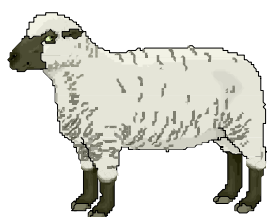


GB surveillance

Small ruminant diseases

QUARTERLY REPORT JAN – MARCH 2009: Volume 13 No. 1

Date: May 2009



The VIDA diagnoses are recorded on the VLA FarmFile database and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

The investigational expertise and comprehensive diagnostic laboratory facilities of both VLA and SAC are widely acknowledged, and unusual disease problems tend to be referred to either. However recognised conditions where there is either no diagnostic test, or a clinical diagnosis offers sufficient specificity to negate the need for laboratory investigation, are unlikely to be represented. The report may therefore be biased in favour of unusual incidents or those diseases that require laboratory investigation for confirmation.

VLA RLs have UKAS Accreditation and comply with ISO 17025 standard. SAC Veterinary Services have UKAS accreditation at their central diagnostic laboratory and at the Aberdeen, Edinburgh, Inverness, St Boswells and Thurso Disease Surveillance Centres which comply with ISO 17025 standard.

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Highlights

- **Significant disease problems associated with acute and chronic fasciolosis in England, Wales and Scotland (page 10)**
- **Rumen fluke (*Paramphistomum* spp) identified in the northwest of England and southwest of Scotland (page 11)**
- **Three incidents of suspected botulism in sheep (page 6)**
- **21% increase in sheep diagnostic submissions in England and Wales compared with the equivalent quarter in 2008 (page 3)**
- **Reduced incidence of salmonellosis in sheep in England, Wales and Scotland (page 6)**

OVERVIEW

Weather and climate

Temperatures were about 1°C below the monthly average (for 1971-2000) in England and Wales in January but slightly higher than the average in Scotland. In February, temperatures were average for England and Wales but slightly higher in Scotland, while in March temperatures were almost 1°C above average in all of GB.

It was a very dry quarter in most of GB: rainfall was close to the monthly average in January but well below it in February and March, especially in Wales which received about 30% of its average rainfall in February. In March, the rainfall pattern was different in Scotland, where close to average rain fell, compared to about only 60% of average in February.

Economics of the small ruminant industries

National Flock

Provisional results of the December 2008 Agricultural Survey show a 4% decline in the English breeding flock compared to a year earlier.

Prices

England - New season (NS) lambs have been gradually entering the market since early February. Combined old season (OS)/NS SQQ* prices at English Auction marts were 165p/kg live weight in February, an increase of 6% on the month, and representing an increase of over a third compared to the same period in 2008. By March the OS/NS SQQ average was 169p/kg live weight.

Cull ewe prices are also much higher than in 2008, reaching an average of £61 in March (£14 higher than a year ago). (Source: EBLEX)

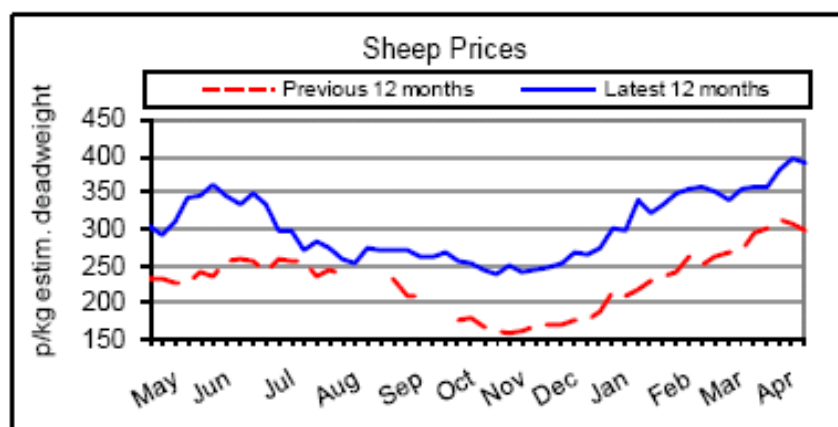
UK Sheep prices were 390.62 pence per kilogram deadweight for the week ending 11 April, 31% higher than the equivalent week in 2008. Trade has remained firm since the start of the year. (Source: Agriculture and Horticulture Development Board). GB sheep meat prices from May 2007 to April 2009 are shown in Figure 1 (Source – Defra – Farming and Food Brief April 2009).

Mutton and Lamb (source: Defra): UK home-fed production of Mutton and Lamb in March 2009 was 12% lower than in March 2008. Production in the first quarter of 2009 saw a 13.5% fall compared to 2008 levels.

*SQQ – price of light, medium and heavy lambs averaged

Export

The weakness of Sterling against the Euro contributed to an increase in export of sheep meat in 2008. Exports to France increased more than to other countries, helped by a campaign jointly run by UK and French meat marketing organizations, aimed at restoring French lamb consumption levels. The increase in exports was expected to continue into 2009, but in January, the volume of exports fell. One factor in this was the reduction of domestic supplies. However, despite the reduced volume, the continuing weakness of Sterling resulted in an increase in value of exported sheep meat. (Source: EBLEX)

Figure 1: GB Sheep meat prices (p/kg estimated deadweight May 2007 – April 2009

<https://statistics.defra.gov.uk/esg/publications/Monthly%20brief/April%202009%20Farming%20%20Food%20Brief.pdf>

Sheep Skins

The decline in sales in the car, upholstery and shoe business has led to a huge decrease in the demand for skins. Major purchasers (China, Turkey, Italy, Pakistan and India) dropped prices substantially and quickly. Green sheep skin prices ex abattoir have now levelled at 60p to £1.00 each, depending on volume and quality. (Source: EBLEX)

Submissions for scanning surveillance

There was a 21% increase in sheep diagnostic submissions in England and Wales compared with the equivalent quarter of 2008 and a 40% increase in diagnostic carcass submissions (table 1). Goat diagnostic submissions showed a 2% fall and goat diagnostic carcass submissions fell by 15% in England and Wales (table 2). In Scotland, sheep diagnostic submissions fell slightly by 1.7% and diagnostic carcass submissions showed a marginal increase. Diagnostic goat submissions increased by over 170% although the number of submissions is small compared with sheep (tables 1 and 2). The increase in sheep diagnostic submissions in England and Wales may have been associated with increased disease due to fasciolosis and continued improved trading conditions. GB diagnostic sheep and goat submissions by region and purpose are shown in figures 2 and 3.

