



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 twelve month period between January and December 2008, with additional information for the last quarter of the year (October to December). 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 diagnoses of non-statutory zoonoses in Great Britain
 Zoonotic pathogens in sheep and goat abortions
 Summaries of VLA surveillance activities for non-statutory zoonoses
 Investigation of zoonotic disease incidents in England and Wales
 VTEC O157 outbreak investigations
 Investigation of *Corynebacterium ulcerans* diphtheria cases
 Weil's disease from an adopted feral rat
 Improvements to Q fever diagnosis

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1. General scanning surveillance

1.1 Annual VIDA data for Great Britain 2008

This table (collated 30/01/09) summarises clinical diagnoses of non-statutory zoonoses and infections shared between animals and man from specimens submitted to VLA and SAC laboratories in 2008 and compares the findings with the 2007 and 2006 data. 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	Total (all species)			Diagnoses in 2008						
	2006	2007	2008	Cattle	Sheep	Goats	Pigs	Birds ¹	Misc	Wildlife ²
Babesiosis	21	18	18	18						
Brachyspira pilosicoli / intestinal spirochaetosis	15	22	49				42	7		
Brucella in marine mammals	0	0	6						1	5
Campylobacter fetopathy	165	217	150	34	116	0			0	0
Chlamydiosis (<i>C. psittaci</i>)	2	2	1					1		
<i>Chlamydophila abortus</i> fetopathy	457	533	346	3	336	7			0	0
<i>Corynebacterium pseudotuberculosis</i> (CLA)	73	87	69		63	6				
Cryptosporidiosis	1168	943	1311	1247	46	11	0	0	7	0
Cysticercosis	1	2	0		0					
Dermatophilus infection	9	33	30	12	16	0		0	2	
Erysipelas	56	61	51		17	1	14	19		
Fasciolosis	951	861	1788	1196	541	5			44	2
Hydatidosis	0	0	0		0					
Leptospirosis (all categories)	45	94	38	38	0	0	0		0	0
Listeriosis (all categories)	199	135	191	50	132	8	0	1	0	0
Louping ill	47	45	25	9	16			0		
Orf (parapox virus)	39	45	44		42	2				
<i>Pasteurella multocida</i> pneumonia/pasteurellosis	436	336	281	142	60	1	63	9	4	2
Pseudocowpox (parapox virus)	0	3	6	6						
Q Fever/ <i>Coxiella burnetii</i>	7	4	5	2	2	1			0	0
Red Mite (<i>Dermanyssus galinae</i>)	37	19	17					17		
Ringworm	34	26	27	18	7	1	0	0	0	1
<i>Sarcoptes scabiei</i> infection	4	6	10	0		0	10			
Streptococcal infection (excl. bovine mastitis)	120	119	151		11	0	134		5	1
Swine influenza	11	9	16				16			
Toxoplasmosis	314	348	201		201	0			0	0
Tuberculosis (excl. <i>M. bovis</i>)	48	30	36			0	2	14	17	3
Yersiniosis (incl. fetopathy)	28	24	32		12	4		11	3	2

NR – Not recorded Shaded boxes indicate a diagnosis is not available or applicable for that species

