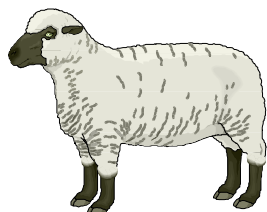


# GB surveillance

## Small ruminant diseases

Quarterly Report: Volume 12. No. 2

Date: April – June 2008



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 Edinburgh and St Boswells Disease Surveillance Centres which comply with ISO 17025 standard.

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### Highlights

- **Bovine Tb in golden Guernsey goats.**
  - VLA scanning surveillance identified *Mycobacterium bovis* in a golden Guernsey goat in Wales. Subsequent investigations by Animal Health revealed more widespread infection on this small unit and evidence of infection in herds with contact with the unit.
- **Bovine Tb identified in a sheep.**
  - *Mycobacterium bovis* was detected in a sheep by VLA scanning surveillance on a unit under movement restrictions due to a TB breakdown in cattle.
- **Increase in incidents of chronic fasciolosis**
  - There was a significant increase in disease incidents in GB compared with the second quarter of 2007.
- **Increase in incidents of parasitic gastroenteritis**
  - Parasitic gastroenteritis including disease associated with *Nematodirus battus* was commonly diagnosed.
- **Summary of incidents of salmonellosis – January to June 2008**
  - There was a reduction in the number of submissions in which salmonellosis was diagnosed although the number of incidents associated with *Salmonella* Montevideo increased.
- **Overview of ovine abortion incidents - January to June 2008**
  - Enzootic abortion of ewes (EAE), toxoplasmosis and infection associated with *Campylobacter* sp. remain the three most common causes of abortion.

## OVERVIEW

### Weather and climate

In April and June, temperatures were close to average across the whole of GB. However it was the warmest May in the UK since 1914, with temperatures 2 to 3°C above average, with the exception of eastern parts of Scotland and NE England, where they were 1 to 2°C above the monthly average.

Rainfall was slightly above average in April (approximately 120% of monthly average), but higher in parts of eastern Scotland and north-east England (140%). In May, rainfall was well above average across southern areas of England and Wales (145%), but below average across central and northern areas of GB (e.g. 34% of average in Scotland). By contrast, in June rainfall was generally close to or above average across much of the UK, but below average across some southern and central areas of England.

### Economics of the small ruminant industries

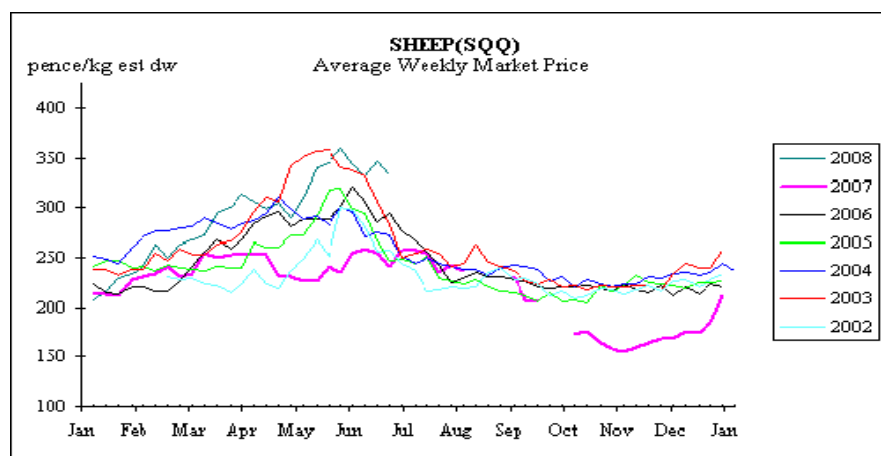
Prices for new season lamb in the second quarter of 2008 remained strong, with average UK deadweight prices peaking at 360.4 p/kg in late May. Prices gradually declined, through June, but remained over 35% higher than the equivalent period last year (table 1 and figure 1). Although increased prices may have improved optimism amongst producers, any additional income must be set against the large increases in fuel, fertiliser and feed costs seen recently.

**Table 1: Prices for estimated deadweight, lambs, April to June 2008 (Source, Defra)**

DATE	P/KG EST DW	% CHANGE FROM 2007
05/04/08	307.0	+ 21.6
12/04/08	298.2	+ 17.7
19/12/08	304.3	+ 31.0
26/04/08	290.6	+ 26.3
03/05/08	309.9	+ 37.4
10/05/08	340.5	+ 50.2
17/05/08	344.2	+ 42.7
24/05/08	360.4	+ 48.0
31/05/08	343.7	+ 35.1
07/06/08	331.9	+ 27.9
14/06/08	347.1	+ 36.2
21/06/08	333.2	+ 38.5

(<http://statistics.defra.gov.uk/esg/datasets/wplivest.xls>)

**Figure 1: Average weekly market price (pence/kg est deadweight) April – June 2002 -2008**



Defra's monthly Farming and Food Brief provides a general overview of the latest Agricultural and Economic Statistics news in relation to the UK's farming and food industries. Further information can be found at: <https://statistics.defra.gov.uk/esg/publications/Monthly%20brief/default.asp>

## Impact of bluetongue

Rapidly changing bluetongue movement restrictions are likely to affect annual breeding sheep sales this summer and autumn, with some sales already postponed. In some areas, separate auctions will be held each side of the “dividing line”. How these restrictions will affect trade is not yet clear.

## Submissions for scanning surveillance

There was an increase in diagnostic sheep submissions compared with the second quarter of 2007 (tables 2 and 3). This is likely to be the result of improved trading conditions.

**Table 2: Sheep Diagnostic Submissions in GB**

April-June Quarter	Submissions			Carcasses		
	E&W	Scotland	Total	E&W	Scotland	Total
2004	1,948	1,162	3,110	924	650	1,574
2005	1,714	1,390	3,104	838	589	1,427
2006	2,104	1,386	3,490	1,045	690	1,735
2007	1,342	1,087	2,429	636	539	1,175
2008	1,587	1,104	2,691	807	501	1,308

**Table 3: Goat Diagnostic Submissions in GB**

April-June Quarter	Submissions			Carcasses		
	E&W	Scotland	Total	E&W	Scotland	Total
2004	168	20	188	21	5	26
2005	158	38	196	42	4	46
2006	159	35	194	29	7	36
2007	175	19	194	46	2	48
2008	212	28	240	73	4	77

## Notifiable Disease Reported

*Mycobacterium bovis* was identified in a golden Guernsey goat in Wales by VLA scanning surveillance and in an Angora goat submitted as part of a separate ongoing investigation by Animal Health (see goat disease section). *Mycobacterium bovis* was also identified in a sheep through VLA scanning surveillance (see systemic and miscellaneous diseases). No other cases of notifiable disease were reported during the quarter.

## *Brucella melitensis*

A total of 357 sheep and goat abortion submissions were examined by VLA and SAC during the second quarter 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 4: Farm Investigation and Advisory Visits

April - June Quarter	E&W	S	Total Visits
2008	23	12	35
2007	20		
2006	16		
2005	22		
2004	22		

## Food Safety Incidents

Table 5: Food Safety Incidents

April - June Quarter	Total Incidents	Botulism	Lead	Copper	Other
2008	8		6	2	
2007	4		4		
2006	3	1		1	1 (diesel oil)
2005	1		1		
2004	4		4		

## ENDEMIC DISEASE SURVEILLANCE

### A note about the disease trends charts.

This section of the report gives selected information on data collected and analysed for diseases assigned a VIDA code, during the quarter or year. For this report, data for England and Wales and Scotland have, for the first time, been combined onto a single histogram. 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 Scotland. The blocks are accompanied by bars indicating 95% confidence limits – generally, the greater the number of samples examined, the smaller is this range and the greater the confidence that reported figure is true.

**Note that the y-axis scale of the charts varies and therefore care must be taken when comparing individual charts.**

## SYSTEMIC AND MISCELLANEOUS DISEASES

### Tuberculosis in a ewe

*Mycobacterium bovis* genotype 17a was isolated from a ewe with gross lesions suspicious of TB, including caseous gritty foci in the caudal mediastinal lymph node. The ewe was from a flock of 200 in north-east Wales and was submitted to VLA as part of routine scanning surveillance. At the time the unit was under movement restrictions due to a TB breakdown in cattle. It is likely that infection in the ewe was an incidental finding in a dead-end host (See Houlihan, M.G. & others (2008) *Mycobacterium bovis* isolated from a sheep during routine scanning surveillance. *Veterinary Record* **163**, 94-95)

### Salmonellosis

#### January to June 2008

Provisional data for diagnostic submissions indicate that salmonellosis was diagnosed in 70 (54 VLA and 16 SAC) ovine submissions in the first two quarters of 2008, compared with 88 (67 VLA and 21 SAC) in the equivalent period in 2007. Salmonellosis was diagnosed in 2.9% of diagnostic submissions with presenting sign "abortion" (3.2% VLA and 2.2% SAC) in 2008. This represents little change from 2.6% (2.7% VLA and 2.6% SAC) in 2007.