Table 1: Sheep Diagnostic Submissions in GB

Jan-Mar	Submissions			Carcases		
	E&W	Scotland	Total	E&W	Scotland	Total
2005	2,631	1,188	3,819	783	405	1,188
2006	2,565	1,357	3,922	805	383	1,188
2007	2,574	1,584	4,158	707	290	997
2008	2,067	931	2,998	634	295	929
2009	2,506	915	3,421	887	297	1,184

Figure 2: GB sheep diagnostic submissions by region and purpose (2008 and 2009)

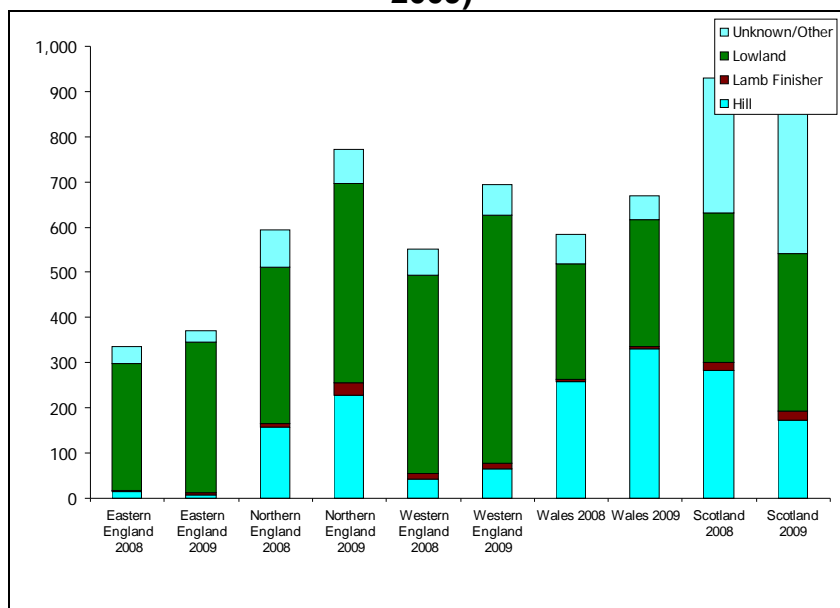
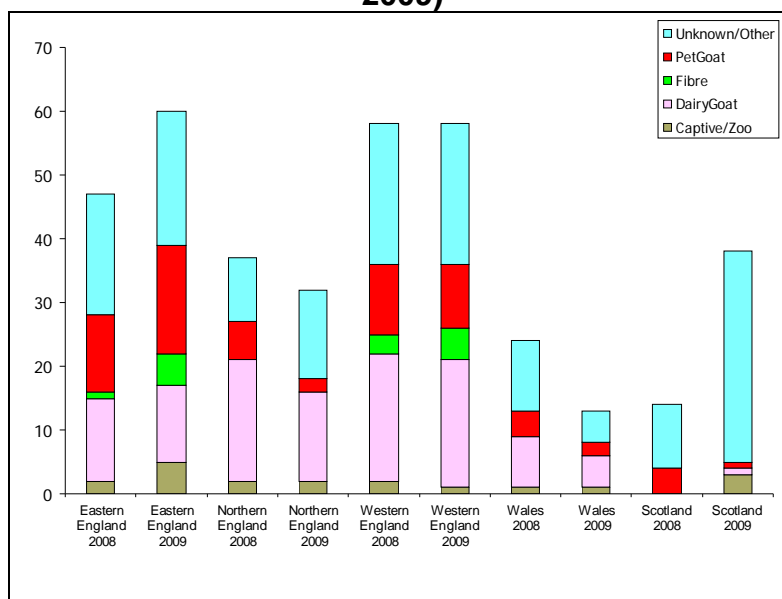


Table 2: Goat Diagnostic Submissions in GB

Jan-Mar	Submissions			Carcases		
	E&W	Scotland	Total	E&W	Scotland	Total
2005	118	16	134	27	2	29
2006	158	12	170	45	3	48
2007	175	33	208	36	2	38
2008	166	14	180	48	2	50
2009	163	38	201	41	6	47

Figure 3: GB goat diagnostic submissions by region and purpose (2008 and 2009)



Notifiable Disease Reported

No incidents of notifiable disease were identified following submissions to VLA RLs or SAC VS. VLA RLs examine brains of foetal lambs and growing lambs up to 6 months of age for gross evidence of possible *in utero* exposure to bluetongue virus. The DVM was notified on three occasions when bluetongue infection could not be ruled out following gross examination. These separate incidents involved an aborted foetal lamb with brain cavitation, an aborted lamb with hydrocephalus and anasarca and two aborted lambs with hydrancephaly. In each incident bluetongue was ruled out following investigation by the local Animal Health Office.

Brucella melitensis

A total of 1,399 sheep and goat abortion submissions were examined and *Brucella melitensis* was not isolated from any sample.

Investigatory and Advisory Farm Visits

VLA and SAC veterinarians visit farms at the request of private veterinary surgeons, to assist with the investigation of unusual, severe or difficult disease incidents. VLA veterinarians also visit for statutory purposes (for example, under the Zoonoses Order to investigate outbreaks of salmonellosis). From the second quarter of 2007, the VLA and SAC VS harmonised the way in which these more detailed investigations involving visits to farms were recorded. This is why comparable data is not available for previous years.

Table 3: Farm Investigation and Advisory Visits

Jan-Mar	E&W	S	Total Visits
2005	26	NA	26
2006	23	NA	23
2007	19	NA	19
2008	13	4	17
2009	17	8	25

Potential Food Safety Incidents

Details of incidents investigated by VLA are published in a quarterly newsletter which is available at: http://www.defra.gov.uk/vla/reports/rep_food.htm

Table 4: Potential Food Safety Incidents

Jan-Mar	Total Incidents	Botulism	Lead	Copper	Other
2005	1	1	0	0	0
2006	1	1	0	2	1 (rodenticide)
2007	4	2	0	1	1 (contamination with ruminant protein)
2008	3	0	0	3	0
2009	5	3	1	1	0

Botulism

Three incidents of this uncommon condition in sheep were investigated during the quarter. One incident of suspected botulism involved a group of 166 breeding gimmers. Over several days sheep were found dead and others showed signs of ataxia and malaise. In total 36 sheep died or were euthanased. The source of botulism was 2 loads of broiler litter which were stacked on the field that the sheep were grazing approximately 3 weeks before the first deaths. In another incident four out of a group of six ewes died. Toxin testing identified *Clostridium botulinum* type D toxin, the source of which was considered to be broiler litter spread on 50 acres of grazing and forage land at the farm. In the third incident, involving the death of five ewes, unusually broiler litter was not involved, and it was considered likely that the source was a point source such as a carcass in the forage.

