



## Non-Statutory Zoonoses (Project FZ2100)



2/09

Quarterly Report

April - June 2009

Monitoring the field occurrence of appropriate animal diseases can highlight the potential for zoonotic transmission and provide a sentinel for human environmental and foodborne health risks. These reports, which primarily relate to farmed animal species, summarise the surveillance activities of the Veterinary Laboratories Agency (VLA) for predominantly non-statutory zoonoses and infections shared between man and animals in England and Wales using data gathered by the network of Regional Laboratories (RLs). Quantitative diagnostic data for all of Great Britain is provided by the Veterinary Investigation Diagnostic Analysis (VIDA) surveillance system, which includes information from the Scottish Agricultural College (SAC) Veterinary Services. Summaries of joint veterinary/medical investigations into incidents and outbreaks of non-statutory zoonotic disease and associated activities are also included. This report covers the three month period between April and June 2009. The Non-Statutory Zoonoses project (FZ2100) is funded by Defra through the VLA's Food and Environmental Safety programme and also uses returns from the Emerging Diseases and Welfare programme. Information concerning compulsorily notifiable or reportable zoonoses is recorded elsewhere under other projects such as FZ2000 (Salmonella).

### Highlights

Table of VIDA diagnoses of non-statutory zoonoses in Great Britain  
Summaries of VLA surveillance activities for non-statutory Zoonoses  
Survey of verotoxigenic *E. coli* O157 in camelids  
Investigation of zoonotic disease incidents in England and Wales  
Investigation of a large *Cryptosporidium* outbreak  
VTEC O157 outbreak investigations

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# 1. General scanning surveillance

## 1.1 Non-Statutory Zoonotic VIDA data for Great Britain: April - June 2009

This table (collated 16/07/09) summarises clinical diagnoses of non-statutory zoonoses and infections shared between animals and man from specimens submitted to VLA and SAC laboratories between April and June 2009 and compares the findings with the same quarter in 2008 and 2007. It includes rare zoonotic infections and those for which zoonotic potential is confined predominantly to immuno-compromised individuals. Diagnoses use strict criteria and are recorded (once only per incident) using the VIDA system. The list is subject to selection, submission and testing bias. It is not definitive and **excludes** notifiable or reportable diseases (notably salmonellosis, which is recorded elsewhere). It is intended as a general guide for veterinary and public health professionals to the diagnosed occurrence of animal-associated infections in predominantly farmed animal species.

Diagnosis	Q2 Total (all species)			Q2 Diagnoses in 2009						
	2007	2008	2009	Cattle	Sheep	Goats	Pigs	Birds <sup>1</sup>	Misc <sup>3</sup>	Wildlife <sup>2</sup>
Babesiasis	6	7	3	3						
<i>Brachyspira pilosicoli</i> / intestinal spirochaetosis	19	12	9				6	3		
Brucella in marine mammals	0	3	0						0	0
Campylobacter fetopathy	16	22	16	5	9	0			2	0
Chlamydiosis ( <i>C. psittaci</i> )	1	0	0					0		
<i>Chlamydophila abortus</i> fetopathy	95	52	60	2	57	1			0	0
<i>Corynebacterium pseudotuberculosis</i> (CLA)	27	16	12		9	3				
Cryptosporidiosis	237	481	347	323	22	2	0	0	0	0
Cysticercosis	2	0	1		1					
Dermatophilus infection	2	3	1	0	0	0		0	1	
Erysipelas	14	10	11		5	0	2	4		
Fasciolosis	149	412	413	317	80	7			9	0
Hydatidosis	0	0	0		0					
Leptospirosis (all categories)	29	7	1	1	0	0	0		0	0
Listeriosis (all categories)	33	53	33	11	21	1	0	0	0	0
Louping ill	22	7	11	0	11			0		
Orf (parapox virus)	10	11	7		6	1				
<i>Pasteurella multocida</i> pneumonia/pasteurellosis	85	81	58	17	31	1	7	2	0	0
Pseudocowpox (parapox virus)	2	0	1	1						
Q Fever/ <i>Coxiella burnetii</i>	2	1	0	0	0	0			0	0
Red Mite ( <i>Dermanyssus galinae</i> )	6	2	0					0		
Ringworm	5	6	3	3	0	0	0	0	0	0
<i>Sarcoptes scabiei</i> infection	2	1	3	1		0	2		0	
Streptococcal infection (excl. bovine mastitis)	37	35	26		1	1	22	0	2	0
Swine influenza	2	5	2				2			
Toxoplasmosis	93	59	55		54	1			0	0
Tuberculosis (excl. <i>M. bovis</i> )	7	7	7			0	0	4	3	0
Yersiniasis (incl. fetopathy)	4	9	7		1	2		1	1	2