Salmonellosis was diagnosed in 0.6% of diagnostic submissions with presenting signs other than "abortion" (0.8% VLA and 0.3% SAC) compared with 1.0% (1.3% VLA and 0.4% SAC) in 2007. The predominant presenting signs in these non-abortion salmonellosis incidents were "found dead" and "diarrhoea". Serotypes, where determined, in ovine salmonellosis incidents are shown in Table 6.

Salmonellosis was not diagnosed in goats by either VLA or SAC in the first six months of 2008.

**Table 6: Serotypes in ovine salmonellosis incidents Q1 and 2, 2007 and 2008**

	Abortion	Abortion	Non-abortion	Non-abortion	Total	Total
	2007	2008	2007	2008	2007	2008
diarizonae	23	16	13	15	36	31
Agama	3				3	0
Derby	2	1			2	1
Dublin	5	7	3	1	8	8
Durham	2				2	0
Enteritidis	1				1	0
Montevideo	7	15	3	6	10	21
Newport	1				1	0
Stourbridge			1		1	0
Typhimurium 104			4	2	4	2
193	1		3		4	0
Unnamed			1		1	0
Unknown	6	2	3	4	9	6
<b>Total:</b>	<b>51</b>	<b>41</b>	<b>31</b>	<b>28</b>	<b>82</b>	<b>69</b>

The percentage of appropriately tested submissions from which disease due to *Salmonella* was diagnosed, is shown in figure 2. On this basis:-

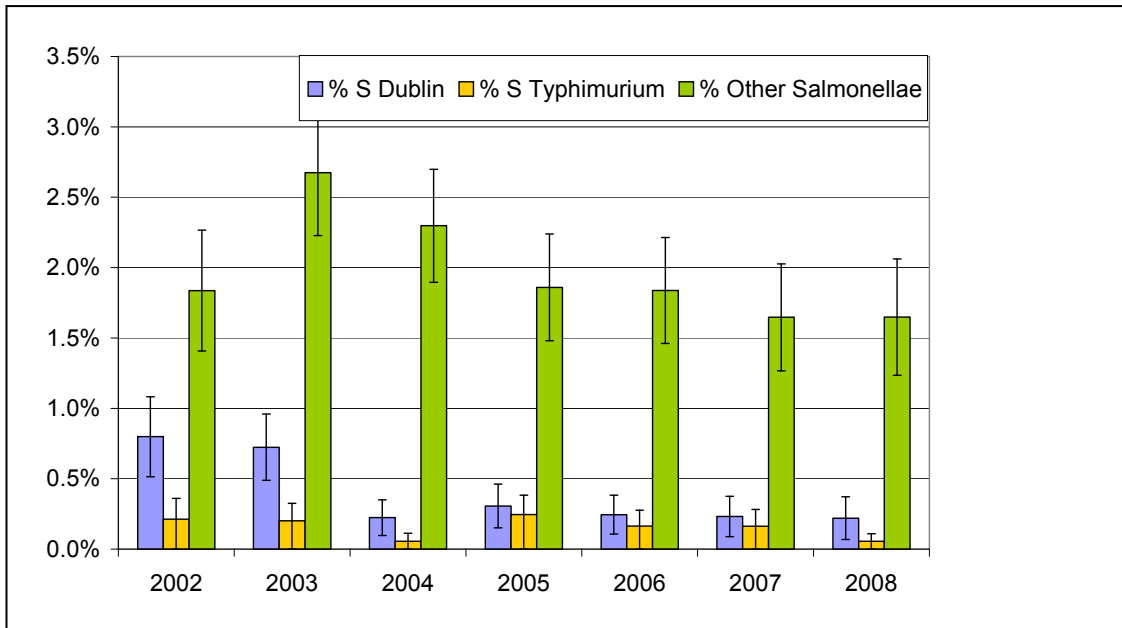
- Diagnoses of *S. Dublin* were at a similar level to 2007
- Diagnoses of *S. Typhimurium* have decreased.
- Diagnoses of other serotypes are similar to 2007 in total, but within the overall figure, there have been fewer incidents involving *S. diarizonae* and more involving *S. Montevideo*.
- The percentage of abortion incidents attributed to *S. Dublin* was slightly higher than in 2007, but no non-abortion incidents were recorded in Q1 or Q2 this year. High ewe morbidity and mortality were only reported in a small proportion of this year's incidents.
- There was a further decrease in the number and percentage of abortion incidents attributed to *S. diarizonae* with little change in non-abortion incidents. In many *S. diarizonae* incidents, concurrent disease was detected, including parasitic gastroenteritis and pneumonia in non-abortion incidents, and *Chlamydophila abortus* and *Campylobacter fetus fetus* infection in abortion outbreaks.
- The number of salmonellosis incidents attributed to *S. Montevideo* reached a peak for recent years in 2004, with lower numbers in subsequent years. In 2008 an increase in reports has been noted by both VLA and SAC. Abortion remains the most commonly recorded presenting sign and high morbidity was reported in several incidents. Ewes were usually reported to be otherwise well, although there were occasional cases of malaise. Other presenting signs included diarrhoea and sudden death. There are reports in the literature and previous anecdotal reports from Regional Laboratories of outbreaks associated with excretion of *S. Montevideo* by wild birds. In one of the incidents investigated in March 2008, the organism was isolated from bird faeces on the premises and it was stated that an unusually large number of starlings was present. In another outbreak, it was noted that concentrate fed to ewes at grass, had attracted wild birds. Over half the incidents occurred in Powys, Hereford and Worcester. During the previous incidence peak in 2004, cases were also recorded in the East Midlands and Welsh borders, with the largest number in Shropshire. In Scotland, Berwickshire had the greatest number of incidents, whereas in 2004 most reports were from Caithness.

**Early Detection Surveillance (EDS) Model**

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 significant increases in reporting Q1 or Q2 of 2008 using either the 5 or 12 year baseline.

**Figure 2: VIDA Incidents of Salmonellosis in Sheep (as percentage of diagnosable submissions) January - June 1999-2008**

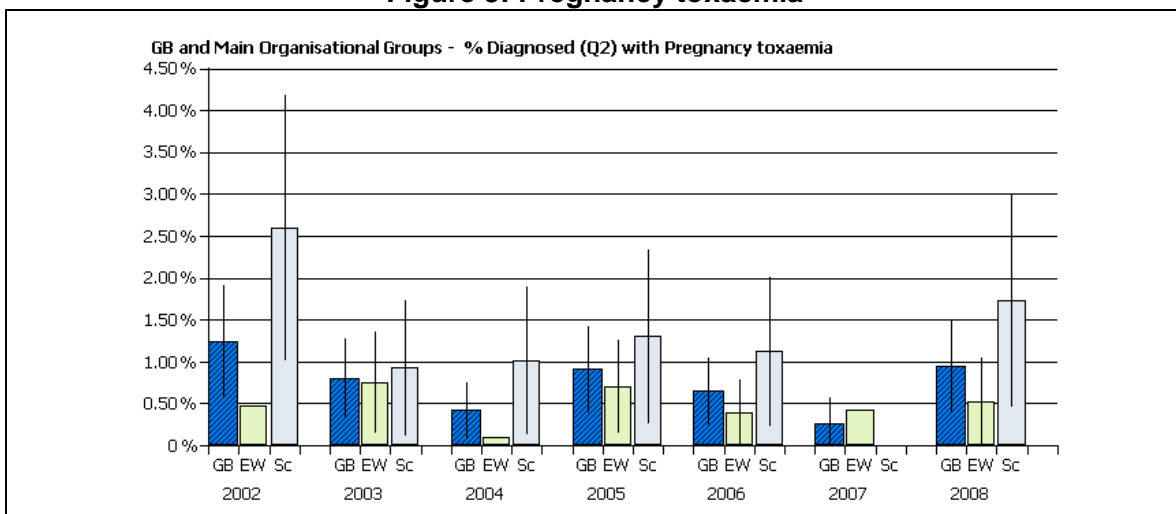


(Vertical bars indicate 95% confidence limits)

**Pregnancy Toxaemia**

Incidents of pregnancy toxaemia (as a percentage of diagnosable submissions) increased in the second quarter of 2008 particularly in Scotland compared to previous years (figure 3).

**Figure 3: Pregnancy toxaemia**



Pregnancy toxaemia (also referred to as ketosis and twin lamb disease) is commonly seen in malnourished ewes, particularly those carrying multiple foetuses. It results from an inability of the ewe to meet the glucose requirements of the foetuses in the last six weeks of pregnancy. As the foetuses grow,

the gravid uterus occupies more space within the abdomen. This restricts the capacity of the rumen and reduces the dry matter intake of the ewe, just as the demands for nutrient energy are at their greatest.

Occasionally, pregnancy toxaemia may be seen in over-fat ewes. In this case voluntary food intake in late pregnancy is restricted, not only by the lambs, but by the volume of intra-abdominal fat. There is rapid mobilisation of bodily fat reserves leading to fatty infiltration of the liver. These flocks may be difficult to manage, as any attempt to reduce energy intake is likely to precipitate the condition.