ENDEMIC DISEASE SURVEILLANCE

A note about the disease trends charts.

This section of the report gives information on occurrence of selected diseases. The data originate from submissions and are summarised and presented according to the diagnosis reached and assigned as a VIDA code. Our charts show the number of diagnoses (numerator) as a proportion of the number of submissions in which that diagnosis was possible (denominator), for all of GB, England & Wales and for Scotland. The bars indicate the 95% confidence limits. Note that the y-axis scale of the charts varies and therefore care must be taken when comparing individual charts.

SYSTEMIC AND MISCELLANEOUS DISEASES

Salmonellosis

Provisional data (21/04/2009) for the first quarter of 2009 indicate that a diagnosis of salmonellosis was recorded in 30* ovine submissions (0.9 % of diagnostic submissions) representing 25 new incidents, 18 to VLA (0.8 % of diagnostic submissions) and 12 to SAC (1.2%). In the equivalent period in 2008, salmonellosis was recorded in 59 submissions (1.9%), 46 to VLA and 23 to SAC. Serotypes are shown in Table 5. Salmonellosis was not recorded in goats in Q1 in 2008 or 2009.

The percentage of appropriately tested submissions from which disease due to *Salmonella* was diagnosed is shown in Figure 4. In recent years, there has been a downward trend in number and percentage of ovine salmonellosis incidents and this has continued during the quarter.

Salmonellosis is more frequently diagnosed in the January to March period than in any other quarter (see Figure 5). At this time sheep may be housed and therefore exposed to higher concentrations of organisms. Development of clinical disease may be associated with the physiological stresses of late gestation, parturition and early lactation.

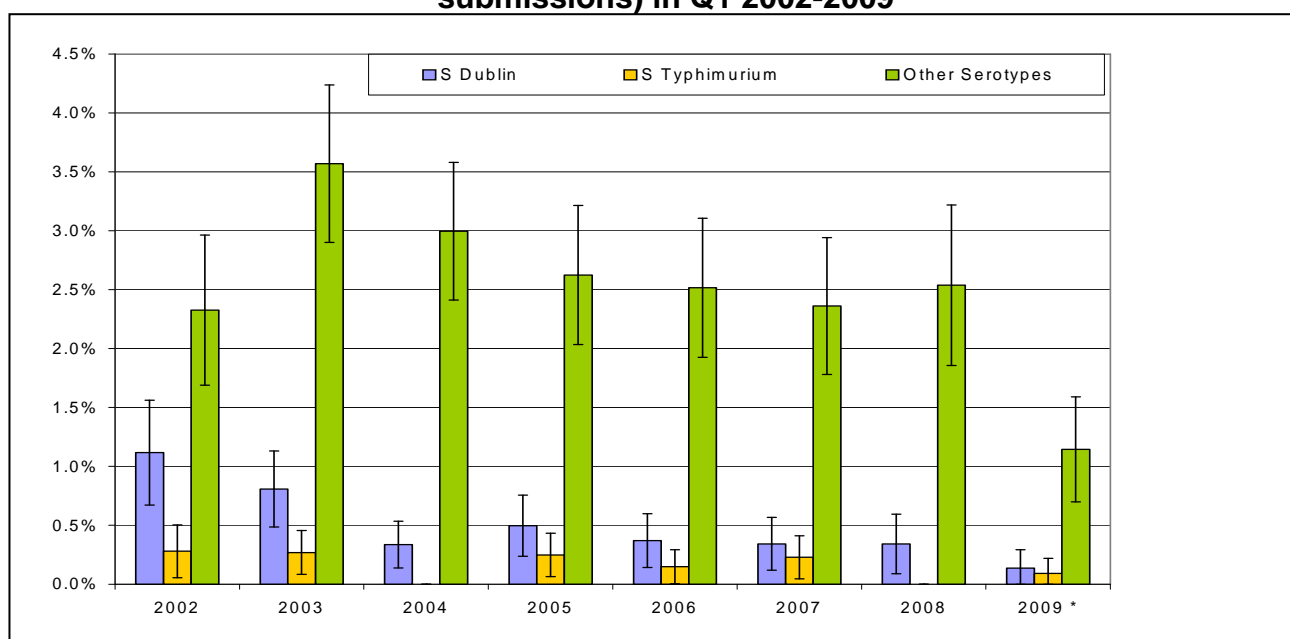
The most frequently reported clinical sign was abortion (21 submissions) and associated serotypes included *S. diarizonae* (5), *S. Montevideo* (3), *S. Newport* (3), *S. Dublin* (2), *S. Typhimurium* (2). The latter is not a common cause of abortion in sheep.

Other presenting signs included diarrhoea, sudden death and recumbency. Associated serotypes included *S. diarizonae* (5) and *S. Montevideo* (3).

Table 5: Serotypes in ovine salmonellosis incidents Q1 2005 to 2009

Serotype or group	2005	2006	2007	2008	2009
<i>S. diarizonae</i>	48	50	35	29	10
<i>S. Agama</i>	2	6	4		
<i>S. Agona</i>			1		1
<i>S. Anatum</i>	1	1			
Group B			1		
Group C		1			
<i>S. Derby</i>	2		1	1	1
<i>S. Dublin</i>	12	10	9	7	3
<i>S. Durham</i>			2		
<i>S. Enteritidis</i>			1		
<i>S. Havana</i>		3			
<i>S. Indiana</i>	3				
<i>S. Kottbus</i>	1				
<i>S. Montevideo</i>	15	8	15	22	6
<i>S. Newport</i>	1		1		3
<i>S. Orion</i>					1
<i>S. Oslo</i>	1				
<i>S. Schwartzengrund</i>			1		
<i>S. Stourbridge</i>	1		1		
<i>S. Typhimurium</i>	8	5	6		2
Not determined / To be determined		1			4
Total serotypes *	95	84	78	59	31

* More than one serotype was isolated from some submissions

Figure 4: VIDA Incidents of Salmonellosis in Sheep (as percentage of diagnosable submissions) in Q1 2002-2009

(Vertical bars indicate 95% confidence limits)

It was noted in 2008 that *S. Montevideo* incidents had increased. Provisional data for Q1 suggest a reversal of this trend. Five of the incidents reported were in Scotland and one in the west midlands of England.