Shaded boxes indicate a diagnosis is not available or applicable for that species

<sup>1</sup> Includes both domestic and wild birds    <sup>2</sup> Mammals only    <sup>3</sup> Miscellaneous exotic farmed species

### Comments

Abortions in ovines due to *Chlamydophila abortus* increased slightly compared to the same quarter last year. The number of cases of fasciolosis (a very minor zoonosis) remains high with increasing number of diagnoses

being made in sheep. Reductions in some disease categories generally reflected a decline in submissions rather than a change in the proportion of diagnoses reached.

An A to Z of animal diseases is available at:

[http://www.defra.gov.uk/animalh/diseases/vetsurveillance/az\\_index.htm#v](http://www.defra.gov.uk/animalh/diseases/vetsurveillance/az_index.htm#v)

## 1.2 Recent reports from Regional Laboratories

This section provides an up to date overview of the main diagnoses and observations concerning zoonotic non-statutory diseases and infections shared between man and animals based on submissions to the VLA (England and Wales only) during the period April to June 2009. It refers to incidents that may not all be included in 1.1 above (because of inherent delays in the recording system). Further information on significant incidents is provided in the reports by the VLA species groups [http://www.defra.gov.uk/vla/reports/rep\\_surv.htm](http://www.defra.gov.uk/vla/reports/rep_surv.htm) and the monthly surveillance reports in the Veterinary Record derived from the VLA's Emerging Diseases and Welfare programme.

### Cattle

***Streptococcus bovis*** infection was identified as the cause of sporadic abortion in a dairy cow. ***Streptococcus dysgalactiae*** was isolated from a septicaemic neonatal suckler calf which had not received adequate colostrum. ***Chlamydophila spp.*** were detected in the stomach contents of bovine dairy fetus aborted at seven months gestation. The milk from a cow with clinical mastitis produced a pure culture of ***Pasteurella multocida***. Another milk sample produced a pure growth of ***Listeria monocytogenes*** and this organism was also isolated from an aborted fetus. ***Yersinia enterocolitica*** was diagnosed as the cause diarrhoea in a group of outdoor dairy heifers. ***Yersinia pseudotuberculosis*** was isolated from the stomach contents of an aborted fetus. Diarrhoea in young calves was commonly attributed to **cryptosporidiosis**. **Babesiosis** was confirmed as the cause of anaemia and red urine in a suckler cow with a heavy tick burden. **Fasciolosis** was diagnosed on numerous occasions. **Parapox** infection was confirmed as the cause of lesions of the nose and tongue of three calves.

