Animal & Plant Health Agency

Zoonoses and Veterinary Public Health

Quarterly report Q1 – January to March, 2022

Project FZ2100

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APHA is an Executive Agency of the Department for Environment, Food and Rural Affairs and also works on behalf of the Scottish Government, Welsh Government and Food Standards Agency to safeguard animal and plant health for the benefit of people, the environment and the economy.

Contents

Monitoring the occurrence of certain animal diseases can highlight the potential for zoonotic transmission and provide an indication of human, environmental and foodborne health risks. These FZ2100 project reports, which primarily relate to farmed animal species, summarise the surveillance activities of the Animal and Plant Health Agency (APHA) and the SRUC Veterinary Services in Scotland, for zoonoses and infections shared between man and animals in Great Britain, using data gathered by the network of Veterinary Investigation Centres (VICs). Quantitative diagnostic data for all of GB is provided by the Veterinary Investigation Diagnostic Analysis (VIDA) surveillance system. Summaries of joint veterinary/medical investigations into incidents and outbreaks of zoonotic disease and associated activities are also included. This report covers the three month period between January and March 2022.

The Zoonoses and Veterinary Public Health project (FZ2100) is funded by Defra, the Scottish Government and the Welsh Government through the APHA's Bacterial Diseases and Food Safety portfolio and also uses returns from scanning surveillance projects. Non-statutory zoonoses are defined as any zoonoses for which no specific animal-health derived legislation exists, and so excludes *Salmonella* and those diseases which are compulsorily notifiable in certain animal species, e.g. brucellosis or TB. Information concerning notifiable or reportable zoonoses is recorded elsewhere, some under specific projects such as FZ2000 (*Salmonella*). *Coxiella burnetii* (Q fever) was made reportable under amendments to the Zoonoses Order in 2021 but continues to be included in this report.

1. General scanning surveillance

1.1 Non-statutory Zoonoses VIDA data for Great Britain: January - March 2022

This table (collated 04/05/2022) summarises clinical diagnoses of non-statutory zoonoses and infections shared between animals and humans from specimens submitted to APHA and SRUC Veterinary Investigation Centres between January and March 2022 and compares the findings with the same quarter (Q1) in 2020 and 2021. 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 Veterinary Investigation Diagnostic Analysis (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). *Coxiella burnetii* (Q fever) was made reportable under amendments to the Zoonoses Order in 2021 but is still included. The table is intended only as a general guide for veterinary and public health professionals to the diagnosed occurrence of animal-associated infections in predominantly farmed animal species in GB.

1. General scanning surveillance: non-statutory zoonotic VIDA data for Great Britain January – March 2022 – all species

VIDA codes	Diagnosis	2020	2021	2022	Cattle	Sheep	Goats	Pigs	Birds [1]	Misc	Wildlife [2]
311	Babesiasis	0	0	0	0						
258 & 659	*Brachyspira pilosicoli* /intestinal spirochaetosis	6	6	7				7	0		
013	*Campylobacter* fetopathy	58	51	102	4	98	0			0	0
282	Chlamydiosis (*C. psittaci*)	0	0	1					1		
014	*Chlamydia abortus* fetopathy	180	184	107	0	106	1			0	0
732	*Corynebacterium pseudotuberculosis (CLA)*	5	2	8		3	5				
318	Cryptosporidiosis	92	124	90	84	5	0	1	0	0	0
362	Cysticercosis	0	2	0		0					
193	Dermatophilus infection	1	2	0	0	0	0		0	0	
022, 133 & 615	Erysipelas	7	3	7		0	0	3	4	0	
371, 372 & 373	Fasciolosis	72	91	59	30	26	1			0	2
363	Hydatidosis	0	0	0		0					
015, 136 & 139	Leptospirosis (all categories)	2	1	1	0	0	0	1		0	0
016, 140, 150, 189 & 711	Listeriosis (all categories)	52	90	71	15	52	4	0	0	0	0