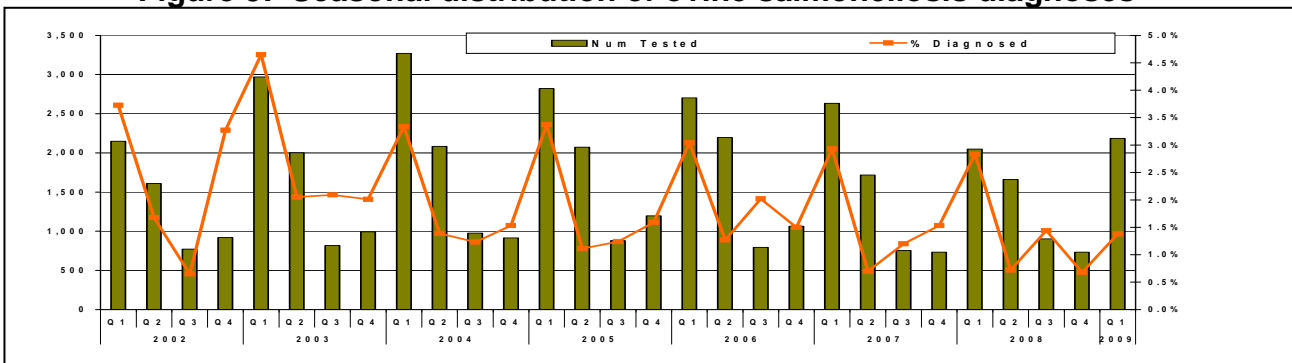
The antimicrobial sensitivity profiles of *S. Newport* isolates are monitored as multi-resistant forms have been reported overseas. None of the ovine isolates obtained this quarter showed resistance to commonly use antibiotics.

Early Detection Model (EDS)

EDS uses historic data in an algorithm to derive expected and threshold values. An exceedance score indicates the degree to which the current count exceeds the threshold; a value of >1 indicates a significant increase in reported incidents, which may indicate a potential outbreak.

There was no indication of a significant increase in diagnoses of salmonellosis in Q1 2009 using either the 5 or 12 year baseline.

Figure 5: Seasonal distribution of ovine salmonellosis diagnoses



Septicaemic conditions

The number of diagnoses of *Bibersteinia trehalosi* septicaemia in GB has shown a non-significant decline from 11 for the equivalent previous quarter to 5 for this quarter. This condition is more commonly diagnosed in lambs in the autumn. Conversely, there was a non-significant increase in colisepticaemia in young lambs, with 22 incidents diagnosed this year compared to 11 in the equivalent quarter the previous year. The change in incidence of both conditions is likely to reflect natural seasonal variation.

ALIMENTARY TRACT DISEASES

Parasitic gastro-enteritis (PGE)

Significantly fewer incidents of PGE were diagnosed in the first quarter of 2009 compared to 2008 in GB but still accounted for 12.5% of diagnosable submissions (figure 6, table 6). Cases were usually recorded in last year's lambs, as well as adults. Diarrhoea and or ill-thrift were the presenting signs. Other pathology was also detected concurrently (e.g. chronic fasciolosis, dental abnormalities and chronic pneumonia) particularly in adult ewes.

It is possible that the number of incidents is lower this quarter due to the weather (generally drier than average) following a dry November and December, which is likely to have reduced infectivity of pastures.

Unusually, strongyloidosis due to *Strongyloides papillosus* was suspected to have caused diarrhoea in 4-6 week old lambs in one incident, after the detection of a large number (22,250) of eggs in a faeces sample. These parasite eggs are often an incidental finding in sheep faeces, but *S. papillosus* can cause disease in very young animals. The parasite inhabits the small intestine, animals being infected by larvae in the dams' milk or through skin penetration by infective larvae. Anthelmintic treatment is usually effective.

Figure 6: PGE in sheep, as a percentage of diagnosable submissions, Jan-March 2002-2009

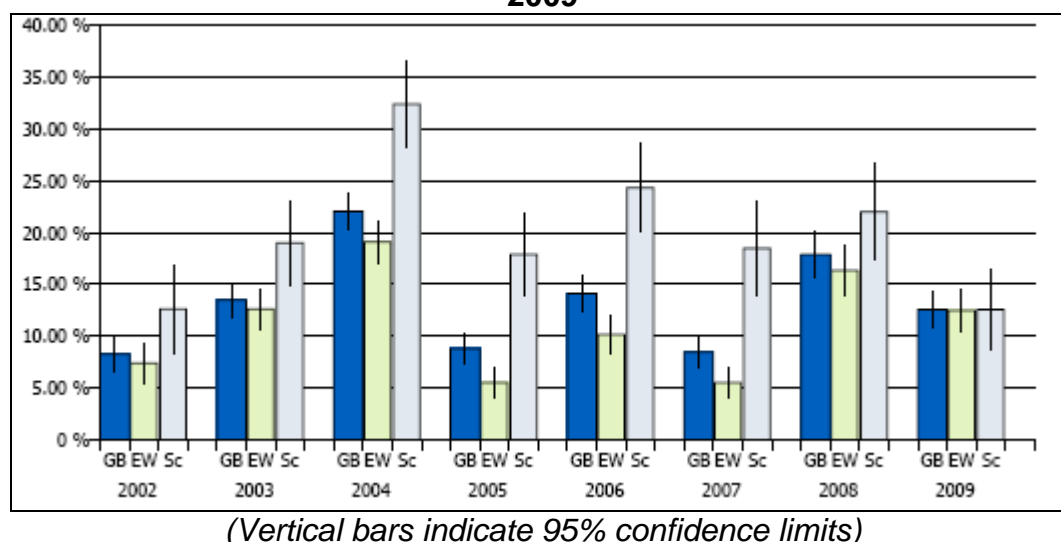


Table 6: Number of incidents of PGE in sheep, Jan-March 2002-2009

Year	Number of incidents of PGE in England and Wales	Number of incidents of PGE in Scotland	Total number of incidents of PGE (GB)
2002	55	30	85
2003	148	69	217
2004	281	156	437
2005	53	62	115
2006	106	96	202
2007	52	51	103
2008	141	67	208
2009	128	35	163