### Sheep and goats

Abortions due to ***Campylobacter fetus***, ***Toxoplasma gondii***, ***Listeria ivanovii***, ***Chlamydophila abortus***, and ***Y. pseudotuberculosis*** were all diagnosed this quarter. **Listeriosis** was diagnosed as the cause of encephalitis in two ewes and septicaemia in a 2 week old orphan lamb. Joint ill in young lambs due to infection with ***S. dysgalactiae*** was diagnosed on several occasions. ***Erysipelothrix rhusiopathiae*** infection was suspected serologically as the cause of joint swellings in three month old lambs. ***P. multocida*** was cultured from the lungs of a lamb with pneumonia. ***Y. pseudotuberculosis*** caused the death of yearling goats. ***Corynebacterium pseudotuberculosis*** (CLA) was cultured from lymph node abscesses from three goats and ocular discharge of another. **Cryptosporidium** oocysts were detected in lambs up to three weeks of age, and also in goat kids with diarrhoea. **Fasciolosis** was confirmed frequently as the cause of death in ewes. **Coenuriasis** ('gid') was diagnosed as the cause of nervous signs in a lamb. ***Sarcoptes scabiei*** mites were identified in a yearling ram with wool slip and pruritis. Nervous signs and deaths in yearlings were attributed to **louping ill** infection. **Orf** (**parapox** virus) was demonstrated by electron microscopy in scab material from the face of a lamb. Ringworm, due to ***Trichophyton verrucosum***, was identified in skin lesions.

### Pigs

***P. multocida*** was isolated from the joints and lung of a finisher pig with signs of pneumonia. Post-mortem examination of an eight-month-old gilt revealed skin lesions characteristic of **erysipelas** infection, a diagnosis later supported by serological test results. ***Streptococcus suis* type 2** was isolated from a batch of preweaned pigs with polyserositis and polyarthritis. ***S. suis* type 1** was recovered from a septicaemic eleven-week-old piglet with signs of nervous disease prior to death. ***S. suis* type 28** was isolated from the eye of a three-day-old piglet with suppurative conjunctivitis. ***Brachyspira pilosicoli*** was identified in the faeces of an eight-week-old pig from a litter affected with diarrhoea and wasting.

## Birds

*P. multocida* was isolated from heart blood of one of several hens that had died suddenly. **Avian tuberculosis** was diagnosed by post-mortem findings and histological examination of the liver of a nine-month-old laying hen that had suddenly become recumbent and in one of six hens with signs of weight loss and respiratory disease.

## Miscellaneous other species and wildlife

A visit was made to investigate an outbreak of **cryptosporidiosis** causing high mortality in neonatal Red deer calves. *Y. enterocolitica* was isolated from the small intestine contents of a red deer, one of seven with signs of diarrhoea and weight loss. Bacterial culture of caseous lesions found in the spleen and liver of an alpaca that had died after showing signs of ill-thrift yielded *Mycobacterium microti* spoligotype 34, an organism commonly associated with rodents. Four out of a group of 30 alpacas aborted in late gestation; examination of abortion material confirmed placentitis and *Campylobacter fetus fetus* was isolated from fetal stomach content. Abortion due to *C. fetus fetus* has not previously been reported in camelids and advice on the zoonotic implications was provided to farm staff. **Fluke** (fasciola) eggs were observed in a faeces sample taken from a 12-year-old llama which had been losing weight. *Sarcoptes* mites were detected in skin scrapings taken from a group of alpacas. Tissues sampled from a captive exotic pig produced growths of *P. multocida*.

## 2. Specific scanning and targeted surveillance and related studies

### 2.1 Campylobacter

A total of 20 isolates from bovine (n=6), ovine (n=9) and miscellaneous (n=5) submissions (predominantly abortion cases) were examined further at VLA Winchester during the period April - June 2009, which is a decrease compared to the same period in 2008 (n=57). In 2009, 2 (33%) bovine, 2 (22%) ovine and 1 (20%) miscellaneous isolates were thermophilic campylobacters (*C.jejuni*, *C.coli*, and *C.sputorum*) compared to 17% in bovines and 40% from ovines from the same period last year.