VIDA codes	Diagnosis	2020	2021	2022	Cattle	Sheep	Goats	Pigs	Birds [1]	Misc	Wildlife [2]
217	Louping ill	1	0	1	0	1			0		
225	Orf (parapox virus)	6	6	3		3	0			0	
152,153, 157, 158	*Pasteurella multocida* pneumonia /pasteurellosis	50	44	53	32	8	0	13	0	0	0
223	Pseudocowpox (parapox virus)	0	0	0	0						
027 & 262	Q Fever/*Coxiella burnetii*	1	0	3	1	1	1			0	0
374	Red Mite *(Dermanyssus gallinae)*	0	0	1					1		
195	Ringworm	3	3	1	1	0	0	0	0	0	0
379, & 392	*Sarcoptes scabei infection*	0	2	2	0		0	1		1	
024, 171, 172 & 644	Streptococcal infection (excluding bovine mastitis)	30	51	30		6	0	24	0	0	0
745	Swine influenza	11	9	7				7			
026 & 315	Toxoplasmosis (incl. fetopathy)	76	133	98		98	0			0	0
142	Tuberculosis (excl. *M. bovis*)	10	13	0			0	0	0	0	0
034 & 154	Yersiniasis (incl. fetopathy)	14	6	6		5	1	0	0	0	0

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

[1] Includes both domestic and wild birds [2] Mammals only

Common minor diseases of zoonotic importance, such as orf and ringworm, are grossly underestimated by the VIDA recording and reporting system, as it is unusual for practising veterinary surgeons to submit material for diagnosis.

More detailed specific information on scanning surveillance diagnoses and trends for endemic diseases is available from:

http://apha.defra.gov.uk/vet-gateway/surveillance/index.htm

1.2 Highlights from APHA and SRUC disease surveillance centres

This section provides a summary of the main items of zoonotic interest from material submitted to the APHA (England and Wales) and SRUC Veterinary Services (Scotland) between January and March 2022.

Further information is provided in the quarterly reports by the APHA species groups and the monthly surveillance reports in the Vet Record derived from scanning surveillance, which can be found at:

http://apha.defra.gov.uk/vet-gateway/surveillance/reports.htm

Quarter 1 in 2022 had comparable numbers of cattle, sheep, goat, and pig diagnostic submissions made to APHA and SRUC surveillance centres when compared with diagnostic submissions for the same species for Q1 of 2020. For sheep, diagnostic submission numbers were 15% lower than Q1 2021. Goat diagnostic submissions were 27% higher than Q1 2021. The cattle diagnostic submissions, although higher than the other species, were 19% lower than Q1 2021. Pig diagnostic submissions were 10% lower than Q1 2021. Avian diagnostic submissions were 8% higher than Q1 2021 although both Q1 2022 and Q1 2021 were lower than Q1 2020.

2. Specific scanning and targeted surveillance and other studies

2.1 Campylobacter

Human campylobacteriosis is usually caused by the thermophilic *Campylobacter* species *C. jejuni* and *C. coli*, which can be found in a wide range of livestock, poultry and wildlife species. Poultry and poultry meat products are the main sources for human infection, and campylobacteriosis is the most commonly reported bacterial cause of food poisoning in the UK, with over 65,000 cases reported in 2018. This report does not cover food-borne illness related to *Campylobacter* infection.

However, non-thermophilic *Campylobacter* strains (such as *C. fetus*) can also (rarely) cause severe systemic illness in people.

Please note that only *Campylobacter* fetopathy numbers are detailed in Table 1 above.

England & Wales

A total of 89 *Campylobacter* isolates (mainly from ruminant abortion cases in England and Wales) were identified by the APHA Starcross laboratory during the period January to March 2022; of those, 84 originated from sheep and five from cattle.

The bovine isolates were one *C. fetus venerealis*, three *C. fetus fetus*, and one *C. jejuni.*

Of the 84 ovine isolates, 72 were *C. fetus fetus*, four were *C. jejuni* and eight were *C. coli.*

Scotland

SRUC Veterinary Services had a total of 131 *Campylobacter* isolates during the period January to March 2022, which were:

Bovine – There were five bovine *Campylobacter* isolates which comprised one *C. fetus venerealis intermedius,* two *C. fetus venerealis,* and two *C. jejuni.*

Ovine – There were seven ovine *Campylobacter* isolates which comprised five *C. fetus* (not typed), and two *C. jejuni.*

Canine – There were 116 canine *Campylobacter* isolates which comprised 99 *C. upsaliensis,* 15 *C. jejuni,* one *C. lari* and one non-typed *Campylobacter* sp.

