 generated unconfirmed result
> Herd D – 2005 and 2006 values taken from TSESS database
Herd D – restrictions reapplied in 2008
Year denotes year of slaughter.

Table 27 Summary data of the FS testing route of the CSFS in goat holdings for the period 2005-2010 (counts by slaughter date)

Year	Holdings	Samples	Tested	Unsuitable (%)	Clas.	% Clas. (95% CI)
2005	2	104	46	58 (55.8%)	3	6.5 (1.4-17.9%)
2006	3	298	159	139 (46.6%)	7	4.4 (1.8-8.9%)
2007	4	379	297	82 (21.6%)	31	10.4 (7.2-14.5%)
2008	4	194	168	26 (13.4%)	15	8.9 (5.1-14.3%)
2009	4	410	402	8 (2.0%)	4	1 (0.3-2.5%)
2010	5	530	505	25 (4.7%)	7	1.4 (0.6-2.8%)

2.5.3 Annual Cull

The testing route of the Annual Cull of scrapie-affected goat holdings was implemented for the second year in 2010 when three holdings in England under restriction submitted eight batches of goats for testing with a total of 227 animals (Table 28). All were suitable for testing but no cases of scrapie were confirmed (0 %, 95% CI: 0-1.6%).

Table 28 Summary data of the AC testing route of the CSFS in goat holdings for the period 2005-2010 (counts by slaughter date)

Year	Holdings	Samples	Tested	Unsuitable (%)	Clas.	% Clas. (95% CI)
2009	1	106	105	1	1	0.9 (0.02-5.2%)
2010	3	227	227	0	0	0 (0-1.6%)

2.6 Conclusions of the GB goat scrapie surveillance in 2010

- No cases of scrapie were detected in either the passive or active surveillance routes in 2010, and this is the first time that no cases have been confirmed in the last 9 years.
- All other cases (7) were confirmed in goats submitted under the FS survey of the CSFS from two holdings already under restrictions and each with a long history of positive cases.
- While 2010 is the second year in which the FS did not confirm any cases of scrapie, this does not represent a significant change in the prevalence of scrapie in this surveillance source. The number of samples tested was the lowest since the establishment of the FS survey nationwide in 2005.
- England is over-represented in the FS survey, with significantly greater number of samples and holdings submitting goats for testing than expected, according to the total goat population and number of goat holdings by country as in the Sheep and Goat Inventory 2010.
- The number of cases confirmed by the CSFS in the monitoring of scrapie-infected herds was similar to the previous year and very low compared to 2007 and 2008, the main reason being the cull in 2008 of two heavily-infected herds that contributed substantially to the prevalence rate in the FS in 2007 and 2008.
- To date there has still not been any case of atypical scrapie confirmed in goats in Great Britain, but a case of co-infection is suspected on the basis of molecular and pathology characteristics, and further investigations - including bioassay - are ongoing at the time of writing this report.