PGE-Nematodirosis

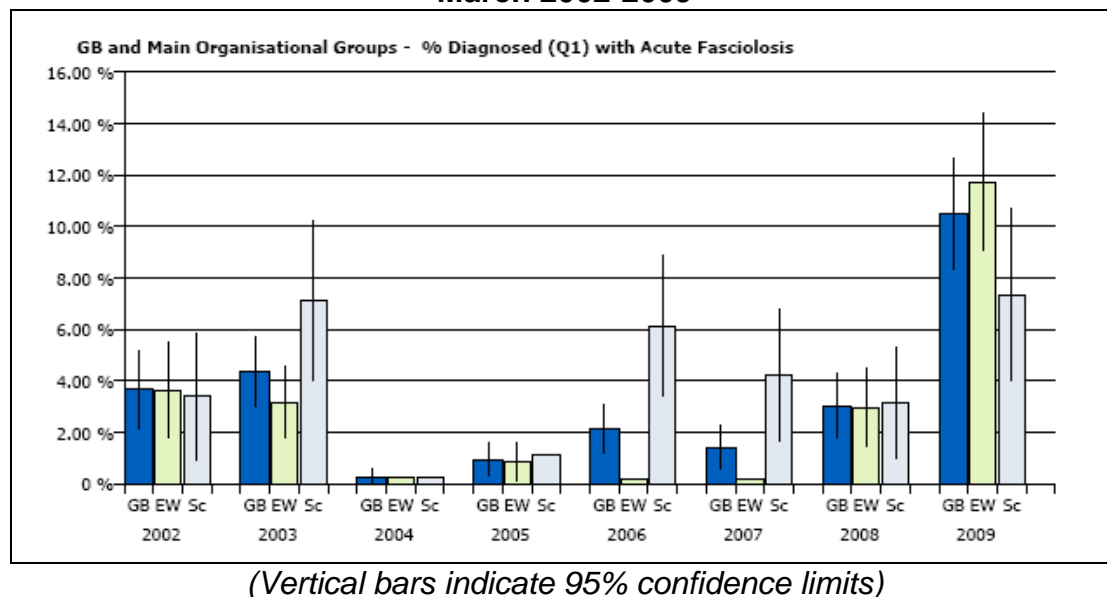
There were 4 incidents of nematodirosis recorded in England and Wales and 1 in Scotland this quarter. The number of incidents usually peaks in the second quarter (April-June) of the year.

PGE-Haemonchosis

There were no incidents recorded in England, Wales or Scotland this quarter. The number of incidents usually peaks in the third quarter (July-September) of the year.

Acute fasciolosis

Figure 7: Acute fasciolosis in sheep, as a percentage of diagnosable submissions, Jan-March 2002-2009



The number of incidents of acute fasciolosis, as a percentage of diagnosable submissions, was higher in the first quarter of 2009 compared to the first quarter periods for the previous six years (figure 7). This was particularly notable in England and Wales and many RLs reported cases of acute fasciolosis in January and February. This may indicate a changing pattern of acute fasciolosis, with cases occurring in the early part of the year rather than in the autumn and winter of the previous year. One report described an outbreak after ewes had been turned out to pasture in February following housing for lambing.

The two wet summers in 2007 and 2008 favoured both the intermediate snail host and the parasite's life cycle causing build up of metacercariae on pasture. It is likely that large numbers of infective metacercariae survived the early winter for acute fasciolosis to occur in January and February. This despite very cold weather in January and February. Metacercariae are resistant to freezing between -2 and -10 degC but lose infectivity at -20degC (Boray and Enigk, 1964).

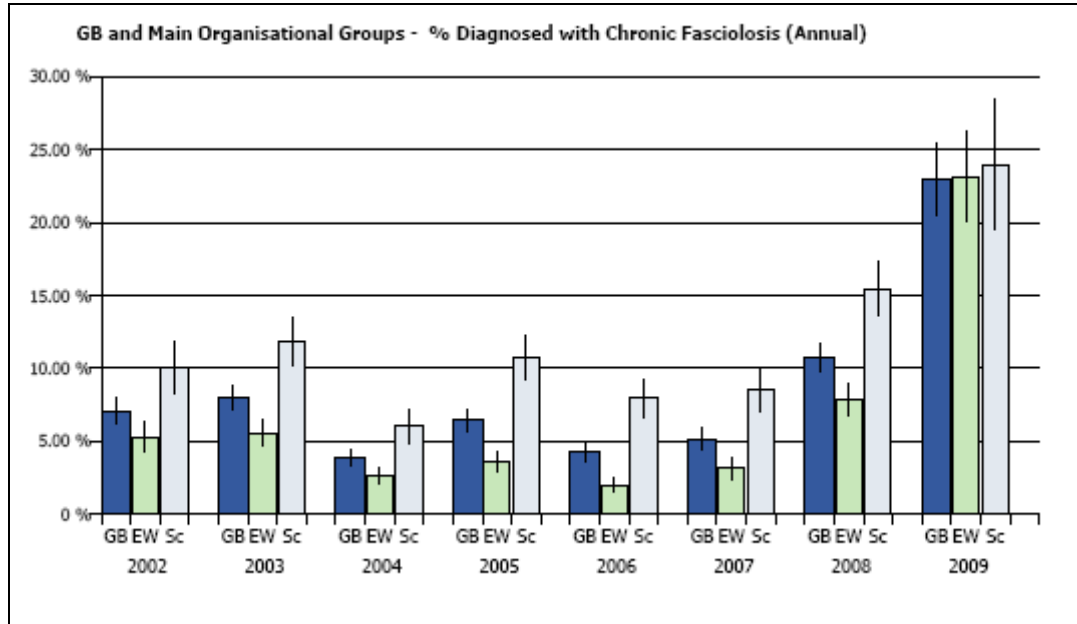
Reference: Boray and Enigk (1964) Laboratory studies on the survival and infectivity of *F. hepatica* metacercariae. *Zeitschrift für Tropenmedizin und Parasitologie* **15**, 324-331.

Chronic fasciolosis

Chronic fasciolosis caused significant disease problems in England, Wales and Scotland. The number of diagnoses, as a percentage of diagnosable submissions has increased in GB in the first quarter each year since 2006 (figure 8). A forecast of a high risk of infection was issued in the autumn of 2008 because of the two wet summers of 2007 and 2008. Despite the forecast and recommendation to treat with flukicide, some farmers did not treat in the autumn and others failed to repeat treatment later in the winter. These points were noted in reports of chronic fasciolosis from RLs in this quarter.

Reports from RLs also suggest that chronic fasciolosis may have contributed to ewes not conceiving and becoming barren, to lower lambing percentages, and also late abortions, where heavy infections caused stress in the ewe such that they were not able to maintain pregnancy.