Feline – There were two feline *Campylobacter* isolates, both were *C. upsaliensis*.

There was also one isolation of *C. jejuni* from a Capybara.

2.2 Leptospirosis

Targeted surveillance by APHA for leptospirosis is variously achieved by analysis of results from: (1) RT-PCR for pathogenic leptospires on appropriate diagnostic samples, 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) and; (3) Bulk milk tank antibody testing (by ELISA) of samples submitted from dairy herds for monitoring purposes. The latter two methods are influenced by vaccination (dogs and cattle); MAT results are also very dependent on the range of serology (pools or single serovars) undertaken.

1. Between January and March 2022, a total of 60 kidney specimens from 24 separate submissions (kidneys from 14 cattle, 1 sheep and 42 pigs, 1 fox, 1 Alpaca and 1 Red Panda) were examined by real-time PCR for pathogenic leptospires with only one porcine positive kidney test result. Five of the samples submitted were unsuitable for testing.
2. Between January and March 2022, a total of 670 serum samples from a range of species were examined (which were mainly canine, bovine, and porcine samples; plus a few samples from other species). Of 122 canine sera examined for *L.* Canicola and 24 for *L.* Icterohaemorrhagiae for export purposes, 3.3% and 0% were positive respectively, compared to 3.3% and 0% for the same quarter last year. Of 52 canine sera tested for diagnostic purposes, 2.1% were positive for *L.* Canicola (7.7% in Q1 2021), 15.4% for *L.* Copenhageni (11.1% in Q1 2021), 9.1% for *L.* Icterohaemorrhagiae (9.1% in Q1 2020), 6.8% for *L.* Bratislava (6.9% in Q1 2021), 5.6% for *L.* Pomona (2.9% in Q1 2021), 10.5% for *L.* Grippotyphosa (2.9% in Q1 2021), 28.1% for *L.* Australis (17.9% in Q1 2021), 4.2% for *L.* Autumnalis (0% in Q1 2021) and 0% for *L.* Sejro (0% in Q1 2021); of 353 bovine samples examined for *L.* Hardjo bovis, 9.1% were positive (10.6% in Q1 2021); from 78 samples received, there were 16.7% positive porcine samples tested for *L.* Bratislava (18.4% in Q1 2021).

3. Between January and March 2022 (Q1, 2022), 4 (36.5%) of 11 bulk milk *L.* Hardjo antibody tests undertaken for monitoring purposes were negative, 4(36.5%) were low-positive, 1(9%) was mid-positive and 2 (18%) were high positive. In 2021, figures for the same quarter (31 tests) were 29% negative, 19% low positive, 16% mid positive and 36% high positive. 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. The reason for the low number of submissions in this Quarter compared to Q1 2021 is unclear, but the low numbers make meaningful comparisons across the two Quarters difficult.

2.3 Mycobacteria (excluding *M. bovis*)

Since *Mycobacterium bovis* became notifiable in all species in 2006, the number of samples examined by APHA Weybridge has increased, particularly from pets and camelids. Samples from pigs are mainly submitted by meat inspectors. A summary of potentially zoonotic non-statutory mycobacteria identified during the calendar year will be provided in the annual (Q4) report.

2.4 Q fever

Q-fever caused by *Coxiella burnetii* has, since April 2021, become a Reportable disease due to amendments to the Zoonosis Order 1989 and as a result is technically no longer a non-statutory zoonosis. Despite this change, the FZ2100 project continues to support investigations into this disease. Private, non-APHA laboratories are now required to report

any isolations of *C. burnetii* to APHA and to submit suspicious tissues for free confirmatory PCR testing to APHA Penrith.