The increase in diagnosis of pregnancy toxaemia may have been caused by the large increase in concentrate costs this spring, leading farmers to try to reduce input costs. Additionally, in many areas of the UK, grass growth in early spring was delayed by long periods of cold easterly winds.

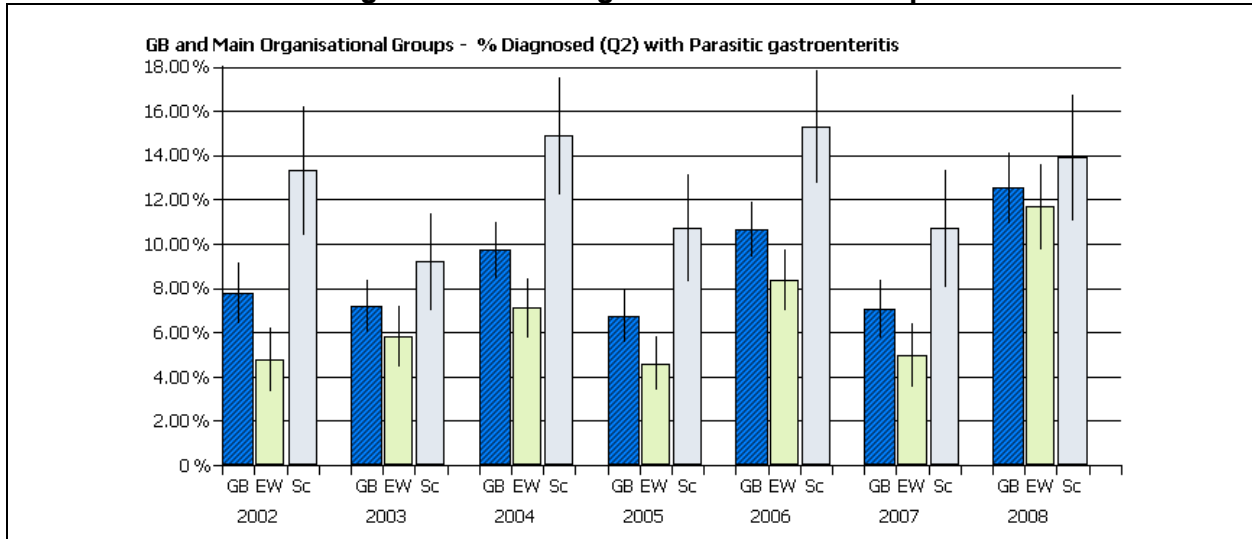
## ALIMENTARY TRACT DISEASES

### Parasitic gastro-enteritis (PGE)

There were significantly more cases of PGE recorded this quarter in England and Wales (109) than at any time since the start of the current recording system in 2002. The number of incidents in Scotland (77) was also increased from previous years, but not significantly so.

It is likely that the wet weather in 2008 (excepting February and May which were generally drier than average), together with average temperatures has provided favourable conditions for parasite development and survival on pasture. PGE cases were seen in young lambs, often together with *Nematodirus battus* infestation. The continued development of anthelmintic resistance is also likely to be an additional factor in an increased number of cases of PGE.

Figure 4: Parasitic gastroenteritis in sheep



### Nematodirosis

The highest number of incidents of nematodirosis due to *Nematodirus battus* is always recorded during the second quarter. The total number of incidents in GB this year (175) was significantly greater than 2007. In Scotland 99 outbreaks of nematodirosis were recorded in Q2, compared to 43 over the same period in 2007. In England and Wales, it was common to detect *N. battus* together with other species of parasites, making it difficult to ascertain effective anthelmintic treatment.

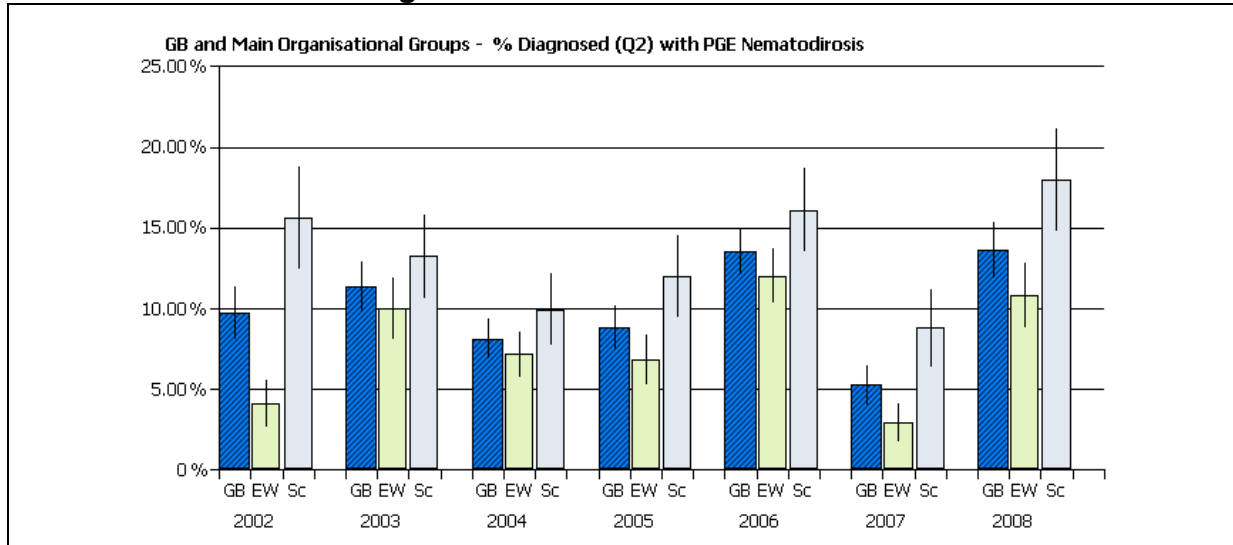
Benzimidazoles are considered the drug of choice for *N. battus*, for a number of reasons

- no benzimidazole resistance has been detected in this parasite,
- the macrocyclic lactones have variable activity against *N. battus*
- the benzimidazoles are a safe class of drug to use in young lambs and

- anecdotal reports indicate good recovery after treatment where *N. battus* is the predominant parasite, compared to other classes of anthelmintic.

However, resistance to benzimidazoles is common in other gastro-intestinal parasites of sheep. In cases of mixed parasite infection, it was advised to check benzimidazole efficacy (if used) with the submission of faeces samples 10-14 days post treatment. Note that levamisole is also effective against *Nematodirus* sp.

**Figure 5: Nematodirosis in lambs**

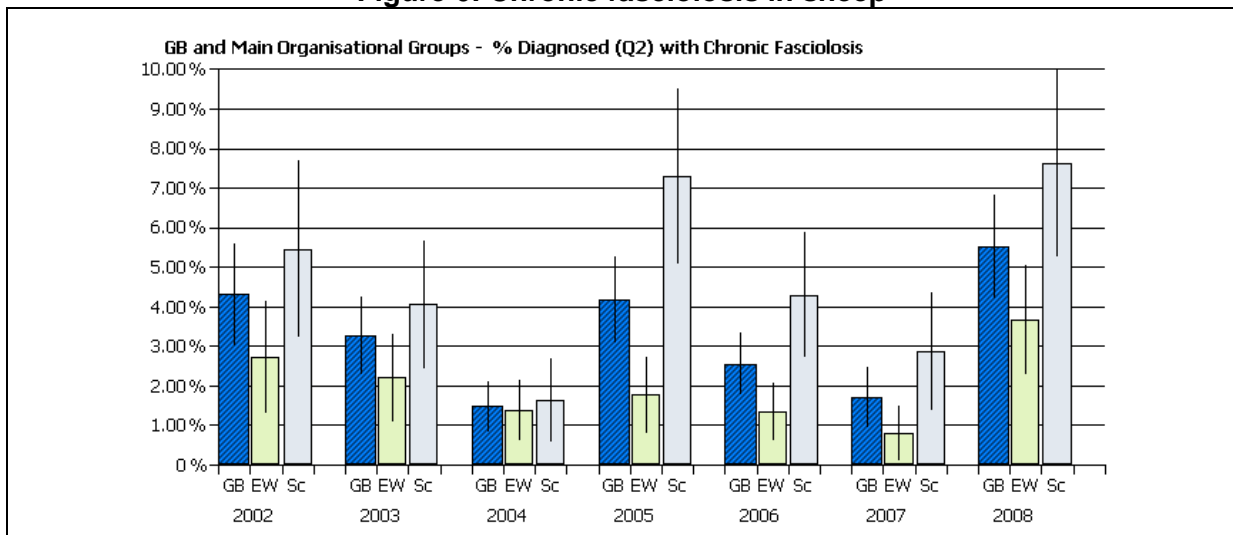


**Chronic fasciolosis**

An increased incidence of chronic fasciolosis highlighted in the first quarterly report of 2008, continued to be noted in the second quarter (figure 6). This particularly affected animals that had not received any fluke treatment in the first quarter of 2008, with infection likely to have been acquired at the end of the grazing season in 2007. In Scotland diagnoses of chronic fasciolosis in the second quarter were almost three times higher than during the same period in 2007 (44 compared to 15) and in England and Wales over five times higher (26 compared with 5).