Figure 8: Chronic fasciolosis in sheep, as a percentage of diagnosable submissions, Jan-March 2002-2009



(Vertical bars indicate 95% confidence limits)

Unusual conditions:

Rumen fluke

Rumen fluke (*Paramphistomum* spp) were identified in a Texel cross ewe that had died of chronic fasciolosis and trichostrongylosis in the northwest of England. *Paramphistomum* spp had previously been reported by VLA in cattle and has also been identified by SAC in both species, on holdings in southwest Scotland. Small numbers of adult fluke in the rumen are not significant, but larval development occurs in the proximal small intestine and heavy infestations can result in enteritis and ill-thrift.

Abomasal emptying defect (AED)

AED was confirmed in a Texel ram which had died after a 10 day period of non-specific clinical signs. Postmortem examination revealed a very enlarged abomasum, which occupied a major portion of the right abdomen. AED is a sporadic cause of dysfunction of the alimentary tract of small ruminants, particularly sheep. Typically, affected sheep are two years of age or older, and the condition progresses over several weeks with abdominal distension, loss of condition and anorexia. Cases are almost invariably fatal. The aetiology of the condition is unknown but various theories have been proposed, most of which relate to deficiencies in autonomic innervation of the abomasum. Some investigators describe lesions of the autonomic nervous system in affected sheep and the condition has been considered to be an acquired form of dysautonomia.

RESPIRATORY DISEASES

Maedi-visna

Disease is sporadically diagnosed by VLA and SAC and during the quarter a single incident was diagnosed by VLA. Three adult ewes from a flock of 150 died within 3 hours of receiving a

vaccine and several others showed respiratory signs and recovered. Samples submitted from a ewe revealed typical histopathological changes in lung and serology (AGIDT) was positive for MV antibodies. Further serology will be carried out in the flock as well as culling of aged ewes.

Ovine pulmonary adenocarcinoma (OPA)

Twenty-eight incidents of OPA (Jaagsiekte) were diagnosed compared with 16 in the equivalent quarter in 2008. This is the highest number of incidents recorded in the first quarter in the last seven years. However, there is considerable variation in the number of incidents recorded on a quarterly basis and the number recorded during the quarter.

URINARY DISEASES

Urolithiasis

Following the importation of soya expeller contaminated with melamine into Europe, RLs were alert to possible disease outbreaks that may have involved contamination with melamine. A urolithiasis problem presented in December 2008 in 20 fast growing yearling tups that were receiving approximately 1 kg concentrate feed/day/head. Three tups in two groups had developed urolithiasis and two had died. Mineral analysis of the feed showed magnesium at 0.19 mg/kg DM, phosphorus at 0.47 mg/kg DM and calcium at 0.82 mg/kg DM. Laboratory examination of urine confirmed bacteria, red blood cell casts, triple phosphate crystals and other unidentified purple crystals. A urine sample was also analyzed for melamine concentrations at Eurofins Laboratories Ltd. Melamine concentrations were <0.5 mg/kg, which was below the minimum detection limit of 0.5 mg/kg. The purple crystals observed at VLA were thought possibly to be associated with the plastic container used to store the urine sample. Indigo crystals can be formed by oxidation of indican, which is found in urine that has become alkaline due to bacterial contamination, combined with indirubin dissolved in the plastic of the container (also known as purple urine syndrome in hospitals).

It is likely that this was a case of uncomplicated urolithiasis associated with the feeding of concentrates to fast growing housed tups, probably triggered by a spell of cold weather and sub-optimal access to trough water.

SKIN DISEASES

Sheep scab and pediculosis (louse infestation)

Lice and sheep scab have continued to be diagnosed relatively frequently in 2009 (table 7). Several cases of severe sheep scab were examined for Animal Health in support of welfare investigations. The condition was also diagnosed at postmortem examination following the private submission of sheep suffering severe debility.

Table 7: GB diagnoses of sheep scab and pediculosis

Year	Sheep Scab	Pediculosis
2002	64	0
2003	90	2
2004	141	46
2005	96	44
2006	79	53
2007	110	77
2008	67	68
2009	61	48

A notable case of concurrent infection with *Chorioptes* mites, biting lice (*Bovicola ovis*) and sucking lice (*Linognathus* sp) was made in Wales from samples from pruritic Welsh Mountain ewes.

MUSCULO-SKELETAL DISEASES

Rickets

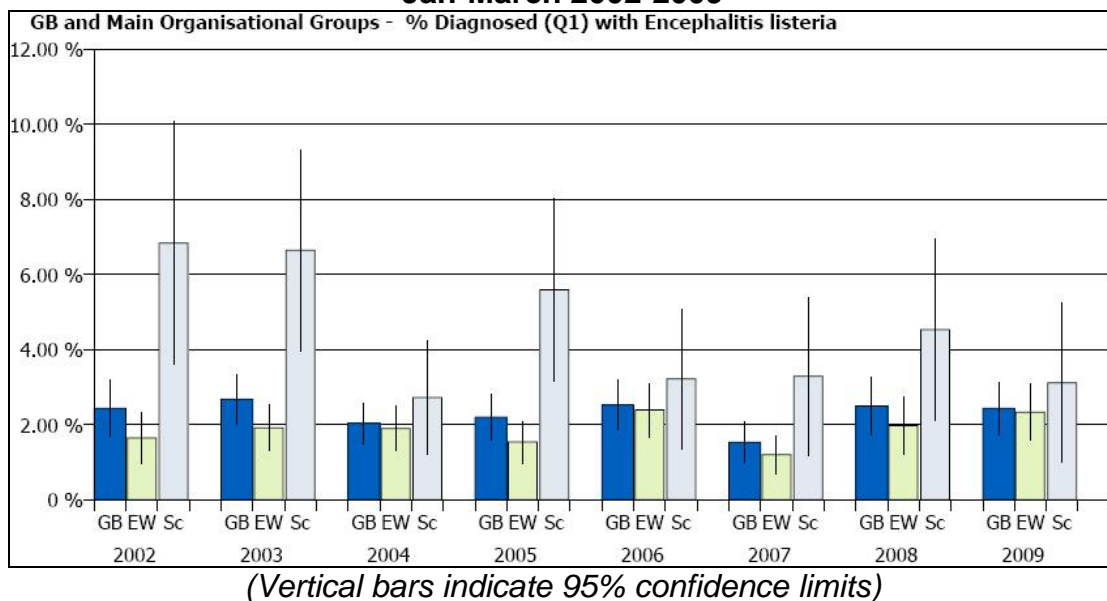
Rickets is not commonly diagnosed by VLA RLs or SAC VS, although several outbreaks were diagnosed in the autumn / winter of 2007. A presumptive diagnosis was made following a farm visit to investigate abnormal gait and shifting lameness in a group of ten in-lamb homebred Lleyn hogs in Cumbria. The affected hogs were in sub-optimal body condition and had a straight-legged hindlimb gait, which improved significantly after treatment with a Vitamin D3 containing drench. Blood samples were taken and biochemistry showed elevated alkaline phosphatase (AP) activity in four of the ten sheep. There were no abnormalities of serum calcium or inorganic phosphate. In previous cases of rickets the most consistent biochemical abnormality was elevated AP. Together with the age, history of grazing new leys over winter, geographical location with respect to latitude and response to vitamin D3 treatment a presumptive diagnosis of rickets was reached. To prevent further outbreaks in future years advice was given with regards the use of a specific Vitamin D drench at 6-8 week intervals over the winter to ensure effective supplementation. The previously reported cases have been summarised by Mearns *et al.*, *Veterinary Record* (2008) **162**: 98-99.