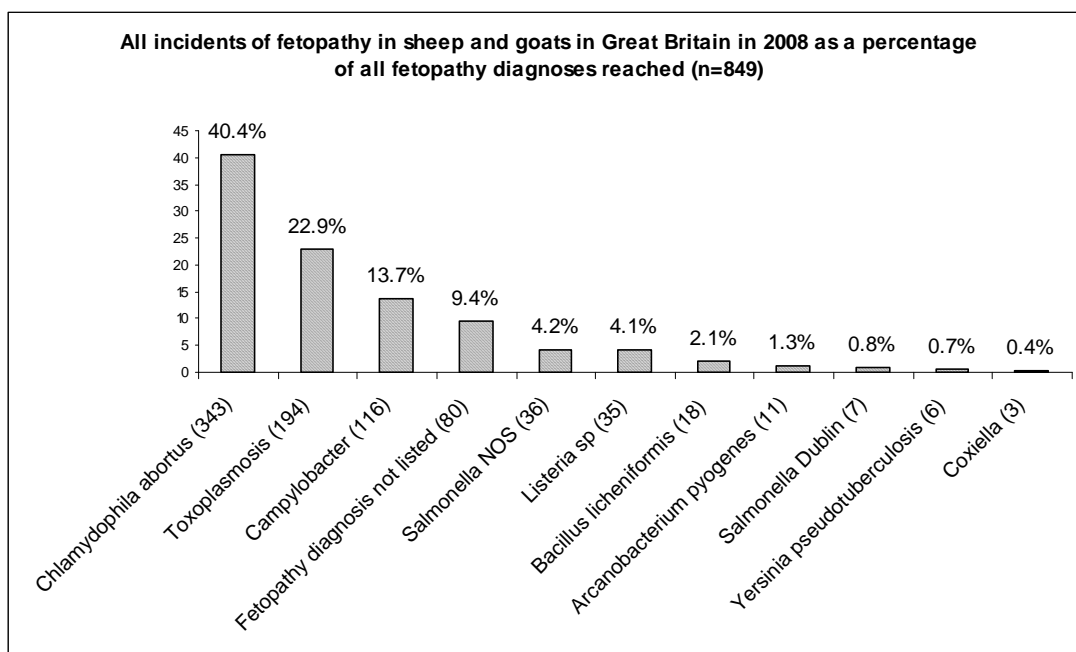
¹ Includes both domestic and wild birds ² Mammals only

Comments

The marked increase in the number of diagnoses of fasciolosis (a very minor zoonosis) has been commented on previously (Q3) and relates mainly to heavy summer and autumn rainfall in endemic areas. There was also an increase in diagnoses of *Brachospira pilosicoli* – another minor zoonosis, mainly affecting immuno-compromised individuals. This appeared to reflect the increased occurrence of dysentery outbreaks in pigs in East Anglia and

an increased awareness in the region. Reductions in some disease categories generally reflected a decline in submissions rather than a change in the proportion of diagnoses reached. Further information on scanning surveillance diagnoses and trends for endemic diseases is available: an A to Z of animal diseases is available at http://www.defra.gov.uk/animalh/diseases/vetsurveillance/az_index.htm#v

1.2 Sheep and goat abortions 2008: in view of the large number of potentially zoonotic infections involved in abortions in these species, additional information (mainly from the first quarter of 2008) is shown separately below; comments on fetopathy incidents encountered specifically in the last quarter are provided in Section 1.3.



1.3 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 October to December 2008 (See previous reports for Q1, 2 & 3 returns). 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 and the monthly surveillance reports in the Veterinary Record derived from the VLA's Emerging Diseases and Welfare programme.

Cattle

Fasciolosis was diagnosed frequently; **cryptosporidiosis** was commonly seen as the cause of scour in young calves. **Listeria monocytogenes** was implicated as the cause of two abortions in a week in a dairy herd; elsewhere **Campylobacter fetus** was confirmed as the cause of abortions in two dairy heifers. **Erysipelas rhusiopathiae** was isolated from heart valve lesions of heifer that had died suddenly. **Pasteurella multocida** was isolated from the lungs of five-month-old calves with respiratory disease. **Leptospira Hardjo** was suspected serologically as the cause of late abortions in a dairy herd and an unexpectedly high number of barren cows in a beef suckler herd. **Trichophyton verrucosum** ringworm was diagnosed on a dairy farm despite vaccination. **Babesiosis** was confirmed from blood smears in a jaundiced suckler cow and in an anaemic adult suckler cow with a heavy tick burden.