The wet weather experienced last year was conducive to completion of the parasite’s life cycle resulting in considerably more disease in the autumn and winter of 2007. Similarly, if favourably wet weather continues in 2008, the risk of fasciolosis will be high in the autumn / winter of 2008.

**Figure 6: Chronic fasciolosis in sheep**



There was a report of congenital abnormalities in lambs following the administration of 2.5% Albendazole, investigated by VLA. Despite the contra indication which stated that this product should not be used from the start of tupping until one month afterwards, this flock was drenched one month after tupping. A high number of weak and stillborn lambs and congenital malformations were encountered in this flock, probably associated with this treatment. A more detailed report of this incident will follow.

**Clostridial Disease**

Considering the availability of good vaccines against clostridial diseases, it is perhaps surprising and disappointing that significant lamb mortality events caused by this group of diseases, are still a common finding in unvaccinated flocks. The most commonly reported clostridial diseases are lamb dysentery (*C. perfringens* type B) and pulpy kidney (*C. perfringens* type D).

**RESPIRATORY DISEASES**

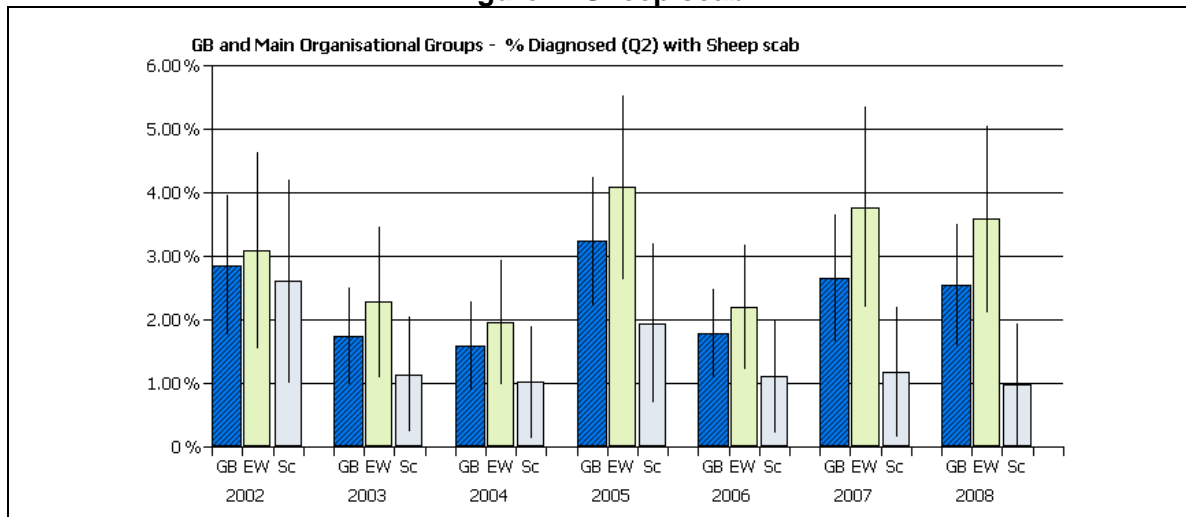
There were no disease incidents associated with maedi-visna infection during the quarter and no significant change in incidence of ovine pulmonary adenocarcinoma (OPA). Although pneumonia associated with *Mannheimia haemolytica* was recorded by most laboratories, there were fewer incidents of disease compared with the equivalent quarter in 2007.

**SKIN DISEASES**

**Sheep scab**

There were no significant changes in the incidence of sheep scab (figure 7).

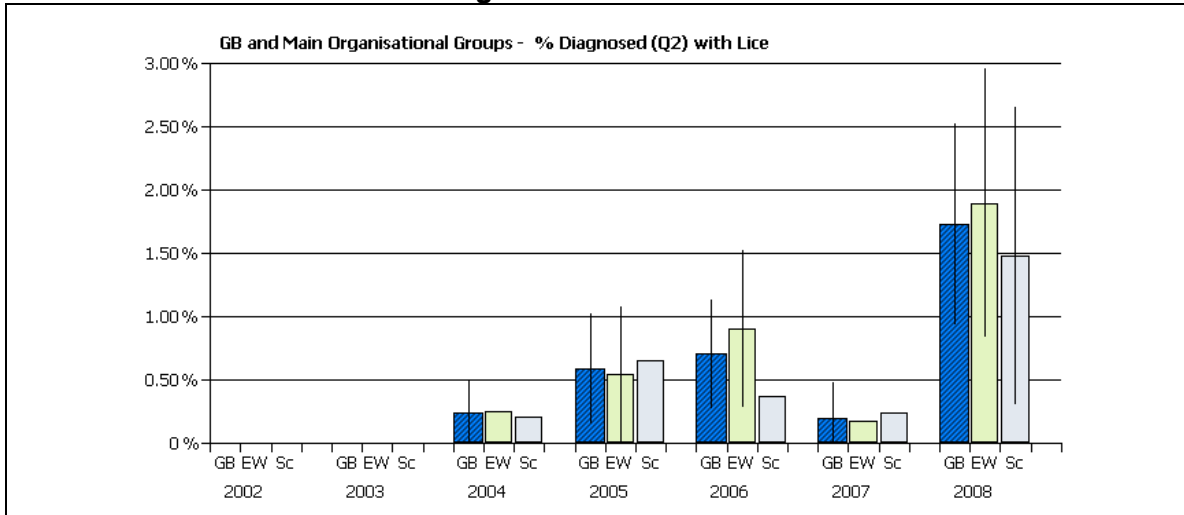
**Figure 7: Sheep scab**



**Pediculosis (Louse infestation)**

The upward trend in the number of diagnoses of lice across GB noted in the previous quarterly report continued into the second quarter (figure 8).

**Figure 8: Pediculosis**



**Ticks and tick-related diseases**

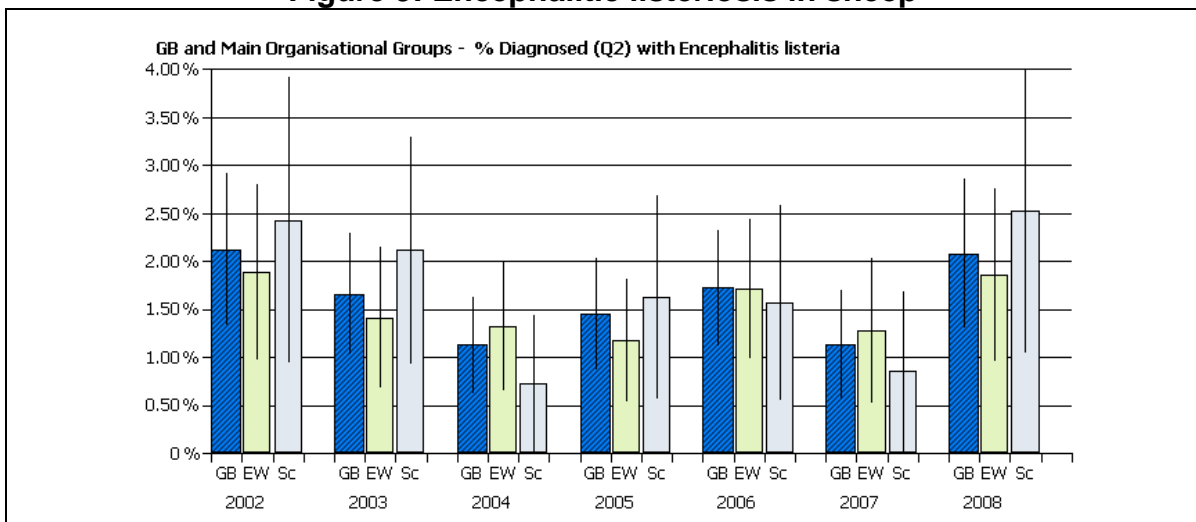
The number of diagnoses of tick-related disease was low, and showed a reduction on 2007 figures. However, this is very unlikely to reflect a real reduction in the number of ticks, nor a reduction in the transmission of tick-borne pathogens in lambs. Anecdotal evidence suggests that tick activity has increased, including outside the spring and autumn periods of activity more typically associated with the parasites.

**NERVOUS DISEASES**

**Listerial encephalitis**

This is the most frequently diagnosed cause of nervous disease of sheep. Diagnoses were made at a higher rate than in recent years, particularly in Scotland (11 in Q2 of 2008 compared with 5 in Q2 of 2007). This finding was also noted in the first quarter of 2008, is likely to reflect the feeding of poorer quality grass silage produced in poor weather during the summer of 2007.