NERVOUS DISEASES

Listerial encephalitis

Encephalitis associated with *Listeria monocytogenes* was again a frequent diagnosis during the first quarter of 2009. The number of diagnoses was similar to 2008 (45 incidents compared to 39).

Figure 9: Encephalitic listeriosis in sheep, as a percentage of diagnosable submissions, Jan-March 2002-2009



Unusual encephalopathy in weaned lambs

The carcasses of two weaned six-month-old lambs were received within a week from a group of 28 purchased a month earlier and recently having access to housing. They had all been treated for fluke and worms a week earlier. Three lambs had developed bizarre nervous signs of aimless walking, head pressing, progressing to recumbency, blindness, opisthotonus and death. There had been no response to treatment with thiamine, antibiotics or anti-inflammatories. Postmortem examination did not reveal any significant findings, but histology detected an “acute multifocal to coalescent cortical necrotising encephalopathy, with minimal vacuolar leucoencephalopathy”. This post-weaning encephalopathy has been noted before and is usually associated with water deprivation/salt intoxication within 48 hours of housing. Four outbreaks were the subject of an earlier letter to the *Veterinary Record* which provided some useful background information. (SFE Scholes *et al.*, *Veterinary Record* (2005) **157**: 853)

No other significant changes associated with the other nervous diseases.

REPRODUCTIVE DISEASES

A full summary of sheep abortion submissions will be provided in the second quarterly report of the year, as abortion submissions continue into April and early May.

GOAT DISEASES

Although the UK goat population remains steady, there are signs of change within the infrastructure of the population itself. The commercial sector remains buoyant with average herd size now remaining fairly constant after a steady rise in the past few years. The British Goat Society (in existence for 130 years), has recently reported a decline in “hobby dairy goat keeping” however, i.e. those goats producing milk for home consumption. Reasons given include increasing costs of implementation of legislative requirements such as ear tagging, TB and scrapie control measures, the cost of carcass disposal and bluetongue vaccination costs, together with the time taken to fulfil these obligations. It is no longer considered by many to “be an enjoyable pastime.”

The industry is currently being consulted about how best to assess the possible prevalence of tuberculosis in the UK goat herd.

The number of submission to RLs is relatively low compared with sheep and no real disease trends or patterns were identified following examination of available data. There were however, a number of interesting case presentations described in RL reports.

Enzootic abortion – associated with *Chlamydophila abortus* was confirmed on three units, on one of which (a 1,000 goat herd) 10/300 had aborted in quick succession. On another unit of 150 goats, problems had been reported in previous years and a vaccination programme was already in place, although losses were still reported.

Cryptosporidiosis – a severe outbreak of diarrhoea was reported in an 800 goat herd, with 20/80 kids aged up to ten-days-old, affected with diarrhoea and dehydration.

Yersiniosis – *Yersinia pseudotuberculosis* was cultured from the aspirate of a mass in the parotid region of an adult goat. The goat had ocular lesions around two weeks prior to developing this mass, and the condition (likened to Parinaud’s Oculoglandular syndrome in man) first presented in this way on these premises approximately one year ago. A paper

entitled "Oculoglandular Syndrome Caused by *Yersinia pseudotuberculosis* in Dairy Goats" will shortly appear in the *Journal of Comparative Pathology* by VLA authors.

Johne's disease – was confirmed on eight units during the quarter, spread across the full spectrum of goat keeping from confirmed disease in one of two pet goats to an incident in an 800 goat herd. In the larger herd, 20 to 30 deaths had been reported each year and had been attributed to Johne's disease. Although a vaccination programme is in place it was described as only "intermittent".

SCANNING SURVEILLANCE FOR NEW AND EMERGING DISEASES IN SMALL RUMINANTS

Monitoring the trends in diagnoses of known diseases cannot, by definition, detect either new diseases or changes in endemic diseases that would prevent a diagnosis from being reached (for example a change in the pathogen that compromised the usual diagnostic test). Such new or emerging diseases would probably first be detected by observation of increased numbers of submissions for clinical and/or pathological syndromes for which a diagnosis could not be reached in the normal way. Submissions for which no diagnosis is reached (DNR) despite testing deemed to allow reasonable potential for a diagnosis to be reached are regularly analysed to look for increases in undiagnosed disease which could indicate the presence of a new or emerging disease. Undiagnosed disease submissions are summarised broadly by the clinical presentation of disease and, once this has been determined by further investigation, the body system affected. Both groups are investigated and trends in the levels are compared over time. For a full account of the methodology, please consult: <http://vla28/reports/diagnosis%20not%20reached/default.asp>

Data recording by VLA and SAC was harmonised from 2007. In this report GB data from the first quarter of 2009 is compared with the data from the equivalent quarter in 2008, because only limited data from SAC was available for 2007.

Supplementary analysis of VLA DNR data is also undertaken using an early detection system (EDS). This uses a statistical algorithm to estimate an expected number of DNR reports and a threshold value. If the current number of DNR reports exceeds the threshold (i.e. exceedance score > 1), this indicates that the number of reports is statistically higher than expected.

Summary

Data analysis revealed no changes thought to constitute evidence of emergence of new, undiagnosed disease in sheep or goats during the quarter.