Sheep and goats

Liver fluke infection was diagnosed on numerous occasions, frequently presenting as sudden deaths. *Chlamydophila abortus* was diagnosed as the cause of 40 abortions in a flock of 220 ewes. *C. fetus* and *Toxoplasma gondii* were also encountered in abortion investigations. *L. monocytogenes* was isolated in septicaemic distribution from two of six lambs that had died suddenly. *Corynebacterium pseudotuberculosis* was isolated from a retropharyngeal lymph node abscess in an adult dairy goat and caseous lymphadenitis was also noted in a ewe with extensive thoracic abscessation. *P. multocida* was isolated from a scrotal abscess in a lamb. Infection with *E. rhusiopathiae* was seen in a group of 120 lambs, of which three subsequently died. *Yersinia pseudotuberculosis* was recovered from a conjunctival swab taken from an adult pygmy goat and *Y. enterocolitica* was isolated from the gut of a diarrhoeic lamb. *Dermatophilus congolensis* was cultured from scab-like skin lesions on the ears of six-month-old lambs, ringworm (*Trichophyton verrucosum*) was confirmed in a group of lambs; orf virus (**parapox**) was demonstrated by EM in scabs on the legs of a recently purchased ram.

Pigs

Immunohistochemistry confirmed active **swine influenza** in a pre-weaned pig and a sow. High antibody titres to *Leptospira Bratislava* were detected in breeding sows. *Streptococcus suis* type 2 infection was encountered on several occasions, principally as a cause of meningitis in piglets. *E. rhusiopathiae* was isolated from vegetative heart valve lesions in two 13-week-old outdoor reared pigs. *P. multocida* was identified as a cause of pneumonia in a batch of growing pigs. *Brachyspira pilosicoli* was isolated from faecal samples of two pigs with diarrhoea and weight loss.

Birds

P. multocida caused respiratory disease in a batch of 12-week-old turkeys. *L. monocytogenes* was isolated from the spleen of a backyard chicken that had been losing weight prior to death. *E. rhusiopathiae* was isolated in pure growth from the liver of a chicken originating from a flock where approximately 1,000 of the 8,000 birds had died. **Avian tuberculosis** was diagnosed in a duck by liver histopathology and was the cause of death of a Lady Ross Touraco from a zoological collection. *Y. pseudotuberculosis* was isolated from the liver of Red crested Touraco from the same collection.

Miscellaneous other species and wildlife

Y. pseudotuberculosis was detected in two of three water buffalo with severe diarrhoea and in a six-month-old corncrake that died suddenly. *Y. enterocolitica* was cultured from faeces of an adult blackbuck with severe diarrhoea. **Fasciolosis** was identified on post-mortem examination of an adult alpaca. *Mycobacterium microti* caused typical tuberculosis-like lesions in the lungs of a two-year-old alpaca. **Cryptosporidiosis** diarrhoea was seen in two young alpaca. *Baylisascaris* eggs were found in faeces from a group of common striped skunks kept in a small zoo.

2. Specific scanning and targeted surveillance and related studies

2.1 Campylobacter

In 2008, 244 putative *Campylobacter* spp isolates from bovine and ovine abortions were submitted for confirmation and speciation within VLA. This typing was initially undertaken at Weybridge and later at VLA Winchester, following internal test reorganisation. Of the 88 bovine abortion isolates, 27 (31%) were thermophilic campylobacters (largely *C. jejuni* or *C. coli*) compared with 18% in 2007. Of the 156 ovine abortion samples, 32 (21%) were thermophilic campylobacters (11% in 2007). Two goat isolates were thermophilic campylobacters. The remaining isolates associated with bovine and ovine abortions were predominately *C. fetus*. *C. jejuni/coli* isolates were also identified from various other host species, including a great bustard and a rhea with enteritis but their role in the etiology of the disease was unclear.