**Figure 9: Encephalitic listeriosis in sheep**

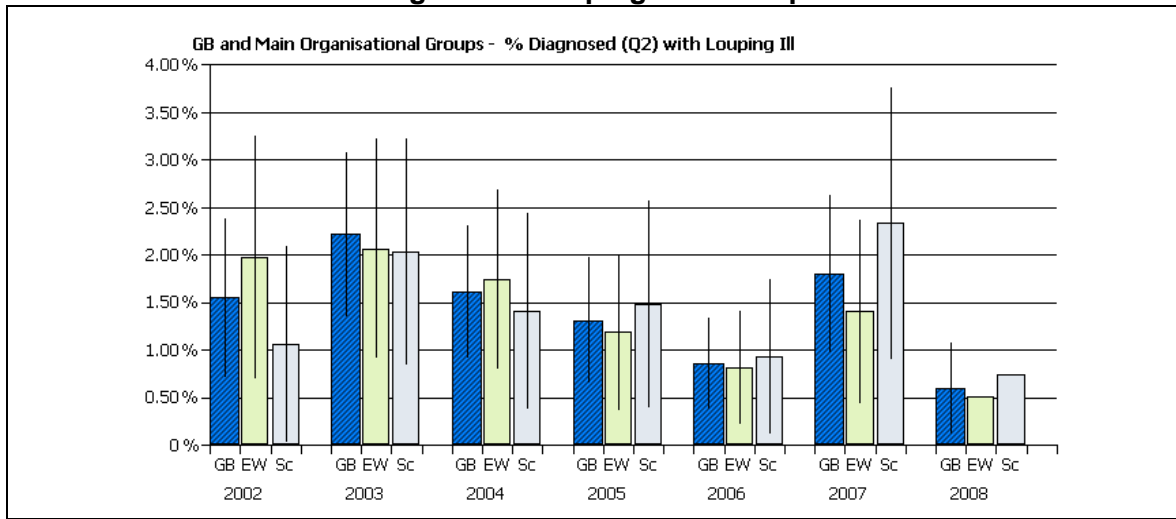


**Louping ill**

Fewer cases of louping ill were diagnosed compared with 2007, with only 6 reports (3 each by VLA and SAC) compared with 18 in 2007 and an average of 17 for the quarter for 2002-2007 (range 12-23). The reason is unknown but factors involved could include a cyclical trend of clinical cases due to varying

flock immunity; increased farmer diagnosis and fewer submissions from extensive flocks due to poor economic returns associated with this sector.

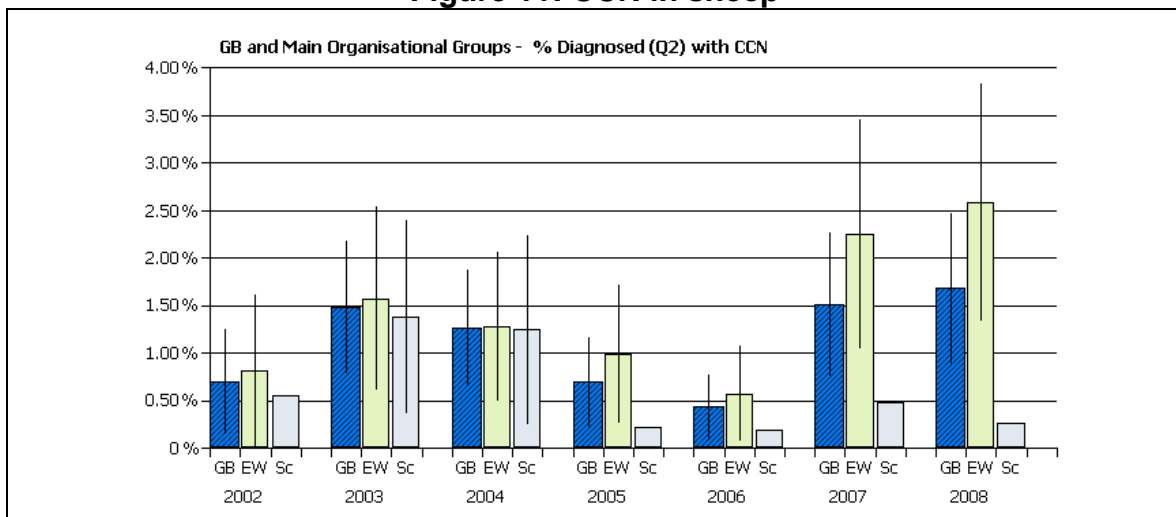
**Figure 10: Louping III in sheep**



**Cerebro-cortical necrosis (CCN)**

Higher rates of CCN have been recorded by VLA in 2007 & 2008 compared with the second quarter of preceding years (fig 11). In contrast, few diagnoses have been recorded by SAC in Scotland since 2004, with only a single case during the quarter compared with 16 by VLA. This may reflect differences in climate, flock types and management systems between these regions that may influence nutritional predisposing factors for the disease.

**Figure 11: CCN in sheep**



**“Polioencephalitis of unknown cause in ruminants”**

This condition was diagnosed in a 3-week-old lamb submitted as a suspect “Swaledale Encephalopathy” (SE). The lamb was born to a Swaledale ewe derived from a ram known to produce SE affected lambs. Although the live lamb submitted had a severe head tremor, there was no body tremor and no fitting typical of SE. This type of polioencephalitis is a sporadic condition, rarely affecting more than a few lambs in a flock. Although a possible association with hypogammaglobulinaemia has been noted, a viral cause is suspected. While the type of virus is unknown, it is probably a common virus which is only rarely able to infect the brain, for example an enterovirus.

### Neurological signs associated with BVDV type 1 virus

It was reported that 20 of 300 lambs from a flock of 200 ewes had been showing neurological signs shortly after birth. There were no abortion problems and the ewes were reported to be in good condition. A live lamb was presented with signs of hyperaesthesia and shaking. Postmortem examination of this lamb together with a dead carcass revealed evidence of BVD type 1 virus by PCR in conjunction with detection of border disease antigen and antibody by ELISA. While pestivirus infection in cattle involving border disease virus has been rarely reported, this submission showed the potential susceptibility of sheep to different pestiviruses. Previous studies have shown that the majority of ovine isolates are associated with border disease virus and around 20% with BVDV type 1 (Willoughby *et al.* (2006) Development of real-time RT-PCR to detect and type ovine pestiviruses, *Journal of Virological Methods*, **132**, 187-194).

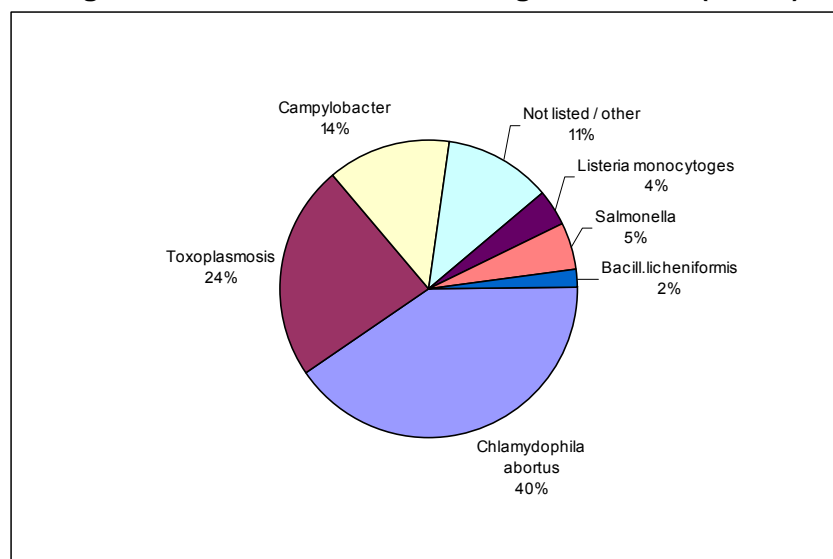
## SYNDROMIC DISEASE ANALYSIS: Ovine abortion January – June 2008

VLA and SAC VS record both the main clinical signs and the main body system for each diagnostic submission that is examined. This allows analysis of data for the major clinical presentations (e.g. diarrhoea, ill thrift, abortion and nervous diseases) and for the main body systems (e.g. cardiovascular, respiratory, and urinary). This data can be further examined for other major risk factors, such as type of sheep, housing, organic status and age, which are also recorded routinely for each submission.

For this report, **Ovine abortion January – June 2008** has been analysed as an example of this type of surveillance.

