Animal &
Plant Health
Agency

Zoonoses and Veterinary Public Health

Quarterly report Q2 – April to June 2023

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 Scotland's Rural College (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. Quantitative diagnostic data for all of Great Britain 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 relevant data for Quarter 2 (April to June 2023).

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. TB. Information concerning notifiable or reportable zoonoses is recorded elsewhere, some under specific projects such as FZ2000 (*Salmonella*). *Coxiella burnetii* (Q fever), avian chlamydiosis (in psittacines) and brucellosis in dogs were made reportable in Great Britain through amendments to the Zoonoses Order in 2021 and are included in this report.

1. General scanning surveillance

1.1 Zoonoses VIDA data for Great Britain: April to June 2023

Table 1 (collated 31 July 2023) summarises clinical diagnoses of zoonoses and infections shared between animals and humans from specimens submitted to APHA, APHA partner post mortem providers and SRUC Veterinary Investigation Centres for the three-month period between April and June 2023 and compares the findings with the data for the same quarter in 2022 and 2021. It includes rare zoonotic infections and those for which zoonotic potential is confined predominantly to immunocompromised 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 and most reportable diseases (notably salmonellosis, which is recorded elsewhere).

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.

Table 1. General scanning surveillance: Zoonoses VIDA data for Great Britain, April to June 2023 – all species

Table notes:

- '-' in a cell indicates that a diagnosis is not available for that species
- birds: data for birds includes domestic and wild birds
- wildlife: data for wildlife includes mammals only

VIDA codes	Diagnosis	2021	2022	2023	Cattle	Sheep	Goats	Pigs	Birds	Misc.	Wildlife
311	Babesiasis	11	8	10	10	-	-	-	-	-	-
258 & 659	*Brachyspira pilosicoli* /intestinal spirochaetosis	13	14	11	-	-	-	11	0	-	-
013	*Campylobacter* fetopathy	9	6	17	1	16	0	-	-	0	0
282	Chlamydiosis (*C. psittaci*)	0	1	0	-	-	-	-	0	-	-
014	*Chlamydia abortus* fetopathy	29	28	32	0	32	0	-	-	0	0
732	*Corynebacterium pseudotuberculosis (CLA)*	3	9	4	-	2	2	-	-	-	-
318	Cryptosporidiosis	113	70	79	63	16	0	0	0	0	0
362	Cysticercosis	1	1	0	-	0	-	-	-	-	-
193	Dermatophilus infection	0	1	2	0	2	0	-	0	0	-
022, 133 & 615	Erysipelas	2	5	2	-	0	0	2	0	0	-
371, 372 & 373	Fasciolosis	61	31	38	25	8	2	-	-	3	0
363	Hydatidosis	0	0	0	-	0	-	-	-	-	-
015, 136 & 139	Leptospirosis (all categories)	0	1	3	2	0	0	0	-	0	1

VIDA codes	Diagnosis	2021	2022	2023	Cattle	Sheep	Goats	Pigs	Birds	Misc.	Wildlife
016, 140, 150, 189 & 711	Listeriosis (all categories)	54	26	35	9	24	2	0	0	0	0
217	Louping ill	7	13	7	2	4	-	-	1	-	-
225	Orf (parapox virus)	10	7	8	-	8	0	-	-	0	-
152,153, 157, 158	*Pasteurella multocida* pneumonia /pasteurellosis	67	44	71	46	24	0	1	0	0	0
223	Pseudocowpox (parapox virus)	0	0	0	0	-	-	-	-	-	-
027 & 262	Q Fever/*Coxiella burnetii*	1	0	3	3	0	0	-	-	0	0
374	Red Mite *(Dermanyssus gallinae)*	3	0	2	-	-	-	-	2	-	-
195	Ringworm	0	0	2	2	0	0	0	0	0	0
379, & 392	*Sarcoptes scabei infection*	1	0	0	0	-	0	0	-	0	-
024, 171, 172 & 644	Streptococcal infection (excluding bovine mastitis)	45	25	22	-	1	0	19	1	1	0
745	Swine influenza	24	8	7	-	-	-	7	-	-	-
026 & 315	Toxoplasmosis (incl. fetopathy)	21	24	56	-	56	0	-	-	0	0
142	Tuberculosis (excl. bovine *M. bovis*)	6	3	3	-	-	0	0	0	2	1
034 & 154	Yersiniasis (incl. fetopathy)	4	3	3	-	0	0	2	0	1	0

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 information on a few noteworthy cases of zoonotic interest from material submitted to the APHA (England and Wales), APHA partner post mortem providers and SRUC Veterinary Services (Scotland) between April and June 2023.