### 2.2 E. coli

#### VTEC O157 in camelids

A 12 month survey of verotoxigenic (VTEC) O157 in camelids began in May 2009 using both carcasses submitted for diagnostic necropsy and faecal samples for routine monitoring or diagnostic purposes to VLA regional laboratories. The information will be used to estimate the extent of VTEC O157 in the sampled population and help evaluate the potential zoonotic hazard from these species. A summary of the initial findings will be provided in the next quarterly report. This survey follows the detection of VTEC O157 in a significant number of camelids examined during human outbreak investigations on premises open to the public (Pritchard, G.C., Smith, R., Ellis-Iversen, J., Cheasty, T & Willshaw, G (2009) Verocytotoxigenic *Escherichia coli* O157 in animals on public amenity premises in England and Wales 1997-2007. Veterinary Record **164**, 545-549)

### 2.3 Leptospirosis

Targeted surveillance for leptospirosis is variously achieved by analysis of results from: (1) RT-PCR for pathogenic leptospires on appropriate diagnostic samples combined with sequencing and denaturing high pressure liquid chromatography (DHPLC), (2) Microscopic agglutination test (MAT) antibody testing on sera submitted for disease diagnosis, monitoring and export (mainly dogs). Diagnostic MAT titres are considered seropositive at 1/100 or above (1/50 for *L. Hardjo bovis* in cattle) (3) Bulk milk tank antibody testing (by ELISA) of samples submitted from dairy herds for monitoring purposes. 2 and 3 are influenced by vaccination (dogs and cattle); MAT results are also very dependent on the range of serology (pools or single serovars) undertaken.

1) 110 specimens (mainly fetal kidneys) from a range of species (mainly cattle and pigs) were examined by RT-PCR for pathogenic leptospires during the quarter. None of the 93 samples which were suitable for testing were positive.

2) 2970 serum samples from a range of species were examined between April – June 2009. Of 852 canine sera, 49.6% and 15.7% were positive to *L. Canicola* and *L. Icterohaemorrhagiae* respectively, compared to 42.7% and

5.6% for the same quarter last year; of 1248 bovine samples examined for *L. Hardjo bovis*, 28.1% were positive (24.1% in 2008); 18.9% of 137 porcine samples tested for *L. Bratislava* were positive (17.4% in 2008). Other significant serovars noted included 5 dogs positive to *L. Bratislava*, 1 positive to *L. Zanoni*, 34 positive to *L. Copenhageni* and 1 horse was positive to *L. Icterohaemorrhagiae*.

3) Bulk milk antibody tests for *L. Hardjo* showed a small change compared to the previous year. Between April and June 2009, 73 (24.5%) of 298 bulk milk antibody tests undertaken were negative, 44 (14.8%) were low-positive, 37 (12.4%) were mid-positive and 144 (48.3%) were high-positive. In 2008, comparable figures for the same quarter (348 tests) were 28.5% negative, 16.4% low-positive, 12.9% mid-positive and 42.2% high-positive. These findings continue to indicate serological evidence of potentially active infection in about 60% of dairy herds from the population submitting samples. The significance of these observations is heavily influenced by vaccination status and selection, although it is thought unlikely that fully vaccinated herds contributed many samples.

## 2.4 Mycobacteria (excluding *M. bovis*)

Since *Mycobacterium bovis* became notifiable in all species in 2006, the number of samples examined by VLA Weybridge has increased, particularly from pets and camelids; samples from pigs are mainly submitted by meat inspectors. Excluding *M. bovis*, potentially zoonotic non-statutory mycobacteria identified during the first six months of 2009 are summarised below. These data were obtained from Defra funded projects projects SB4510 and SB4300.

Species	Pigs	Goats	Alpaca	Fallow Deer	Cats	Dogs
<i>M. avium</i>	6	6	1	1	1	1
<i>M. microti</i>	1	0	1	0	12	0
<i>M. kansasii</i>	1	0	0	0	0	0
Unclassified Mycobacterium	4	0	0	1	3	0

## 2.5 Streptococcus suis

*Streptococcus suis* isolates from diagnostic material submitted to RLs are typed further for disease surveillance purposes at VLA Bury St Edmunds. The numbers and serotypes from porcine diagnostic material submitted to RLs during April - June 2009 are shown below, with data for previous years for comparison.