- Statistically significant increases were seen in the GB sheep figures for the reproductive syndrome and the presenting sign abortion, for this quarter as compared to the equivalent quarter in 2008. This trend will be further analyzed to see if it constitutes evidence of any new disease or syndrome.
- Statistically significant decreases were seen in the GB sheep figures for the nervous syndrome and for the respiratory presenting sign, for this quarter as compared to the equivalent quarter in 2008.
- There were no statistically significant changes for any of the syndromes or presenting signs in goats, in GB for the 1st quarter as compared to the equivalent quarter in 2008

A: OVERALL FIGURES**SHEEP**

- During Q1 2009, the percentage of diagnostic submissions for GB where a diagnosis was not reached (DNR) was 25.5% compared to 24.2 % in the same quarter in 2008. The increase is not statistically significant (Z= 1.04)
- The percentage DNR for SAC decreased from 25.6% for Q1 2008 to 25.3% for this quarter. The increase was not significant (Z= -0.14)
- The percentage DNR for VLA submissions increased from 23.4% for Q1 2008 to 25.5% for this quarter. The increase was not significant (Z= 1.41)

GOATS

- There was a decrease in the percentage of DNR submissions from 26% for Q1 2008 to 21% for Q1 2009. The figure was not significant (Z= -1.01). The separate VLA and SAC figures reflect this change.
- The total number of goat diagnostic submissions for GB was 110 in Q1 2008 and 107 for Q1 2009.

B: DNR ANALYSIS BY SYNDROME/BODY SYSTEM**GB – SHEEP**

- A statistically significant increase was seen in the % DNR in GB for the **reproductive syndrome** for this quarter as compared to the equivalent quarter in 2008 (table 8). The increase for this syndrome is also reflected in the figures for the VLA, which increased from 35.8% to 41.1% and is statistically significant (Z= 2.11). There also was an increase from 40.5% to 44.7%, for the SAC figures, which is not a significant change (Z= 1.00). See specific discussion under section D below.
- The GB figures for the **nervous syndrome** decreased significantly from 17.3% to 6.6 % (Z= -2.04). The separate VLA and SAC figures reflect this change, but were not individually statistically significant.

Table 8: Summary of the changes in undiagnosed ovine disease (GB), by syndrome, between Q1 2008 and Q1 2009.

Syndrome/Body System	%DNR Q1 2008 (n= 2 289)	Change	%DNR Q1 2009 (n= 2363)	z ‡
Circulatory	0	=	0	
Enteric	9.6	↓	8.2	-0.89
Mastitis	0	=	0	
Musculoskeletal	10.7	↓	6.9	-0.51
Nervous	17.3	↓	6.6	-2.04
Reproductive	37.2	↑	42.0	2.21
Respiratory	4.6	↓	2.8	-0.69
Skin	10.1	↑	11.9	0.46
Systemic & Miscellaneous	10.7	↓	10.3	-0.14
Urinary	0	=	0	
Overall	24.2	↑	25.5	1.04

‡ Statistically significant if z >1.96 or z <-1.96 (not calculated if N < 40). Significant values in **bold**.

GB – GOATS

There were no statistically significant changes for any of the syndromes for this quarter compared to the equivalent prior quarter or the previous quarter. For most syndromes the figures are too low for statistical analysis.

C: ANALYSIS BY PRESENTING SIGN

GB – SHEEP

- There was a significant increase ($z = 2.11$) for the **presenting sign abortion**, from 36.1 % Q1 prior years to 40.8 % Q1 2009. This is very closely related to the increase in the reproductive syndrome and will be discussed in section D below.
- Both the SAC and VLA figures show increases, with respective increases from 40.1 to 44.9% and 34.7 to 39.5%. The figures for SAC and VLA are not individually significant.
- There was a statistically significant ($z = -2.62$) decrease for the **presenting sign respiratory**, with DNR down from 20% Q1 2008 to 0% Q1 2009. Both the individual VLA and SAC figures reflect this. Numbers of submissions with this presenting sign are low, as pneumonia in sheep is often presented as sudden deaths.

GB – GOATS

There were no significant changes for any of the presenting signs for the GB figures, nor for the separate SAC or VLA figures. The figures are mostly too low for statistical analysis.

C: EARLY DETECTION SURVEILLANCE (EDS) MODEL (SHEEP ONLY)

EDS did not indicate a significant change in number of DNR submissions for any body system in any month in Q1 2009.

D: SPECIFIC ANALYSIS OF THE SIGNIFICANT INCREASE IN DNR REPRODUCTIVE SYNDROME AND PRESENTING SIGN ABORTION, IN SHEEP IN GB

- The increase in the reproductive syndrome is closely related to the presenting sign abortion, which showed a similar significant increase in GB. Particularly for the 1st quarter, the majority (92% for this year's quarter) of submissions under the reproductive syndrome presented as abortions. The **presenting sign abortion** was therefore examined in further detail.
- Both the SAC and VLA figures show increases for this presenting sign, with respective increases from 40.1 to 44.9% and 34.7 to 39.5%. The figures for SAC and VLA are however not individually significant.
- By region: Both the Western England and the Wales regions had significant increases in % DNR for this presenting sign for this quarter.
- Month: A significant increase was seen in March only.
- Age category: By default the majority of submissions will be from adult animals, and analysis of this category is therefore meaningless.
- Purpose: Significant increases in DNR were seen in Hill sheep and Lowland sheep, which combined make up 81% of the submissions in this category.
- Housing: A significant increase was seen in housed sheep.

- The majority (93%) of the submissions in this category are “Not Carcass” and also show a significant increase. (NB – aborted fetuses counts as “Not Carcass”)
- Possible causes other than a new disease or syndrome:
 - If one of the conditions causing abortion in sheep has had a marked decline, it may cause a significant increase in the proportion of DNR. Comparing VIDA figures for this year to prior years, there was no obvious marked decline in any of the abortion causing conditions.
 - Marked change in total numbers of submissions: The total numbers of diagnostic GB submissions for this presenting sign subjected to tests which were considered to offer a “reasonable” probability of reaching a diagnosis was 941 in Q1 2008 and 1028 for this quarter. There was therefore no marked change.
 - Increase in the number of submissions classed as “reasonable testing” despite less than ideal submission type. This is a possibility and will be investigated further.
- Possible syndromes to consider:
 - Bluetongue vaccination. Other areas in the south of England have had a higher uptake of vaccination, with no similar increase in %DNR for this presenting sign.
- **Summary:** Initial investigations suggest, that a higher proportion of diagnostic submissions under this presenting sign may have been categorised as “reasonable testing” in certain areas, and that this may explain the significant increases detected. This issue will therefore be investigated further and will be reviewed again in quarter two.