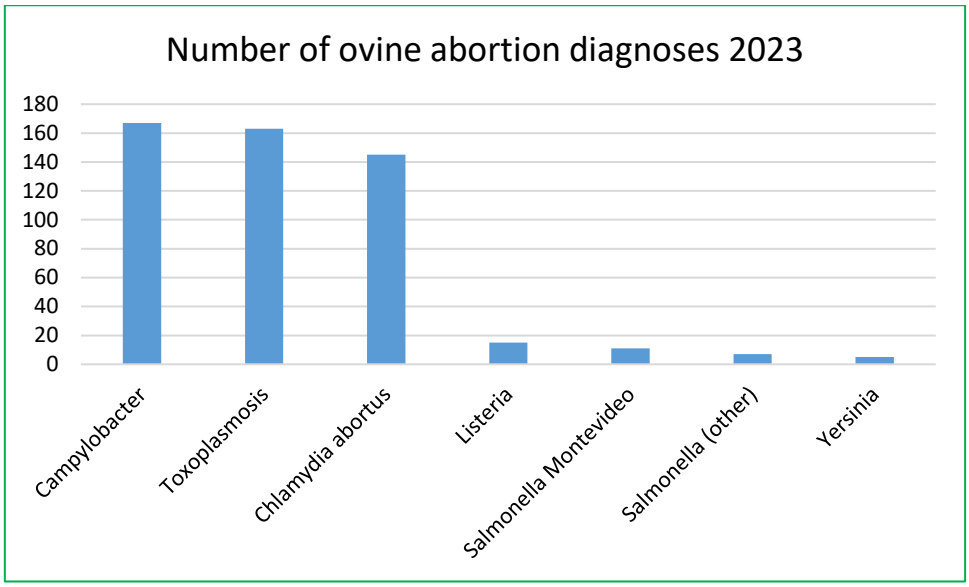
Further information is provided in the quarterly reports by the APHA species groups and the monthly surveillance reports in the Vet Record derived from scanning surveillance. The reports are available on the APHA VET Gateway website.

Update of January to June 2023 ovine abortion diagnoses

Ovine abortion investigations for the 2023 lambing season were performed by APHA, APHA partner post mortem providers and SRUC between January and June 2023, with February and March being the busiest months. Veterinary Investigation Officers (VIOs) provide zoonoses advice to private veterinary surgeons to pass on to their farm clients when potentially zoonotic organisms are identified. Potentially zoonotic organisms that may be detected during ovine abortion investigations include *Chlamydia abortus*, *Toxoplasma gondii*, *Campylobacter* sp., *Listeria* sp., *Salmonella* sp., *Yersinia* sp. and *Coxiella burnetii.* Figure 1 comprises a chart which includes the most common ovine abortion diagnoses for 2023.

Figure 1: Number of ovine abortion diagnoses January to June 2023

- The data was analysed for the period January to June 2023
- The majority of the investigations took place in February to April inclusive
- The most common causes of ovine abortion are listed



For the 2023 lambing season, illustrated in the above chart, there were abortion diagnoses as follows: 167 *Campylobacter* sp., 163 Toxoplasmosis, 145 *Chlamydia abortus* (ovine enzootic abortion), 15 *Listeria* sp., 11 *Salmonella* Montevideo, 7 other *Salmonella* sp. and 5 *Yersinia* sp.