Year	1	2	3	4	7	8	9	10	12	14	15	16	28	31	33	1/2	UT	Totals
2006	3	7					1											11
2007	2	12		1	1											2		18
2008	2	15		1	3	2	1									1	5	30
2009	3	18	1	1	2	3							1			1	3	33

*Streptococcus suis* type 2 again predominated.

## 2.6 Toxoplasmosis

The European Food Safety Authority (EFSA) has highlighted the significance of toxoplasmosis as a foodborne zoonosis and the need to improve surveillance in this field. Serological examinations for *Toxoplasma gondii* using the latex agglutination test (LAT) are undertaken by the VLA on sera submitted to RLs by veterinary practitioners for diagnostic, monitoring and screening purposes. A summary of these findings for the period April - June 2009 (which do *not* constitute a structured survey), is given below. Positive samples, as defined here, have LAT titres of 1/64 or greater and indicate a history of exposure to this protozoan parasite.

In sheep in the second quarter of 2009, 123 (47%) of 259 sera tested (from 41 separate submissions) were positive for *T. gondii*. 1 (50%) of 2 reindeer sera received (from 1 submission) tested positive for *T. gondii*. 3 goat sera (1 submission), 3 alpaca sera (3 submissions) and 8 pig sera (2 submissions) all tested negative.

## 2.7 *Trichinella spiralis*

From January 2006 enhanced testing for *Trichinella spiralis* (by the EU approved pepsin digest method specified in Commission Regulation SANCO 2537/2005) was extended to the domestic slaughter of all boars, sows and farmed wild boar. Testing of samples from small abattoirs was undertaken by VLA Langford, Thirsk and Bury St Edmunds under contract to the Meat Hygiene Service. VLA Weybridge also undertakes testing of samples submitted from feral wild boar and is collaborating with the Food and Environment Research Agency, York, in surveying foxes.

Between April and June 2009, a total of 3027 individual samples (from 932 submissions) were received by VLA for testing in pools, each consisting of up to three different submissions. There were 103 equine submissions, 723 from boars/sows and 106 from wild boar. In addition, 9 feral wild boar samples were tested at Weybridge. All tests gave negative results.

## 3. Investigations into zoonotic and potentially zoonotic incidents

The VLA has worked closely with the HPA and other agencies in the production of **Guidelines for the surveillance and joint investigation of zoonotic diseases in England and Wales**. These guidelines are now in operation and can be found at: [http://www.hpa.org.uk/web/HPAwebFile/HPAweb\\_C/1240530336599](http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1240530336599).

VLA collaborations with the HPA in the investigation of zoonotic incidents are also included in HPA Zoonoses newsletters:

<http://www.hpa.org.uk/webw/HPAweb&Page&HPAwebAutoListName/Page/1234254474768?p=1234254474768>

### 3.1 Cryptosporidiosis

Investigations to assist in human outbreaks of cryptosporidiosis linked to direct contact with animals are undertaken at the request of Consultants in Communicable Disease Control (CsCDC) of HPA/NPHS and in collaboration with the National Cryptosporidium Reference Unit (CRU), Swansea and follow jointly agreed guidelines.