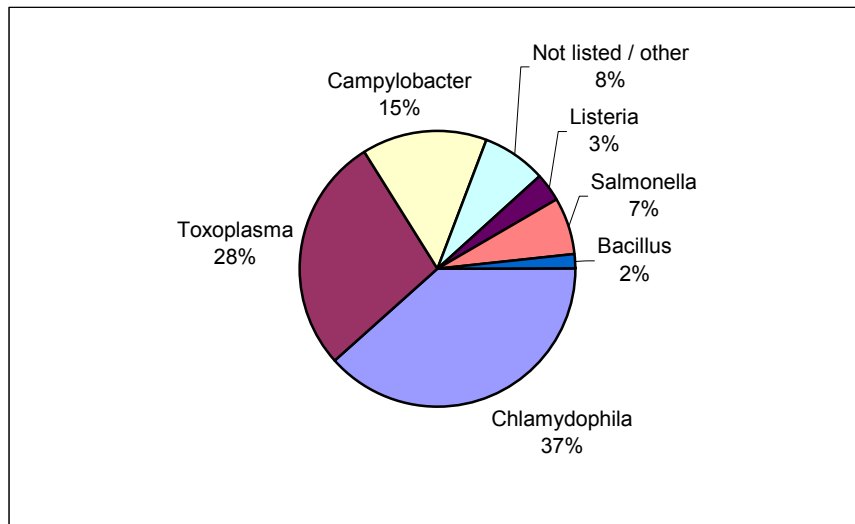
Diagnoses were reached in 53% of submissions where the presenting sign was recorded as abortion. The six most commonly diagnosed causes are illustrated below (fig 12). Causes accounting for 3% or fewer of the diagnoses are grouped with "other" diagnoses i.e. those that do not have a specific VIDA code. The most frequently diagnosed causes of abortion were those associated with *Chlamydomphila abortus* (40%) and *Toxoplasma gondii* (24%) infections, accounting for around two thirds of diagnoses, with *Campylobacter* species infection the third most frequent diagnosis (14%). A number of other bacterial infections account for the majority of the remaining diagnoses, including *Listeria* species, *Bacillus licheniformis* and *Salmonella* species, most commonly *S.Typhimurium*, *S.Dublin* and *S.Montevideo*.

Figure 12: GB Ovine abortion diagnoses 2008 (n=777)



Cumulative comparative data for 2003 – 2007 indicates a very similar proportional distribution of diagnoses (figure 13).

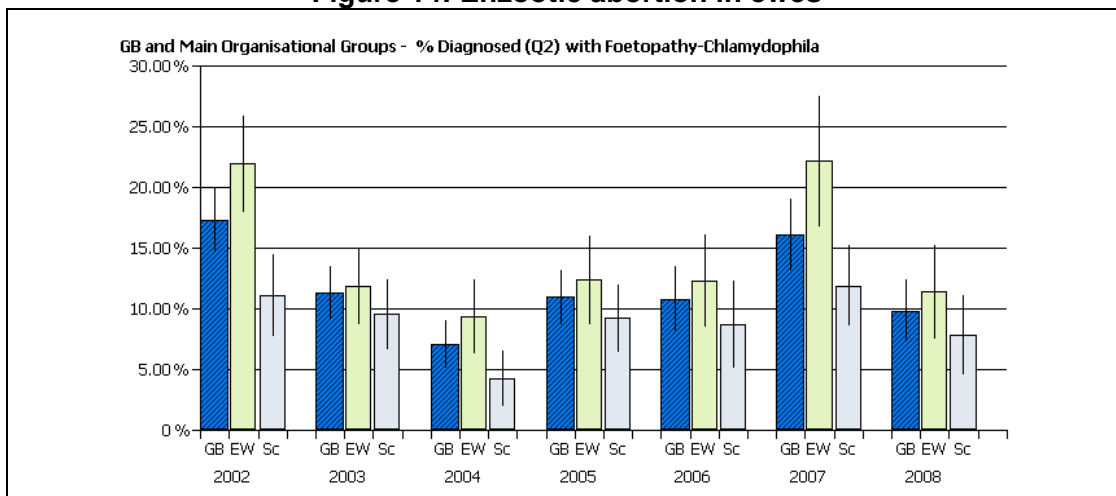
**Figure 13: GB Ovine abortion diagnoses 2003-2007 (n=5501)**



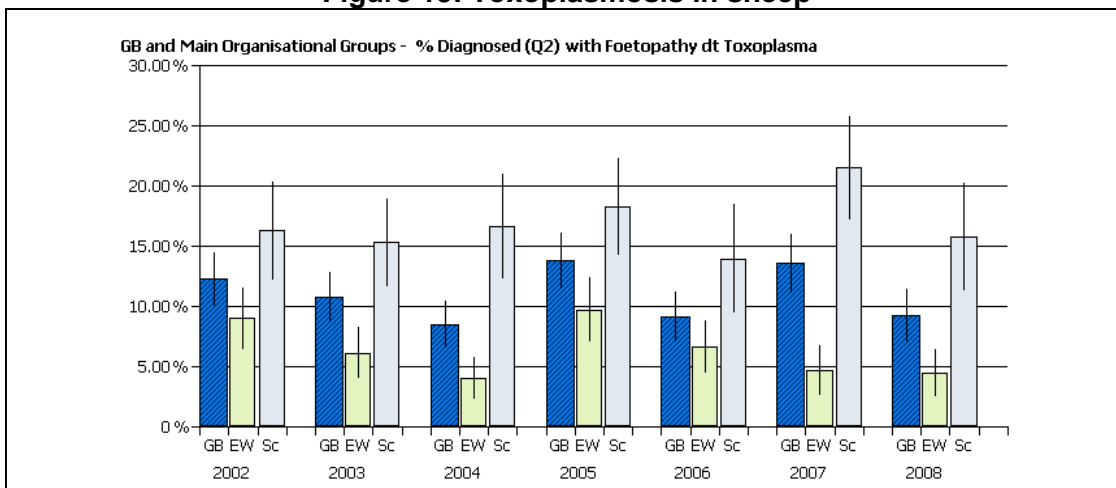
**Trend analyses:**

Enzootic abortion of ewes (EAE) due to *Chlamydophila abortus* is relatively more frequently diagnosed in England and Wales compared with Scotland (figure 14), whereas the converse is true for *Toxoplasma* associated abortions (figure 15). This probably reflects a higher prevalence of *C. abortus* in flocks in England & Wales associated with a higher proportion of lowland flocks and more inter-flock movements, allowing for the spread of this infection. There are also more EAE accredited free flocks in Scotland.

**Figure 14: Enzootic abortion in ewes**

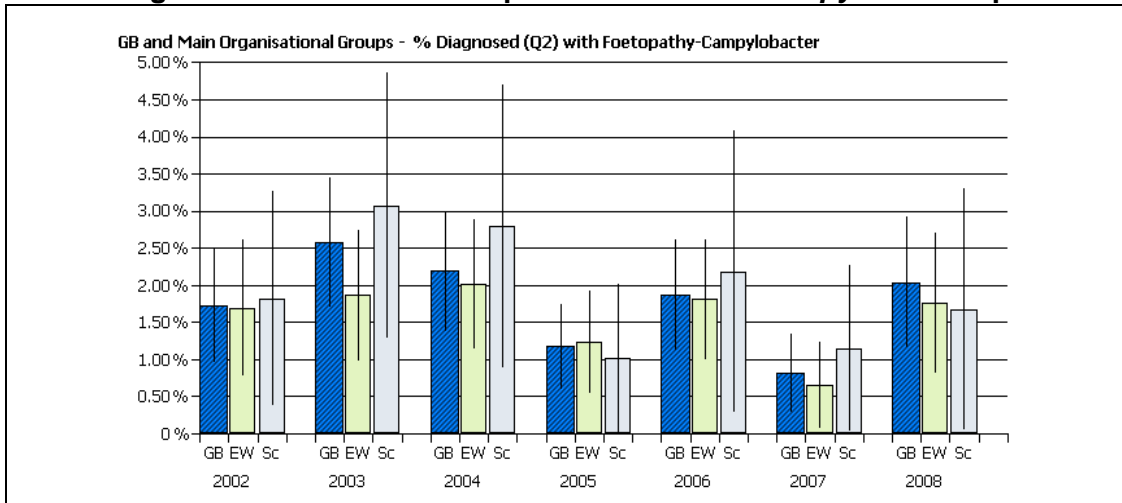


**Figure 15: Toxoplasmosis in sheep**



Abortions due to *Campylobacter*, either *C.fetus fetus* or *C.jejuni* were diagnosed at similar rates by VLA and SAC and within the range recorded since 2002 (figure 16).