The three commonest causes of ovine abortion in Great Britain are *C. abortus*, *Toxoplasma gondii*, and *Campylobacter* sp. (usually *C. fetus fetus* or *C. jejuni*). Usually we find *C. abortus* and *T. gondii* are the most common causes of ovine abortion followed by *Campylobacter*. This year there have been more *Campylobacter* abortion diagnoses. Vaccines are available for *C. abortus* and Toxoplasmosis.

Advice on the risks of infections that can be transmitted via contact between pregnant women and parturient or post-parturient animals is provided on the GOV.UK website: Pregnancy: advice on contact with animals that are giving birth. Public Health Wales have issued similar guidance: Advice issued to pregnant women during lambing season - Public Health Wales (nhs.wales)

Update: Unusual presentation and detection of a protoparvovirus in a lamb

This is an update following the previous report of an unusual presentation of a human-like Tusavirus (protoparvovirus) in a six-month-old lamb which had died from pneumonia, but which also had skin lesions affecting the lips (Zoonoses and Veterinary Public Health Quarterly Report, January to March 2023).

Testing of faeces, small intestinal content, liver, kidney, and lung from this lamb using a PCR developed by APHA (following initial sequencing) resulted in the detection of this protoparvovirus in all of these samples, indicating systemic infection. Further faecal sampling on farm of lambs in the same management group revealed positive protoparvovirus PCR results in 3/10 animals, indicating wider circulation in the flock.

Following this, additional surveillance work was done to establish if this protoparvovirus was present in sheep in a few other flocks in Great Britain. Of nine submissions three

submissions (from different geographical locations) had tissues that were positive for the protoparvovirus (Ovine Tusavirus). Further work is required to determine what pathological effects are caused by this virus in sheep and further epidemiological studies will be required to determine zoonotic or zooanthroponotic potential.

Update: Colisepticaemia in (non-neonatal) older dairy calves

Following the report about unusual cases of *Escherichia coli* septicaemia in older calves in the annual 2022 Zoonoses and Veterinary Public Health Report further investigations have been ongoing.

Summarising, during 2022 colisepticaemia was diagnosed in two to four-month-old dairy-bred calves. The clinical signs included acute malaise, recumbency and respiratory signs. Cases were identified in seven herds in England and Wales, and colleagues in SRUC had identified similar outbreaks in dairy-bred calves on several farms. Most cases were in weaned calves, and there was no consistent evidence of other diseases involved. The *E. coli* isolates from some of the cases have undergone whole genome sequencing and the results of this are currently being analysed. Initial results confirm that these calf isolates are not the O strains which have caused human outbreaks in recent years. Thus they are not O157, O26, O103, and O145 strains. The Cattle Expert Group report that the sequence data of the isolates will be analysed and characterised further.

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. The United Kingdom Food Security Report 2021 indicated that there were 54,979 laboratory-confirmed infections in 2020, 68,006 in 2019, and 67,984 in 2018. Note, there may have been an impact of the COVID-19 pandemic on the 2020 figures.

This Zoonoses and Veterinary Public Health report does not cover foodborne 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

In Q2 2023 there were a total of 11 *Campylobacter* isolates identified by the APHA Starcross laboratory, which were mainly from ruminant abortions and comprised:

- Bovine – 1 isolate which was *C. fetus venerealis intermedius*
- Ovine – a total of 10 isolates, all *C. fetus fetus*

Scotland

SRUC Veterinary Services had a total of 73 *Campylobacter* isolates during Q2 2023 which were:

- Bovine – there were no *Campylobacter* isolates
- Ovine – a total of 6 isolates: all were *C. fetus* not-typed
- Canine – a total of 63 isolates: 45 *C. upsaliensis,* 15 *C. jejuni,* 1 *C. coli,* and 2 non-typed *Campylobacter* sp.
- Feline – a total of 4 isolates: 3 *C. upsaliensis* and 1 *C. jejuni*

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.

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 (enzyme-linked immunosorbent assay) 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 April and June 2023, a total of 60 kidney specimens (kidneys from 10 cattle, 43 pigs, 1 deer, 3 wild boar and 3 foxes) were examined by real-time PCR for pathogenic leptospires. There was 1 positive kidney test result for a fox. 2 of the submitted samples (1 cattle sample and 1 pig sample) were unsuitable for testing (these were too autolysed).