Diagnosis of Q fever is undertaken using PCR to confirm the presence of *Coxiella burnetii*, typically following the identification of suspicious acid-fast bodies in MZN stained smears of foetal tissues. Confirmation of Q fever as a cause of fetopathy requires histopathology and immunohistochemistry of placental tissue, in addition to a positive PCR result. In each case where a clinical diagnosis is made, public health colleagues are informed of the incident and the zoonotic potential of this organism is highlighted to the farmer and private veterinary surgeon, with the provision of an advisory sheet:

Q fever: Information for farmers

There were five Q fever PCR positive submissions in Q1 2022, two in January and three in February. These comprised two bovine submissions, two caprine submissions, and one ovine submission. The bovine submissions were in January, from two aborted cows, each from a separate dairy farm. One of these farms was in Wales, the other in South West England. The two caprine submissions, which were in February from aborted goats, were from the same farm in South West England. The single ovine submission, which was in February, was from an aborted ewe within a lowland flock in Central England.

Further information about the ovine submission, which was considered to be an unusual case, is available in section 3.4. One of the bovine submissions, one of the caprine submissions, and the ovine submission were VIDA coded as causes of abortion associated with *Coxiella burnetii* infection.

2.5 *Streptococcus suis*

Streptococcus suis isolates from diagnostic material submitted to APHA and SRUC Veterinary Investigation Centres are typed further for disease surveillance purposes. The numbers and serotypes from porcine diagnostic material submitted during the period January to March 2022 are shown below, with data for the same quarter in previous years for comparison. UT = untypeable

Year (Q1)	1	2	3	4	5	7	8	9	13	14	15	16	20	24	29	31	33	UT	Total
2020		8	3	2		7		1		4	1		2			1		2	**31**
2021	3	11	1		2	13	2		1	4		1		1			1	3	**43**
2022	5	10	2			2		1		3								5	**28**

In previous years (before 2021) *Streptococcus suis* type 2 had predominated, but in Q1 2021 *Streptococcus suis* type 7 was slightly more prevalent. In Q1 2022 *Streptococcus suis* type 2 is again most common, although there is still some spread across serotypes.

2.6 Toxoplasmosis

The European Food Safety Authority (EFSA Journal 2007, 583, 1-64) 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 APHA on sera submitted to VICs. The findings presented below provide a summary of the serological status of samples submitted for diagnosis, monitoring and screening purposes during the period January to March 2022, but do not constitute a structured survey. Positive samples, as defined here, have LAT titres of 1/64 or greater and indicate a history of exposure to this protozoan parasite. Toxoplasmosis as a cause of fetopathy in sheep and goats may also be diagnosed through antigen (PCR) testing of placental tissue, and in sheep through IFAT testing of fetal blood or body fluid.

In sheep, 162 blood samples were tested of which 66 (41%) were positive for antibodies to *T. gondii.* In goats, samples from 11 individual animals from five different holdings were tested with two positive results.

Toxoplasmosis as a cause of small ruminant abortion was confirmed on 98 occasions in sheep.

3. Investigations into zoonotic and potentially zoonotic incidents

Protocols for the investigation of zoonotic disease incidents in England and Wales are set out in the following document:

Guidelines for the Investigation of Zoonotic Disease (England and Wales)

There is similar guidance on the investigation and management of zoonotic disease in Scotland:

http://www.hps.scot.nhs.uk/resourcedocument.aspx?id=1190

Advice for members of the public planning a trip to animal-associated visitor attractions and other information can be found on the PHE Zoonoses Webpages.

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 UKHSA/PHW (CsPHM of PHS in Scotland) and in collaboration with the National Cryptosporidium Reference Unit, Swansea, and follow jointly agreed guidelines.

No investigations into Cryptosporidiosis outbreaks were conducted in the first Quarter of 2022.

3.2 STEC

Shiga toxin-producing *E. coli* (STEC, formerly known as VTEC) outbreak investigations are undertaken, according to agreed guidelines, at the request of CsCDC of UKHSA/PHW (CsPHM of PHS in Scotland) where an animal-associated source is suspected. These investigations often also involve collaboration with other organisations, including the Environmental Health Departments of Local Authorities and the Health and Safety Executive. Determination of phage type (PT), shiga toxin (ST) type, and comparison of human and animal isolates by whole genome sequencing (WGS) analysis are performed by the Gastrointestinal Bacteria Reference Unit (GBRU), UKHSA Colindale. If isolates from animals circumstantially implicated in outbreaks have an indistinguishable WGS profile to those from human cases, this is taken as confirmatory evidence of a causal association. Other STEC (VTEC) PTs or WGS types may be detected incidentally during the investigation of animal premises.