#### Farm open day outbreak

A large outbreak of cryptosporidiosis with at least 155 suspected cases, including over 41 laboratory confirmed (of which 4 were secondary cases within families), was linked to a visit by 382 children from eight local primary schools to a dairy farm in Carlisle at the end of April 2009 and received much local media attention. The children were divided into groups and visited various work stations on the farm. They came into direct contact with a cow (which they milked), four calves (some of which had previously had diarrhoea), a nanny goat and four baby kids; they also walked through the central passage of the cow cubicle house. The children were provided with alcoholic hand gel (which is not effective against *Cryptosporidium*) before receiving refreshments in the farm office. *Cryptosporidium* spp. oocysts (subsequently confirmed at VLA Weybridge by PCR as *C. parvum*) were found using the fluorescent antibody test (FAT) in three out of seven faecal samples taken from the calves and their environment. The goats had been brought in especially from a farm in Lancashire for the open day and had since returned. This farm was subsequently also visited and the nanny and kids from the same group were sampled – *Cryptosporidium* spp. oocysts were detected in seven of 20 samples examined by FAT. Two of these were confirmed (by IMS and PCR sequencing at the CRU) as *C. parvum*; the others were *C. xiaoi*, which is a new species, closely related to *C. bovis* but with known host adaptation to sheep and apparently also to goats. *C. xiaoi* has not been reported in humans. The gp60 sequences from the *C. parvum* isolates from the calves and from one of the goats matched that found in the human cases, which suggested that either host could have been the source of the outbreak. Although *C. parvum* infection can cause diarrhoea in neonatal farm animals, it is

mainly subclinical. However, infected animals frequently shed oocysts in numbers greatly above the minimum infectious dose for people. Therefore, efficient hygiene precautions (especially adequate hand-washing facilities) are needed to prevent faecal-oral zoonotic transmission from clinically normal animals. Hygiene advice for farm visits is available in HSE information sheet No.23.

### 3.2 VTEC O157

VTEC O157 outbreak investigations are undertaken according to agreed guidelines at the request of CsCDC of HPA/NPHS where an animal-associated source is suspected, and variously involve collaboration with other organisations, including the Environmental Health departments of Local Authorities and the Health and Safety Executive. Determination of phage type (PT), Vero cytotoxin (VT) type and comparison of human and animal isolates by pulsed field gel electrophoresis (PFGE) and variable number of tandem repeat (VNTR) analysis are performed by the *E. coli*/Shigella/Yersinia/Vibrio Reference Unit of the Laboratory of Gastrointestinal Pathogens, HPA Centre for Infections, Colindale. If isolates from animals circumstantially implicated in outbreaks have the same PT and indistinguishable PFGE profiles from human cases, this is taken as confirmatory evidence of a causal association. In practice, there can be minor PFGE profile variation amongst some isolates associated with an outbreak investigation. VNTR profiles of strains within an outbreak can also show variation at a single tandem repeat locus; application of this method is currently under development. Other VTEC O157 PTs may be detected incidentally during the investigation of animal premises.

In May, VLA investigated a small open farm linked to 7 cases of human VTEC O157 PT 21/28, VT2 infection. The three initial cases were in young children, one with HUS, with the remaining four being secondary family contacts. VTEC O157 PT 21/28 was isolated from five (11%) out of 45 faecal and environmental samples taken, with all isolates yielded from lambs which had been bottle fed by the public. The human and lamb isolates gave indistinguishable fragment profiles when examined by PFGE. VNTR showed that isolates from human and animal sources had either the same profile or differed at a single tandem repeat locus only. In conclusion the strain typing results were consistent with the open farm being the source of the outbreak. Appropriate advice was given in accordance with existing guidelines.

In June, VLA assisted the HPA following reports of infection in two young children with VTEC O157 PT 21/28, VT2, linked to an open farm. Infection was transmitted to six family members with three cases complicated by haemolytic uraemic syndrome. VTEC O157 PT 21/28 was subsequently isolated from five (16%) of 31 environmental samples and 41 (33%) of 125 faecal samples collected, with isolates obtained from goats, deer, llama, sheep, horses, donkeys and pigs). Five environmental isolates and nine faecal isolates, representing all the different positive animal species, had the same PFGE profile as the human isolates, or a minor variant of it. VNTR confirmed the results of PFGE, supporting the epidemiological findings that faecal contamination on the premises was the probable source of the infection. The risks associated with goats accessing public areas, difficulties in cleaning floor surfaces and the children's ball pool play area, and improving hand washing facilities were highlighted by the investigators and appropriate remedial measures were introduced.