2. In Q2 2023, a total of 513 serum samples from a range of species were tested for *Leptospira* antibodies. A summary of the serology findings for dogs, pigs, and cattle is provided in Table 2. 97 canine sera were tested for export purposes and 33 for

diagnostic purposes. 88 porcine samples were tested for *L*. Bratislava; 265 bovine samples were tested for *L*. Hardjo bovis.

Table 2. Single *Leptospira* serovars tested in dogs, pigs, and cattle – expressed as percentage positive for the number of samples tested for each serovar

Table notes:

- for each year, Q2 is the period from April to June
- more than one serovar may be detected in a serum sample
- abbreviations used in this table:
    - Canine E. = canine export (dogs tested for export purposes)
    - Canine D. = canine diagnostic (dogs tested for diagnostic purposes)
- the total tested columns are the numbers of samples tested for each serovar
- the % positive is the percentage of each tested serovar which gave a positive result, for example 14.4% of 97 canine export samples tested were positive for *L.* canicola antibodies

Species	Serovar	Total tested: Q2 2023	% Positive	Total tested: Q2 2022	% Positive
Canine E.	*L.* Canicola	97	14.4	132	5.3
Canine E.	*L.* Icterohaemorrhagiae	6	16.7	6	0
Canine D.	*L.* Australis	6	100	14	71.4
Canine D.	*L.* Autumnalis	6	0	14	7.1
Canine D.	*L.* Bratislava	33	6.1	40	17.5
Canine D.	*L.* Canicola	26	30.8	35	20
Canine D.	*L.* Copenhagenii	29	27.6	39	46.2
Canine D.	*L.* Grippotyphosa	1	0	10	40
Canine D.	*L.* Icterohaemorrhagiae	31	0	36	19.4
Canine D.	*L.* Pomona	1	0	9	11.1
Canine D.	*L.* Sejroe	1	100	6	66.7
Porcine	*L.* Bratislava	88	19.3	17	0
Bovine	*L.* Hardjo bovis	265	9.4	185	7.6

In addition to single serovars, Leptospira pools (multiple serovars) are tested on a significant number of canine, porcine, and bovine samples. Pooled serovars are not included in the above data.

3. Between April and June 2023 there were 8 bulk *L.* Hardjo antibody milk tests (for monitoring purposes) which gave the following results: 3 (37.5%) were negative, 0 (0%) were low positive, 1 (12.5%) was mid positive and 4 (50%) were high positive.

   For comparison, between April and June 2022 there were 13 bulk *L.* Hardjo antibody milk tests (for monitoring purposes) which gave the following results: 2 (15.5%) were negative, 2 (15.5%) were low positive, and 9 (69%) were 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. Low submission numbers also make comparisons across the two years difficult.

2.3 Mycobacteria (excluding bovine cases of *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 Official Veterinarians at abattoirs.

Our testing protocol has changed, and since 30 March 2022 all new submissions from non-bovine animals have been tested by PCR which detects the *M. tuberculosis* complex and *M. bovis*. If positive for the *M. tuberculosis* complex and *M. bovis*, the sample is sent for culture to harvest growth to establish the whole genome sequencing (WGS) clade of *M. bovis*.

If positive for the *M. tuberculosis* complex and negative for *M. bovis*, an unvalidated PCR for *M. microti* is carried out. If the PCR is positive for *M. microti*, there is no further testing. If the PCR for *M. microti* is negative, culture is carried out to establish the Mycobacterium present (possibilities include other members of the *M. tuberculosis* complex such as *M. tuberculosis* or *M. caprae*).

This means that we will not be receiving results for as wide a range of *Mycobacterium* sp. as previously. A summary of potentially zoonotic non-statutory mycobacteria identified during the calendar year will be provided in the annual (Q4) report.

An update of interesting cases will be provided in the next Zoonoses and Veterinary Public Health Quarterly Report.

2.4 Q fever

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 placentae (or foetal samples). 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 when *C. burnetii* is detected by PCR, 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

Comparisons of Q-fever data in quarter 2 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.