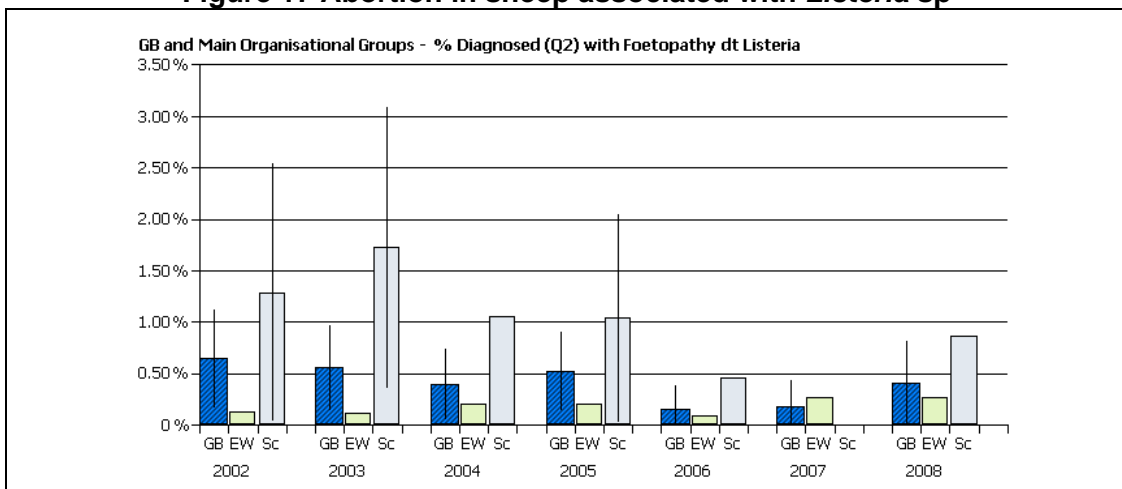
**Figure 16: Abortion in sheep associated with *Campylobacter* sp**



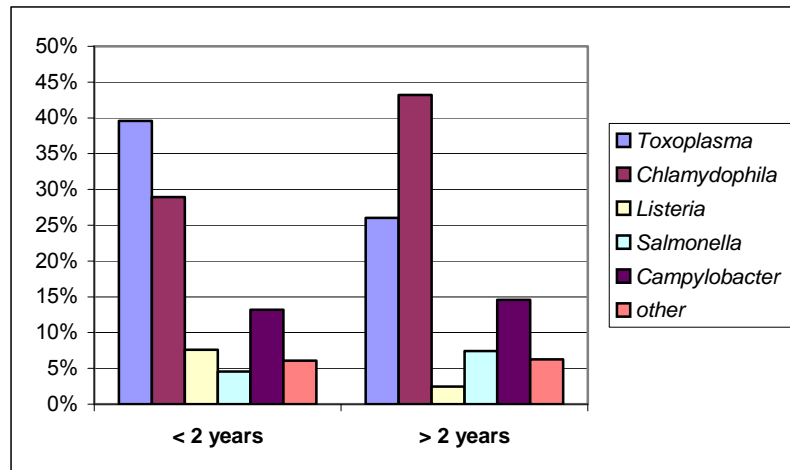
Abortion associated with *Listeria* sp. (predominantly *L. monocytogenes*, but occasionally *L. ivanovii*) is relatively more frequently diagnosed in Scotland compared with England & Wales (figure 17). SAC also recorded more outbreaks of encephalitis in sheep due to *L. monocytogenes* during the first quarter of 2008 (GB Surveillance report, small ruminants 2008 Q1). As already noted, this is likely to be due to poor quality grass silage crop from 2007 being fed during this period. The trend analysis also indicates that this difference between the regions has been present for most of the preceding five years.

Abortion associated with *Bacillus licheniformis* is also a more frequent diagnosis in Scotland. In 2008 SAC recorded 20 incidents, compared with a single VLA diagnosis. During the period 2003 - 2007 *B. licheniformis* has accounted for around 3% of abortion diagnoses in Scotland, compared with  $\leq 0.2\%$  for England and Wales. Both *Listeria* and *B. licheniformis* infections are associated with consumption of poorly fermented / conserved silage. This may reflect different flock management and feeding practices between the countries, for example with greater reliance in Scotland on grass silage produced in less favorable conditions and therefore of poorer quality.

**Figure 17 Abortion in sheep associated with *Listeria* sp**



Differentiation of diagnoses by age, when recorded, indicates *Toxoplasma* associated abortions to predominate in ewes up to 2 years of age accounting for 40-45% of diagnoses, compared with 20-25% of older ewes. This reflects the greater susceptibility of younger ewes, which develop strong immunity once they have experienced infection or have been vaccinated. This is seen to be a consistent finding over the years, as the data for 2008 is similar to the cumulative data for the preceding five years (figure 18):

**Figure 18: Ovine abortion by age group (GB 2003-2007)**

## GOAT DISEASES

### Tuberculosis

TB in goats in the UK is extremely rare with no cases being recorded for more than 50 years. It is of concern therefore, that two confirmed incidents have been investigated by the VLA during the current quarter. People handling infected goats and those drinking their milk unpasteurised, are clearly at risk of zoonotic infection.

The first incident involved an adult Angora goat, one of 12 Angoras and 16 Pygmy goats kept together on a smallholding in west Wales. They were housed together with a llama in which *Mycobacterium bovis* (spoligotype 9) infection had been confirmed. This goat submission was part of an ongoing investigation on the unit by Animal Health and multiple caseous lesions were identified throughout lung tissue of the goat at post mortem.

The second incident involved Golden Guernsey goats on a separate unit in west Wales, where *Mycobacterium bovis* (spoligotype 9) was also confirmed. This incident was identified by VLA scanning surveillance following the submission of an adult female Golden Guernsey goat with a history of anorexia, milk drop, loss of weight and a chronic cough. Postmortem examination revealed two large and multiple small caseous lung lesions. Following a report to Animal Health, the remaining animals in the herd of origin were tested using the comparative intradermal tuberculin test, and 13/20 animals were identified as reactors using the standard bovine interpretation. Tracings have now identified at least 20 herds with contact (through goat shows and goat purchases) in 13 different counties in England and Wales. Skin test positive goats have been identified on 8 premises to date. A letter to the Veterinary Record highlighted this incident (Crawshaw and others, Veterinary Record, July 26 2008, **163**, page 127).

Although both isolates are confirmed spoligotype 9 – this is the predominant finding in bovine TB in the geographical area.

### Mange

Ectoparasite control in large housed dairy goat herds can be difficult to control. This is due firstly to the rapidity with which infestation can spread (through close contact), but also to the lack of licensed ectoparasiticides and the cost associated with the requirement for 7-day milk withholding. One severe outbreak of chorioptic mange was investigated by an RL in a 300 goat herd, affecting only mature goats over 6 months. Many goats were severely affected, exhibiting a hypersensitivity type reaction, *Staphylococcus aureus* was associated with secondary dermatitis, with a combined effect of inappetance, milk drop and weight loss.

### Oculo-glandular syndrome in milking goats.

Oculo-glandular syndrome is an uncommon condition seen in man, usually associated with *Bartonella henselae*, *Francisella tularensis*, fungal organisms and *Mycobacterium tuberculosis*. Unusually, this syndrome was diagnosed in a goat from a 1,200 milking goat herd.

An increase in incidence of ocular disease was noted within the milking animals presenting as unilateral blepharospasm, conjunctival chemosis and hyperaemia, mucopurulent ocular discharge and miosis. This progressed to a granulomatous conjunctivitis with similar granuloma-like lesions present on the face and ipsilateral parotid and submandibular lymphadenopathy. *Yersinia pseudotuberculosis* was isolated from ocular lesions and associated draining lymph nodes (parotid and submandibular lymph node) from an animal presented for postmortem examination. Histological examination of tissues indicated a severe chronic active suppurative and plasmalymphocytic conjunctivitis and a suppurative and necrotising lymphadenitis. In total 50-60 goats were affected throughout February, March and early April.

At the start of the outbreak there was also a concurrent outbreak of enteric yersiniosis due to *Yersinia pseudotuberculosis*. The use of a straw chopper to bed up the pens was also introduced, with goats remaining in pens whilst straw was being sprayed into them. It was felt the physical irritation of dust and straw particles led to a conjunctivitis and behavioural changes in the goats associated with rubbing of eyes on forelimbs and pen fixtures resulting in inoculation of the conjunctivae with *Yersinia pseudotuberculosis*.

There are only two recorded cases of *Yersinia pseudotuberculosis* in man, both of which have striking similarities to the pathology noted in these goats.

## 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 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.

Data recording by VLA and SAC was harmonised from 2007. In this report GB data from the first quarter of 2008 is compared with the data from the equivalent quarter in 2007. Because only limited data from SAC is available at present, VLA data for this quarter has also been compared with pooled data for the five previous years.

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.**

- A statistically significant change in % DNR for the reproductive syndrome in GB was related to data from SAC but not VLA. Data will be re-analysed when SAC have reviewed some anomalous records for Q1 and 2 2007, at the start of the current data processing system.
- In VLA data, submissions related to the “circulatory” body system and those with principal clinical sign “lame” showed statistically significant increases in % DNR. However, numbers of relevant submissions in the current quarter are low. No clinical significance is suspected, but monitoring will continue as further data accumulates.
- It was previously noted that submissions to the VLA related to the “nervous/sensory” body system would be scrutinised in 2008 following an increase in % DNR in 2007. % DNR for this body system gave no cause for concern in Q2 2008.

## GB – SHEEP

During Q2 2008, the percentage of diagnostic submissions where a diagnosis was not reached (DNR) was 23% compared with 17% in Q2 2007. The difference is statistically significant ( $z=3.86$ ).

- For the **reproductive system** there was a statistically significant increase in % DNR from 20% in Q2 2007 to 46% in Q1 2008 ( $z = 6.72$ ).
  - SAC 3% in 2007 & 47% in 2008, a statistically significant increase ( $z=8.94$ )
  - VLA 39% in 2007 & 45% in 2008, no significant difference ( $z=1.01$ )\*

\* VLA data may vary slightly from that shown in the VLA section below because GB data was processed on a different date.