Work carried out by VLA as part of the European project (CampyECnet) to investigate the role of immunity on

the epidemiology of *Campylobacter* infections, indicated that the exposure to *Campylobacter* is significantly greater than indicated by reported disease figures and that human immunity is an important factor in control and prevention (Havelaar and others 2009, Immunity to *Campylobacter*: its role in risk assessment and epidemiology. Critical Reviews in Microbiology, in press).

2.2 *Cryptosporidium*

Following successful surveys in lambs (2006) and pigs (2007), a 12 month geographically structured survey commenced in January 2008 to assess the potential zoonotic hazard and environmental burden of *Cryptosporidium* from calves up to three months old submitted to VLA for diagnostic necropsy. Additional data, including farm husbandry details and final disease diagnosis, were collected for the analysis. Of the 229 samples examined, 101 (44.1%) were positive by the fluorescent antibody test for *Cryptosporidium*, with 40% having the maximum oocyst score (2×10^6). Of 18 isolates sequenced so far, 17 were *C. parvum* and one was *C. bovis*.

2.3 *E. coli*

A survey was operated by VLA between May 2005 and June 2008 to enhance surveillance of *E. coli* from diagnostic submissions to RLs and detect new and emerging strains of potential zoonotic importance, and those associated with disease in animals. A total of 613 isolates from endemic diseases submissions from cattle, 232 from pigs, 122 from sheep and 12 from goats were examined during the study. Overall, 38 (3.9%) of the 979 isolates were VT+, 53 (5.4%) were eae positive and 19 (1.9%) were both VT and eae positive. Further analyses are underway.

2.4 *Giardia*

Although more common in the human population of England and Wales than cryptosporidiosis, human giardiasis has received little public health attention. Case control studies in the UK have identified contact with animals, contact with recreational fresh water, consumption of tap water and travel to developing countries as risk factors. In a collaborative study with the HPA, Microbiology labs and the University of Liverpool, VLA Preston collected about 650 samples from farm animals during a 12 month period to compare genetic types in animal and human faecal specimens in the North West of England. Detailed results are not yet available but preliminary findings suggest a high prevalence of giardia in the samples.

2.5 Hepatitis E

The VLA is participating in several hepatitis E virus (HEV) initiatives, including a three year European FP7 project (VITAL) which aims to sample various points in the production chain from farm to retail outlets and a Med-Vet-Net/Royal Vet College (London) collaboration looking at HEV excretion prevalence in UK pigs. The prevalence of HEV in pigs in England was further characterised by RT-PCR on faecal samples in 2008. Two studies (each of 10 farms) indicated that 21.5% of pigs in N. Yorkshire/Humberside and 12.3 % of pigs in East Anglia were excreting HEV in faeces. The significance of this regional difference is being investigated, but the inclusion of two outdoor herds (interestingly, the only herds amongst the two studies to have no positive samples) in the East Anglia study may have skewed the figures. These studies have also shown that whilst the highest prevalence of excretion was amongst growing pigs, more than 5% of fat pigs and adult sows were excreting virus: the former being of potential relevance for foodborne transmission, and the latter suggestive of virus persistence or re-infection. Slurry stores were sampled at 17 of the farms, 10 of these (64.7%) were positive for HEV, many with high copy numbers of viral RNA. Attempts to demonstrate infectivity of HEV in these samples by in-vitro propagation are continuing. A set of 80 liver samples collected at retail outlets in SW England in 2006 and found to be negative for HEV by RT-PCR, were retested by a more sensitive PCR and one sample was shown to be positive.

References:

Banks, M., Grierson, S., Fellows, H.J., Stableforth, W., Bendall, R. & Dalton, H.R. (2007) Transmission of hepatitis E virus. *Veterinary Record* **160**, 202

McCreary, C., Martelli, F., Grierson, S., Ostanello, F., Nevel, A & Banks, M (2008) Age-related excretion of hepatitis E virus in pigs and presence in slurry stores in the UK. *Veterinary Record* **163**, 261-265

2.6 Hydatid disease

During 2008, a pilot hydatid disease control programme started in Wales targeting farm dogs in the high incidence area of South Powys. Initially, an eradication campaign had been proposed for Wales by the Welsh Assembly Government but this has now been reduced to a pilot control campaign to be followed by a review. The first results of dog sampling within the control area indicated a prevalence of around 11% of dogs sampled, which represented evidence of infection on 21% of farms sampled. The way forward over the next few years for controlling hydatid is further being investigated, including the possibility of using abattoir data as an indicator of the distribution of infection in animals within Wales.