During the period April and June 2023 a total of 22 samples (from 18 submissions) were tested for the presence of *Coxiella burnetii* by PCR at the APHA Q fever National Reference Laboratory, Penrith Veterinary Investigation Centre. The samples comprised 11 placental samples, 6 foetal fluid samples, 2 foetal stomach contents samples, 2 spleen samples, and a cervical swab. The *C. burnetii* PCR has been validated for placental and foetal fluid samples, although other samples are also tested.

These samples were from 16 cattle, 1 sheep, and 1 goat submissions. 7 samples tested positive for *C. burnetii* (5 cattle samples from 5 farms, 0 sheep samples and 2 goat samples from 1 farm). In addition, the detection of *C. burnetii* in 21 bovine bulk milk samples by PCR at an overseas laboratory (18 from English dairy farms, 3 from Welsh dairy farms) were reported to APHA. Further information about the positive submissions is provided in section 3.4.

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 submission numbers and serotypes from porcine diagnostic material submitted during the period April and June 2023 are shown below, with data for the previous two years (Q2 2022 and Q2 2021) for comparison.

Table 3. *Streptococcus suis* serotypes from porcine diagnostic material

Table note:

- UT = untypeable

	1	2	3	4	6	7	8	9	10	13	14	19	24	33	34	UT	Total
Q2 2021	3	11	3	2	-	5	1	3	1	1	4	-	-	-	1	3	**38**
Q2 2022	6	8	-	1	-	2	1	-	-	-	-	-	-	-	-	-	**18**
Q2 2023	1	10	1	1	2	2	2	-	-	-	1	-	-	-	-	2	**22**

Serotype 2 was the most common serotype in Q2 for all three years (2021 to 2023).

APHA also assisted a public health investigation whereby a butcher had fallen ill and was hospitalized with bacterial meningitis. *Streptococcus suis* infection was confirmed. APHA assisted the multidisciplinary Incident Management Team with the provision of both species (pig) expert and zoonoses advice. Testing of the human *Streptococcus suis* isolate at our APHA Starcross bacteriology laboratory confirmed Serotype 2.

In Great Britain *S. suis* colonisation is widespread in pigs and reduction/elimination of *S. suis* infection from any potentially infected pigs associated with this case was not a realistic proposal and would not address the fact that any alternative sources of pig carcases may pose a similar risk. Even if the same serotype was identified in pigs as in the person, different strains can be represented in one serotype.

Advice to reduce the risk of zoonotic infection included a review of butchery hygiene and working practices. Simple preventive measures include wearing gloves during processing pig meat or slaughtering and hand washing after handling raw pork meat. Proper cooking of any pork/pork product eaten is also important. The Food Standards Agency advise that pork and pork products should be thoroughly cooked until all the juices run clear as this will eliminate any *S. suis* found in the meat.

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 April to June 2023, 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 foetal blood or body fluid.

During the period April and June 2023 there were no ovine samples and no caprine samples submitted for Toxoplasma serology. Toxoplasma fetopathy figures for sheep and goats are provided in Table 1.

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: Guidelines on the roles and responsibilities of agencies involved in the Investigation and Management of Zoonotic Disease in Scotland

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

The Industry Code of Practice for preventing or controlling ill health from animal contact at visitor attractions (published by Access to Farms) is available on the National Farm Attractions Network website.

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 the UK Health Security Agency (UKHSA) and Public Health Wales (PHW) and in collaboration with the National Cryptosporidium Reference Unit, Swansea, and follow jointly agreed guidelines.

Consultant(s) in Public Health Medicine (CsPHM) lead on these zoonoses investigations in Scotland).

Quarter 2 is traditionally the busiest time for cryptosporidiosis investigations and is related to the frequency of open farm visits undertaken by families or school groups around the Easter holiday and May Bank Holidays. Contact with young lambs either through bottle-feeding or handling is the major risk factor for the zoonotic spread of *Cryptosporidium parvum* in these settings. The availability of appropriate hand-washing facilities including

soap, rather than antimicrobial gel (which is not effective for this pathogen) is extremely important.