There appears to have been large decrease between Q2 2007 and Q2 2008 in the percentage of ovine diagnostic submissions excluded from analysis by SAC as not having undergone testing giving a “reasonable” probability of reaching a diagnosis. Q1 2007 was the first quarter for which this was recorded by SAC, whereas it has been used by VLA from 1999. Some SAC records for Q1 and Q2 2007 showed inconsistencies in the relevant data field which are being investigated.

## GB – GOATS

During Q2 2008, the percentage of caprine diagnostic submissions where a diagnosis was not reached (DNR) was 22% compared with 21% in Q2 2007. The difference is not statistically significant ( $z=0.35$ ).

- SAC 0% in 2007 & 29% in 2008 (very low numbers)
- VLA 24% in 2007 & 21% in 2008 ( $z=-0.40$ )\*

## VLA - SHEEP

### Overview

- No diagnosis was reached in 21% of diagnostic submissions in both Q2 2008 compared with 20% and Q2 in prior years. ( $z=0.80$ ).
- There was a significant increase in percentage DNR for the circulatory system from 1% in Q2 2007 to 11% in Q2 2008 ( $z = 2.07$ ) although number of submissions was small.
- There was a statistically significant increase in percentage DNR for clinical sign “lame” from 9% in prior years to 33% in Q2 2008 ( $z= 2.64$ ) although number of submissions was small.

### Circulatory System

There was a significant increase in percentage DNR for the circulatory system from 1% in Q2 2007 to 11% in Q2 2008 ( $z = 2.07$ ). The number of relevant submissions this quarter was too small to permit valid analysis by factors such as region, age and management. The syndrome has been noted for monitoring as more data becomes available in future quarters.

**Table 7: Summary of the changes in undiagnosed ovine disease between Q2 2007 and Q2 2008.**

System	%DNR Q1 Prior Years † (n=10,288)	Change	%DNR Q1 2008 (n= 1,343)	z ‡
Circulatory	1	↑	11	2.07
Enteric	16	=	17	0.27
Mastitis	4	↓	0	-0.66
Musculoskeletal	15	↑	23	1.11
Nervous	16	↓	7	-1.91
Reproductive	38	↑	44	1.39
Respiratory	4	=	4	-0.02
Skin	23	=	23	0.02
Systemic & Miscellaneous	18	↓	17	-0.20
Urinary	2	↓	0	1.09
Overall	20	↑	24	0.80

† Prior years = pooled data from, 2003-2007.

‡ statistically significant if  $z > 1.96$  or  $z < -1.96$  (not calculated if  $N < 40$ )

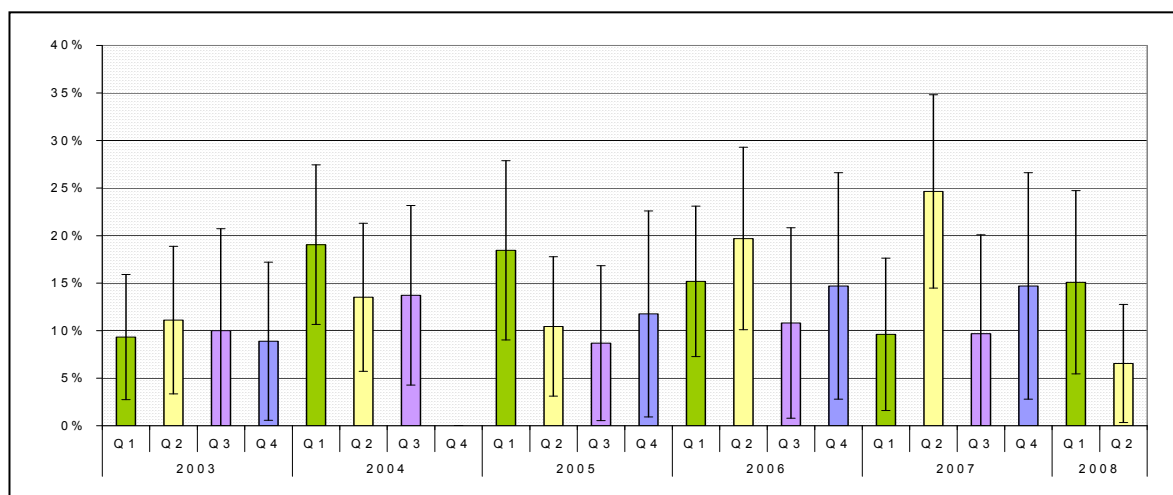
### Nervous System

Detailed monitoring of submissions related to this system is being carried out as %DNR in 2007 was significantly higher than in prior years.

- There was no significant change in %DNR for any region, age category, husbandry system or housing status when Q2 2008 was compared with Q2 in prior years.
- %DNR for nervous system submissions was significantly lower for housed sheep Q2 2008 than in prior years ( $z = -1.96$ ) but numbers of submissions from house sheep in Q2 are very low.
- %DNR for submissions including a carcase was also significantly lower ( $z = -2.06$ )

The increase in % DNR noted last year was associated mainly with Q2 and Q4, so detailed monitoring will continue. Changes in % DNR for the Nervous system are shown in figure 19.

**Figure 19: % DNR for “Nervous” Syndrome Q1 2003 to Q2 2008**



### Lameness

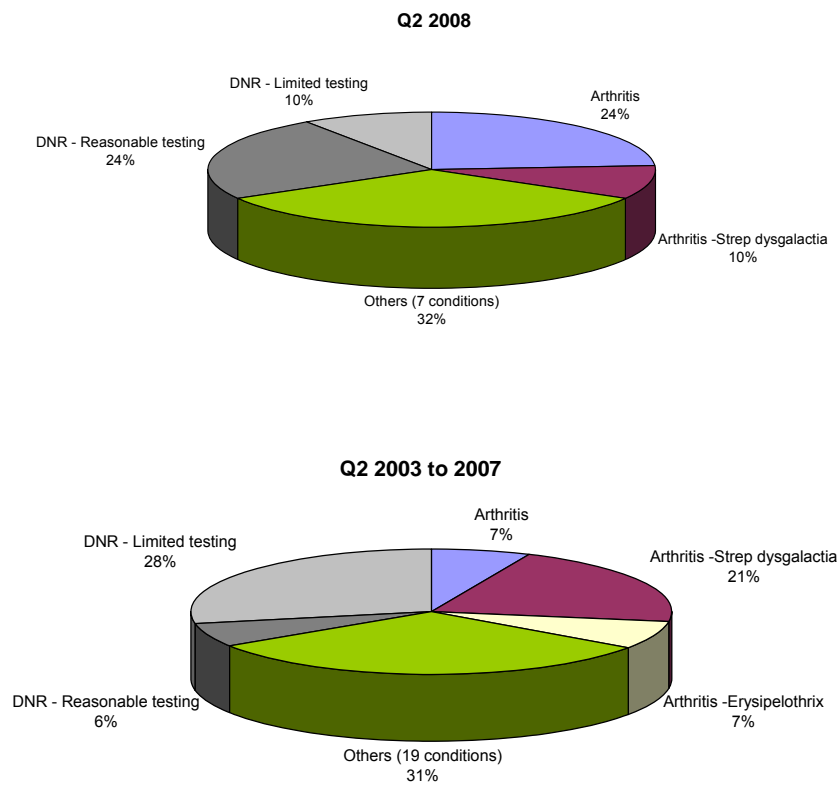
For submissions with clinical sign “lame”, there was no significant change in %DNR for any region or housing status when Q2 2008 was compared with Q2 in prior years.

- %DNR for preweaned lambs was significantly higher in Q2 2008 than in prior years ( $z = 2.51$ ). Numbers of submissions from lame sheep in other age categories were too low for statistical analysis.
- %DNR for lowland sheep was significantly higher in Q2 2008 than in prior years ( $z = 3.09$ ). Numbers of submissions from lame sheep in husbandry systems were too low for statistical analysis.

- %DNR for submissions not including a carcass was significantly higher in Q2 2008 than in prior years ( $z= 2.91$ ). Although numerically greater, submissions from lame sheep included a carcass did not show a significant change in %DNR ( $Z=1.13$ ).

Changes in the proportions of diagnoses reached for a clinical sign may result in a change in the proportion of DNR submissions for that sign. Predominant diagnoses for submissions with presenting sign “lame” in Q2 in 2008 and prior years are shown in Figure 20. Changes include lower percentages of arthritis due to *Erysipelothrix* and *Streptococcus dysgalactiae* and a higher percentage of arthritis due to other causes. Further investigation revealed that the latter included cases of *E coli*, joint ill and age related arthritis.

**Figure 20: Diagnoses in Submissions with principal clinical Sign “Lame”**



**Early Detection Surveillance (EDS) Model**

EDS did not indicate a significant change in number of DNR submissions for any body system in any month in Q2 2008.

**VLA - GOATS**

- During Q2 2008, the percentage of caprine diagnostic submissions to VLA where a diagnosis was not reached (DNR) was 21% compared with 28% in Q2 prior years. The difference is not statistically significant ( $z=-1.47$ )
- There was no significant change in percentage DNR for any body system or clinical sign for which there were sufficient submissions for statistical analysis.