No investigations into STEC outbreaks were conducted in the first Quarter of 2022.

3.3 *Corynebacterium ulcerans*

Corynebacterium ulcerans was first isolated from cases of throat infection in humans in 1926, with zoonotic outbreaks initially associated with direct contact with farm animals or consumption of unpasteurised milk. The organism can produce diphtheria toxin which is capable of producing human disease with the same clinical signs as cutaneous or respiratory diphtheria caused by *C. diphtheriae*. More recently, *C. ulcerans* has been isolated from the oral cavity of domestic pets such as dogs and cats, and current zoonotic outbreaks are investigated by APHA and SRUC Veterinary Services in Scotland by throat swabbing of in-contact companion animals.

There were four *Corynebacterium ulcerans* incidents within Quarter 1, 2022 compared to nil incidents in the same Quarter last year: this would appear to be in keeping with the general trend of increasing numbers of such incidents throughout the latter part of 2021. This increase has prompted UKHSA (formerly Public Health England) to establish a national incident for diphtheria. This aims to combine the response to the increases seen

in toxigenic *C. ulcerans* cases across England as well as responses to community transmission of *C. diphtheriae*. There will be several workstreams within the incident and there is recognition that it might take some time to address all the key issues fully. Some of the main issues to be addressed include NHS laboratory diagnostics, clinical patient management and use of antitoxin, understanding the risk factors for animal to human transmission, a seroprevalence study, carriage study, publication of revised national diphtheria guidance, and awareness raising for health professions.

In three out of the four incidents the index case was of human *C. ulcerans* infection associated with chronic leg skin ulcers or non-healing surgical wounds on two occasions and in one case a throat pseudomembrane. All three cases had domestic pets within the household that were initially identified as the likely source of the infection. APHA was invited in all cases to join the UKHSA Incident Management Team (IMT) meetings to provide veterinary input around swabbing of the household pets and liaising with private veterinary surgeons responsible for the pets in question about the swabbing process and any subsequent treatments. In one incident out of the three a positive *C. ulcerans* isolation was made at APHA Starcross from one of a pair of household dogs and advice was given to treat both of the dogs and to collect post-treatment swabs to confirm clearance. In the fourth incident the index case was a dog with *C. ulcerans* isolated from an infected post-surgical skin wound with human contacts receiving vaccination and antimicrobial treatments as directed by UKHSA. A post-treatment throat swab from the index dog was negative for the organism.

3.4 Q fever *(Coxiella burnetii)*

Comparisons of Q-fever data in quarter 1 of previous years should be made with caution because from April 2021 Q fever has been a Reportable disease. This means that there is likely to have been increased surveillance for Q fever following April 2021.

As stated in section 2.4 there were five Q fever PCR positive submissions from ruminant abortions in Q1 2022 which comprised two bovine submissions, two caprine submissions and one ovine submission. There were no concerns regarding human illness with any of these submissions. Further information on the ovine submission investigated by APHA is included below:

Four abortions had occurred in a group of 130 ewes over a ten-day period on a farm in Central England. These sheep were vaccinated against enzootic abortion (which is caused by *Chlamydia abortus*). Foetal and placental tissues from one of the aborted ewes was submitted to APHA Shrewsbury for investigation. Gross post-mortem examination of the placenta revealed dark red cotyledons and dark red intercotyledonary areas with no obvious exudate or thickening. There was no indication of *C. abortus* placentitis. On Modified Ziehl Neelsen (MZN) staining the placental tissue showed acid fast organisms which were suspicious of *C. burnetii* and this was confirmed by the detection of *C. burnetii* on PCR testing. Histopathological examination of the placenta revealed suppurative inflammation with intra-trophoblastic bacteria. These changes were consistent with

placentitis due to *C. burnetii*. The foetuses and placentae from the other three aborted ewes were not investigated. Different causes of abortion (affecting different ewes) can be present in one flock. In our experience at APHA *C. burnetii* is sporadically identified rather than causing flock outbreaks of abortion. The greatest risks of potential zoonotic infection from *C. burnetii* is considered to be when livestock housing is cleaned out as dust can be a source of infection via inhalation; thus it was advised that cleaning was done on still rather than windy days, and if possible the bedding should be dampened before this was undertaken.