During April to June 2023 APHA assisted with the public health investigation of seven *C. parvum* zoonotic outbreaks (five in England and two in Wales). One of the outbreaks was an incident of cryptosporidiosis linked to a milk vending machine which was commented on in the Q1 2023 Zoonoses and Veterinary Public Health Report. Of the other human *C. parvum* outbreaks three were linked to open farms, two to commercial farms (one of these had diversified into an open farm), and one to a farm shop premises which had animals on site.

Animal sampling (involving the collection of freshly voided faeces samples by APHA) and testing was undertaken in two outbreaks where it was appropriate to do sampling. Testing involved collaborative work with initial testing at APHA followed by genotyping at the Cryptosporidium Reference Unit, Swansea. For the on-farm vending machine investigation 32 cattle samples were collected. *C. parvum* DNA was detected in 4 calf and 2 cow samples. The same gp60 and MLVA profiles as the human outbreak strain were confirmed in 2 calf samples but amplification was too weak to confirm the others.

In the second outbreak with sampling (an open farm) 30 faeces samples were taken, 10 from calf pens, 10 from lamb pens and 10 from piglet pens. Some non-zoonotic cryptosporidium species were detected in the cattle and pig samples. 6 lamb samples were PCR positive with 3 confirmed as *C. parvum* of the same gp60 subtype and MLVA profile as the human cases.

An advisory visit by APHA was made to a premises which had held a lamb feeding public event in April. The Incident Management Team had established an epidemiological link of the cases of human cryptosporidiosis to visits and handling of animals on the farm, however the lambs were no longer present for sampling. The only animals remaining on site at the time of the visit were a small number of goats enclosed in one pen as they had been during the risk period. People were not allowed to enter this pen during visits, but the pen had open sides onto the main walkway through the animal site.

No faecal samples had been taken from any of the animals present during the risk period, predominantly lambs. The goats were not sampled at the advisory visit given the time scale and low risk of contact. The greatest risk factor for infection was the bottle-feeding of lambs, with visitors allowed to enter the pen containing the lambs and the fact that the visitors held the lambs during their bottle-feeding. Advice was given regarding adherence to the Industry Code of Practice regarding bottle-feeding of lambs, the siting of further supervised hand washing facilities, and the use of a one-way system of visitor movement which would ensure availability of the hand washing facilities between the lamb handling area and the other site attractions and picnic areas.

3.2 STEC

Shiga toxin-producing *Escherichia coli* (STEC, formerly known as VTEC) outbreak investigations are undertaken, according to agreed guidelines, at the request of CsCDC of UKHSA and PHW (CsPHM 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 PTs or WGS types may be detected incidentally during the investigation of animal premises.

No investigations into STEC outbreaks were conducted in the second quarter of 2023.

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 arranging throat swabbing of in-contact companion animals.

The guidance for the public health management of toxigenic *C. ulcerans* in companion animals in England is now available online: Public health management of toxigenic C. ulcerans in companion animals

During Q2 2023 APHA was involved with assisting the UKHSA Incident Management Teams with four toxigenic *Corynebacterium ulcerans* incidents, which comprised one human index case and three animal index cases.

These investigations are multidisciplinary and APHA works closely with public health colleagues to investigate, manage, and provide advice regarding the animals involved. Typically APHA will also liaise closely with the private veterinary surgeon to facilitate surveillance swabs, treatment and post treatment clearance swabs as appropriate. APHA also provides advice on health and safety procedures for private veterinary surgeons and pet owners including information on cleaning of pet bedding and pet toys. Comprehensive information is available in the companion animal public health guidance.

During Q2 APHA also continued to provide support for an in-contact positive dog (human index case from Q1) that had re-tested positive for toxigenic *C. ulcerans* following a course of antibiotics. The dog eventually gave a negative clearance swab result however further advice was provided as the dog was on long-term treatment for atopic dermatitis. It was unknown if the dog would become reinfected as the dermatitis treatment was immunomodulatory. The human index case was reported to have recovered.

The human index case which presented in Q2 2023 had chronic skin lesions. There was an elderly cat in the household that was not amenable to swabbing.