2.7 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. Hardjobovis* in cattle) (3) Bulk milk tank antibody testing (by ELISA) of samples submitted from dairy herds for monitoring purposes. 1 and 2 are influenced by vaccination (dogs and cattle); MAT results are also very dependent on the range of serology (pools or single serovars) undertaken.

(1) A total of 667 specimens from a range of mammalian species (mainly cattle and pig fetal kidneys) were examined by RT-PCR for pathogenic leptospires during 2008. Six (1.2%) of the 497 samples suitable for testing, were positive; these comprised cattle (5) and rat (1). The five positive cattle submissions represented 1.4% of the 351 bovine samples compared with 1.5% in 2007.

2) 14,003 serum samples from a range of species were examined. Of 4269 canine sera, 43.8% and 9.7% were positive to *L. Canicola* and *L. Icterohaemorrhagiae* respectively, compared to 34.9% and 8.2% for 2007; of 4719 bovine samples examined for *L. Hardjobovis*, 29.9% were positive (37.1% in 2007); 40.8% of 708 porcine samples tested for *L. Bratislava* were positive (19.9% in 2007). Other significant serovars noted included 61 dogs positive to *L. Bratislava*, 11 positive to *L. Zanoni*, 2 positive to *L. Pomona* and 145 positive to *L. Copenhageni* and 6 horses was positive to *L. Icterohaemorrhagiae*.

3) Bulk milk antibody tests for *L. Hardjo* showed little change compared to the previous year. During 2008, 350 (30.5%) of 1146 tests undertaken for monitoring purposes were negative, 174 (15.1%) were low positive, 153 (13.4%) were mid positive and 469 (40.9%) were high positive. In 2007, the comparable figures (1764 tests) were 30.5% negative, 14.2% low positive, 13.5% mid positive and 41.9% high positive. These findings suggest a stable situation in the population sampled, with serological evidence of potentially active infection in about half of the dairy herds submitting samples. The significance of these observations is heavily influenced by vaccination status and selection bias although it is thought unlikely that fully vaccinated herds contributed many samples.

2.8 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 2008 are summarised below. These data were obtained from Defra funded projects SB4510 and SB4300.

Species	Cats	Dogs	Deer	Camelids	Pigs	Other
<i>M. avium</i>	5	4	6	1	3	2 (kangaroo, goat)
<i>M. microti</i>	23	0	0	1	1	1 (field vole)
<i>M. kansasii</i>	0	0	1	0	0	1 (bongo antelope)
Other	4 ¹	1 ²	0	1 ³	0	0

¹ *M. fortuitum* (1), *M. malmoense* (2), *M. xenopi* (1) ² *M. tuberculosis* (1), ³ unclassified mycobacterium (1)

2.9 Q fever

Q fever maintained a high profile following the 2007 human outbreak in the Cheltenham area (See 2007 Annual report) and a very large outbreak in the Netherlands during 2008. In order to improve diagnostic and surveillance capability for *Coxiella burnetii*, the VLA undertook validation of a real-time PCR and also compared three commercial ELISA kits during 2008. The VLA is also organising a proficiency testing exercise with several other European laboratories. An ongoing Q fever investigation in a large infected milking goat herd will shortly be concluded. Cotyledon samples collected during the study will be examined by the newly validated PCR.

2.10 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 2008 are shown below with data for previous years for comparison.