The three animal index cases which presented in Q2 2023 comprised two cats and a dog; all three pets were from different households. Toxigenic *C. ulcerans* was detected in an ear swab from the dog. It and the other close contact dog in the household were treated with antibiotics and both were negative for *C. ulcerans* on clearance swabbing.

One of the cat cases is complex and ongoing as the cat has chronic inflammatory ear polyps requiring staged surgeries. Toxigenic *C. ulcerans* was detected in cultures from an ear swab. The cat is receiving antibiotic treatment and an update will be provided in the next Zoonoses and Veterinary Public Health Quarterly Report.

The other feline animal index case involved an entire male stray cat which had a neck lesion. The cat was admitted to an animal charity and received veterinary attention, including wound debridement and castration. Apart from the neck lesion, the cat was clinically well and tested negative for both Feline Leukaemia Virus and Feline Immunodeficiency Virus. At the charity the cat was isolated and barrier nursed, and then was temporarily fostered.

Suspect *C. ulcerans* was detected by a private veterinary laboratory from microbiological culture of a swab of the neck lesion. The swab was taken following wound debridement. The isolate was confirmed as toxigenic via the UKHSA Respiratory and Vaccine Preventable Bacteria Reference Unit.

Despite antibiotic and supportive treatments, the neck lesion did not improve and the decision was made to euthanise the cat. Follow-up of this case identified there were two dogs in the foster household, although the cat had been kept apart from the dogs. The cat had free access to the house when the dogs were not present.

On guidance of APHA, oropharyngeal swabs of both dogs were taken by the private vet and sent to the APHA Starcross laboratory for bacteriological testing. Toxigenic *C. ulcerans* was isolated from one of the dogs. Both were treated with a course of spiramycin-metronidazole combination. The clearance oropharyngeal swabs from both dogs resulted in no detection of *C. ulcerans*.

APHA followed up four additional animals (three dogs and one cat) from two households which had close contact with the index household during the infectious period. These four pets were all healthy and *C. ulcerans* was not detected from oropharyngeal swabbing of all

four. The human contacts were investigated by the local Health Protection Team and all human contacts that required swabbing returned a negative result.

3.4 Q fever *(Coxiella burnetii)*

During Q2 2023 there were five separate dairy farms and one dairy goat farm where *Coxiella burnetii* was detected by PCR. There were four positive bovine placental samples; three from cows which had aborted and one from a cow that had a stillborn calf. Two of the placental samples were from English farms, two were from Scottish farms (the stillbirth occurred on a Scottish farm). The fifth bovine PCR positive sample was a cervical swab from a cow where the herd had previously tested positive for *C. burnetii* via an industry-linked *C. burnetii* bulk milk PCR test.

There was no placenta available for the goat submission and foetal fluid from aborted twins was tested by PCR, both returning a positive result with the detection of *C. burnetii*.

For all ruminant abortion investigations and reports of the detection of *C. burnetii* APHA provides comprehensive advice to private veterinary surgeons including information about optimising ruminant abortion investigations, laboratory testing, and zoonoses advice for private vets to pass on to their farmer clients.

Transmission of *C. burnetii* to humans is most frequently due to inhalation of contaminated aerosols or contaminated dusts. Aerosolized bacteria are spread in the environment by infected animals after normal births and / or abortion. Birth products contain the highest concentration of bacteria, but *C. burnetii* is also found in urine, faeces, and milk of infected animals.

Compared to aerosol transmission, milk is considered low risk. However the general advice is that it is advisable to not ingest unpasteurised milk. There are also other zoonotic organisms that can be acquired from the ingestion of unpasteurised milk.

3.5 Avian chlamydiosis (psittacosis)

Chlamydia psittaci, the causative agent of avian chlamydiosis (psittacosis) can cause serious human illness. The disease has been described in many species of birds, particularly in parrots, parakeets, budgerigars and cockatiels. Other commonly affected birds include pigeons and doves. Ducks and turkeys may also be affected, but chickens less frequently. Birds can carry the organism without any signs of disease, or they can become mildly to severely ill. Information is available at the following links:

https://www.gov.uk/guidance/psittacosis

https://www.hse.gov.uk/agriculture/zoonoses-data-sheets/psittacosis.pdf

Avian chlamydiosis (in psittacines) is reportable to APHA.

In Q2 2023 there were no diagnoses of avian chlamydiosis recorded in the VIDA database. There were also no reports of avian chlamydiosis in psittacine birds.

4. *Brucella canis*

Since July 2020, there has been a large increase in the number of incidents of canine brucellosis due to infection with *Brucella canis* and APHA, in liaison with health protection agencies across Great Britain, has been involved in investigating these. The UK Chief Veterinary Officer advised on this potential zoonotic disease in a letter published in the Vet Record in February 2021. Changes to the Zoonoses Order in 2021 included amendments which added dogs to the list of animals in which the detection of *Brucella* sp. is reportable for each administration in Great Britain.

Further information is available in the APHA Canine Brucellosis: Summary Information Sheet. In the second quarter (Q2) of 2023, there were 50 epidemiologically separate incidents reported to the APHA Brucella National Reference Laboratory where there has been strong evidence of infection with *Brucella canis*. All 50 incidents were identified by serology and presented at least one other risk factor for *B. canis* infection and were reported to the relevant public health authorities. Investigations into these incidents has resulted in the testing of 54 dogs in total (50 index dogs and 4 contact dogs). All 54 dogs were serologically positive for *B. canis*.

There has been a complex and ongoing *B. canis* incident in Wales (previously reported in the Q1 2023 Zoonoses and Veterinary Public Health Quarterly Report). For this incident, during Q2, three further dogs have been traced and tested by *B. canis* serology. One of these dogs was seropositive and the other two dogs were seronegative.

All but one of the 50 incidents identified during Q2 has involved testing of a single dog although this may be subject to change if further information about significant contacts becomes available.

Summary of the Q2 incident involving five dogs to date

APHA was informed by a private veterinary laboratory of a bacteriological culture of canine semen where *B. canis* had been isolated and identified by MALDI-TOF (Matrix-assisted laser desorption ionization–time-of-flight mass spectrometry). Unfortunately the private laboratory had discarded the culture without sending it to APHA and the result could therefore not be confirmed by the APHA Brucella Reference Laboratory.

APHA informed public health authorities following the initial report from the private laboratory due to the risk of onwards transmission and possible high risk human exposure. It was recommended samples were submitted to APHA for *B. canis* serology and culture. The index dog tested serologically positive by ELISA and serologically negative by serum agglutination test (SAT). Unfortunately samples were not received for culture.

The index dog originated from a breeder, had been sold to another breeder, and had produced a minimum of two litters. It was reported that the dog was mated with bitches originating from Russia. The dog had returned to its original owner, who observed mating failures when trying to mate the dog with their bitch.

Further investigations resulted in the testing of four dogs, one dog was the sibling of the index dog, one dog was mated with the index dog, and two dogs were household contacts. All four dogs were serologically positive by SAT and ELISA.

Origin of the index dogs and summary of clinical signs

47 of the incidents identified during this quarter were associated with the importation of the index dog into the UK. Index dogs originated from Abu Dhabi (1), Bosnia (1), Bulgaria (3), China (2), Croatia (1), Cyprus (2), Greece (2), Romania (25), Russia (1), Serbia (1), Spain (3), South Africa (1), Turkey (1), Origin unknown (3), and the UK (3). Of the three dogs originating from the UK, it was reported that one dog was mated with a bitch imported from Russia and the remaining two dogs were tested due to presenting with clinical signs consistent with *B. canis* infection.

Clinical signs of infection have varied between the 50 seropositive index dogs: 12 dogs presented with clinical signs consistent with infection and 31 dogs were reported to have had no clinical signs. No clinical information was provided for seven dogs. For dogs presenting with clinical signs, one or more of the following clinical signs were reported: infertility, abortion, discospondylitis, lameness or joint pain, pyrexia, lethargy, ocular changes, scrotum abnormalities, vaginal discharge, and penile discharge.