Year	1	2	3	4	5	7	8	9	10	12	14	15	16	22	25	31	33	1/2	UT	Totals		
2005	10	50	9	10		3	2									1	1		5	91		
2006	8	42	5	6		1	1	1		2	1	1					1	1	2	1	73	
2007	6	54	15	3		6	1	6	1			2	1					1		3	5	104
2008	8	54	5	4	1	10	6	4			1		3	1					3	15	115	

Streptococcus suis type 2 again predominated.

2.11 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 in 2008 (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 110 (49%) of 223 sera tested (from 64 separate submissions) were positive for *T. gondii* compared with 228 (44%) of 649 sera (149 submissions) in 2007. In goats, none of 4 sera (2 submissions) were positive in 2008 compared with 18 (47%) of 38 sera (10 submissions) in 2007. In alpacas, 1 of 6 sera were positive in 2008 (3 submissions). No pig sera were tested in 2008 or 2007.

2.12 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 Central Science Laboratory, York, in surveying foxes.

In 2008, a total of 11689 individual samples (from 3540 submissions) were received by VLA for testing in pools each consisting of up to three different submissions. There were 328 equine submissions, 2788 from boars/sows and 415 from farmed wild boar. Twenty six feral wild boar samples were also examined. All samples (including those from foxes) gave negative results.

3. Investigations into zoonotic and potentially zoonotic incidents

During 2008, the VLA worked closely with the HPA and other agencies in the production of draft guidelines for the joint investigation of zoonotic diseases in England and Wales. It is anticipated that these will be in operation by the middle of 2009 and will be available on the Internet.

VLA collaborated with the HPA in the investigation of a number of incidents and outbreaks during 2008; the main ones are summarised below. See also the link below for the recently introduced 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, Swansea and follow jointly agreed guidelines.

A small outbreak of cryptosporidiosis (*C. parvum*) affecting veterinary students who had handled infected calves was investigated in June (See Q2 report for details). This coincided with the publication (Gait and others, Veterinary Record 2008, **162**, 843-845) of a similar outbreak in Edinburgh.

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.

Four outbreak investigations were undertaken during 2008 (all in August and September); three were on premises open to the general public. The main findings are summarised below; further details were provided with the Q3 report. An analysis of outbreak investigations associated with open farms 1997-2007 revealed that VTEC O157 was present on 61% of 31 premises sampled, with the highest proportion of positive samples on positive premises (29%) in cattle, followed by sheep (24%); infection was also detected in a range of other species (Pritchard and others, Veterinary Record, in press)

Month	History	Main findings
August	Two dairy farms and a smallholding linked to five cases (including two babies at a nursery) of infection with VTEC O157 PT34, VT2.	VTEC O157 PT34, VT2 isolates from one of the dairy herds (mainly from young stock) had 2 PFGE profiles similar to human isolates. VNTR profiles of human and animal strains differed at a single locus. Data suggested a probable link.
August	Three cases of VTEC O157 PT21/28, VT2 in visitors to an open farm.	Strains indistinguishable from human cases by PFGE were isolated from goat, horse, and pig and alpaca faecal samples, with a very closely related isolate obtained from a donkey. VNTR showed variation affecting one repeat locus. Appropriate precautions adopted to reduce hazards in main risk areas.
September	Three cases of VTEC O157 PT21/28, VT2 with circumstantial links to an open farm.	VTEC O157 was not detected on the premises. This was noted as operating to good standards of compliance with recommended guidelines (HSE 2002).
September	Four cases of VTEC O157 PT21/28, VT2 linked to a farm visitor centre, including a case in a member of staff. Several secondary asymptomatic cases.	Strains indistinguishable by PFGE and VNTR were detected in human cases and a range of species including goats (predominantly), horse, pig, and donkey. Appropriate advice was given on risk management.

3.3 *Corynebacterium ulcerans*

During 2008, VLA Preston assisted local Health Protection Units (HPUs) in the investigation of potential sources of infection in three separate single cases of human disease (severe pharyngitis) associated with toxigenic *Corynebacterium ulcerans*. Pharyngeal swabs were collected from two cats and two dogs and forwarded to Cfl Colindale for culture – *C. ulcerans* was not recovered from any of the samples, and in each case the source of infection was not determined. It appears that there is little or no transmission of *C. ulcerans* between humans in these circumstances (contrasting with the contagious nature of *C. diphtheriae* infections). In one case investigated during 2008 the patient could have had recent contact with more than 100 companion animals (mostly dogs) through various activities but following extensive deliberations only the family dog was sampled. VLA is collaborating with the HPA regarding the revision of WHO manuals on the laboratory diagnosis and management of diphtheria cases (animal/veterinary aspects associated with toxigenic *C. ulcerans*). VLA is also a partner in a joint application to sequence the *C. ulcerans* genome at Liverpool University.

Reference: Hogg, R., Wessels, J., Hart, J., Efstratiou, A., De Zoysa, A., Mann, G., Allen, T. & Pritchard G. Possible zoonotic transmission of toxigenic *Corynebacterium ulcerans* from companion animals in a case of fatal diphtheria. *Veterinary Record* (In press)

3.4 Leptospirosis (Weil's disease)

In November 2008, the VLA assisted the local HPU with the investigation of a case of confirmed Weil's disease in a young woman associated with adoption of a feral rat. Pathogenic leptospire, consistent with *Leptospira interrogans* serogroup icterohaemorrhagiae were detected by real-time PCR in kidney tissue from the rat (Strugnell and others 2009, *Veterinary Record* **164**, 186). A similar case was reported in 2008 by Gaudie and others (*Veterinary Record*, **163**, 599-601). These incidents demonstrate an area of potential zoonotic concern.

3.5 Chlamydiosis

Support was given to the HPA outbreak control team investigating nine confirmed cases of chlamydiosis in poultry slaughterhouse workers (commencing in May 2008); there were five more suspected cases in November amongst temporary foreign workers recruited for the Christmas trade. Control measures advocated included compulsory wearing of face masks in the main risk areas. No clinical signs of disease were present in the birds. The implications under the Psittacosis order 1953 of detecting infection were evaluated by Animal Health. There are a number of well documented reports in the literature of infection with *Chlamydophila psittaci* in poultry workers, including cases in duck processing plants in Norfolk in 1979/1980.

4. Publications

Publications and posters in 2008 funded or part funded by FZ2100:

Arnold, M.E., Ellis-Iversen, J., Cook, J.C., Davies, R.H., McLaren, I.M., Kay, A.C.S & Pritchard, G.C (2008) Investigation into the effectiveness of pooled fecal samples for detection of verocytotoxin-producing *Escherichia coli* O157 in cattle. *Journal of Veterinary Diagnostic Investigation* **20**, 21-27

Bull, S., Thomas, Humphrey, T, Ellis-Iversen, J. Cook, A.J. Lovell,R. & Jorgensen F. (2008) Flock Health Indicators and *Campylobacter* spp. in Commercially Housed Broilers Reared in Great Britain. *Applied and Environmental Microbiology*, 5408-5413

Ellis-Iversen, J., Cook, A. J. C., Smith, R. P., Pritchard, G. C. & Nielen, M., 2008 Temporal patterns and risk factors for *Escherichia coli* O157 and *Campylobacter* spp. in young cattle. *Journal of Food Protection* (In press)

Ellis-Iversen, J., Pritchard, G. C., Wooldridge, M. & Nielen, M., (2009) Risk factors for *Campylobacter jejuni* and *Campylobacter coli* in young cattle on English and Welsh farms. *Prev Veterinary Medicine*, **88**, 42-48.,

Ellis-Iversen, J. & Watson, E (2008). A 7-point Plan for Control of VTEC O157, *Campylobacter jejuni/coli* and *Salmonella* serovars in young Cattle, *Cattle Practice*, **16** (2).

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