Animal & Plant Health Agency

Zoonoses and Veterinary Public Health

Quarterly report Q3 – July to September 2023

Project FZ2100

Published: November 2023

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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 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 humans and animals in Great Britain, using data (which primarily relates to farmed animal species) 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 veterinary public health investigations into incidents and outbreaks of zoonotic disease and associated activities are also included. This report covers the relevant data for Quarter 3 (July to September 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. The FZ2100 project also uses returns from scanning surveillance projects.

This report provides information about non-statutory zoonoses, as well as *Coxiella burnetii* (Q fever), avian chlamydiosis (in psittacines), and brucellosis in dogs, which were made reportable in Great Britain through amendments to the Zoonoses Order in 2021. 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, for example, TB. Information concerning notifiable and other reportable zoonoses is recorded elsewhere, some under specific projects such as FZ2000 (*Salmonella*).

1. General scanning surveillance

1.1 Zoonoses VIDA data for Great Britain: July to September 2023

Table 1 (collated 30 October 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 July and September 2023. The table also compares the latest findings with the data for the same periods 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 Great Britain.

Table 1. General scanning surveillance: Zoonoses VIDA data for Great Britain, July to September 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	27	11	11	11	-	-	-	-	-	-
258 & 659	*Brachyspira pilosicoli* /intestinal spirochaetosis	21	15	12	-	-	-	12	0	-	-
013	*Campylobacter* fetopathy	3	2	0	0	0	0	-	-	0	0
282	Chlamydiosis (*C. psittaci*)	1	0	0	-	-	-	-	0	-	-
014	*Chlamydia abortus* fetopathy	1	0	0	0	0	0	-	-	0	0
732	*Corynebacterium pseudotuberculosis (CLA)*	13	9	8	-	7	1	-	-	-	-
318	Cryptosporidiosis	48	38	36	36	0	0	0	0	0	0
362	Cysticercosis	0	0	0	-	0	-	-	-	-	-
193	Dermatophilus infection	0	0	2	2	0	0	-	0	0	-
022, 133 & 615	Erysipelas	8	4	3	-	0	0	2	1	0	-
371, 372 & 373	Fasciolosis	37	31	23	12	10	1	-	-	0	0
363	Hydatidosis	0	0	0	-	0	-	-	-	-	-

VIDA codes	Diagnosis	2021	2022	2023	Cattle	Sheep	Goats	Pigs	Birds	Misc.	Wildlife
015, 136 & 139	Leptospirosis (all categories)	1	1	0	0	0	0	0	-	0	0
016, 140, 150, 189 & 711	Listeriosis (all categories)	19	8	10	2	7	0	0	0	0	1
217	Louping ill	12	16	17	1	11	-	-	3	2	-
225	Orf (parapox virus)	4	12	12	-	12	0	-	-	0	-
152,153, 157, 158	*Pasteurella multocida* pneumonia /pasteurellosis	32	40	38	23	12	0	3	0	0	0
223	Pseudocowpox (parapox virus)	0	0	0	0	-	-	-	-	-	-
027 & 262	Q Fever/*Coxiella burnetii*	1	0	0	0	0	0	-	-	0	0
374	Red Mite *(Dermanyssus gallinae)*	8	3	0	-	-	-	-	0	-	-
195	Ringworm	1	2	2	1	0	0	0	0	0	1
379, & 392	*Sarcoptes scabei infection*	0	0	0	0	-	0	0	-	0	-
024, 171, 172 & 644	Streptococcal infection (excluding bovine mastitis)	25	22	19	-	1	0	18	0	0	0
745	Swine influenza	6	2	10	-	-	-	10	-	-	-
026 & 315	Toxoplasmosis (incl. fetopathy)	2	1	2	-	2	0	-	-	0	0
142	Tuberculosis (excl. bovine *M. bovis*)	1	3	2	-	-	0	0	0	1	1
034 & 154	Yersiniasis (incl. fetopathy)	3	3	2	-	0	0	2	0	0	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 July and September 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, which can be found on the APHA VET Gateway website.

Cryptosporidiosis in calves and lambs

Diarrhoea in young ruminants is a common presenting sign, and farm animal veterinary surgeons may be called out to investigate diarrhoea cases and outbreaks in calves, lambs and goat kids. Sometimes very few animals are affected, with minimal morbidity, and at other times there are severe clinical signs in affected animals and deaths.

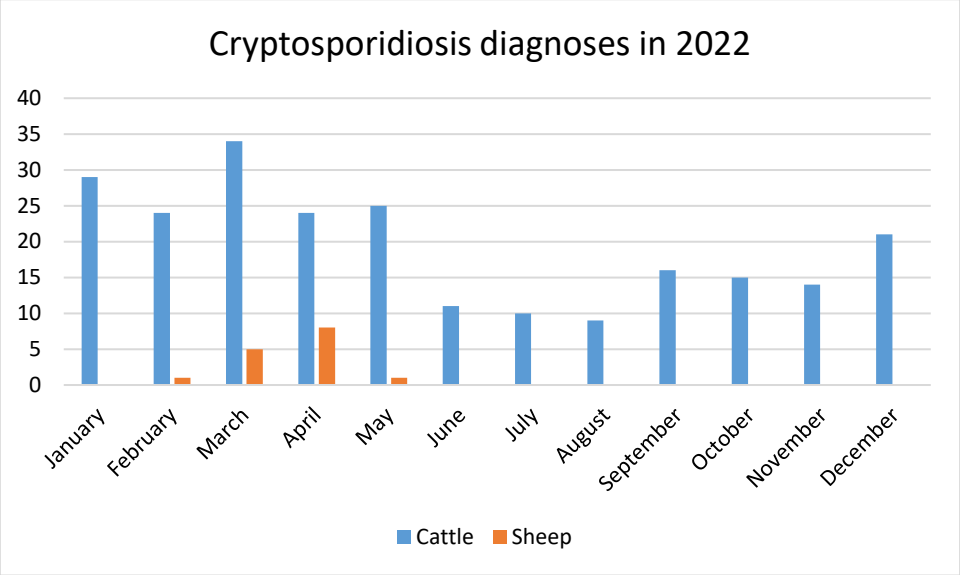
One of the infectious causes of diarrhoea in young ruminants is cryptosporidiosis caused by *Cryptosporidium parvum* (which is a protozoan coccidian parasite). *C. parvum* primarily infects the small intestine and is transmitted directly between hosts by the faecal-oral route via sporulated oocysts. The oocysts are highly resistant to commonly used disinfectants and can survive up to 12 months in cool moist environments. Widespread contamination of the environment can develop during outbreaks. Cryptosporidiosis is an important zoonosis, and subclinically infected animals can also shed large numbers of oocysts that may infect humans. Strict hygiene precautions are essential for control.

APHA assists with public health investigations of human outbreaks of cryptosporidiosis that are linked to direct contact with animals. The second quarter (April to June) 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 *C. parvum* in these settings.

Figure 1 below provides information on the VIDA diagnoses of cryptosporidiosis for each month of the year during 2022. The diagnoses will be associated with the presence of young animals. Cattle calve throughout the year, with peaks in the spring and autumn,

whereas sheep give birth seasonally. The chart illustrates the seasonal pattern of diagnoses of cryptosporidiosis in lambs commencing in February and ending in May, with a peak in April. With the bovine cases of cryptosporidiosis there are cases in calves throughout the year with reduced numbers of diagnoses in the summer months, June to August.

Figure 1. VIDA diagnoses of cryptosporidiosis in calves and lambs during 2022



Avian tuberculosis in two hens from a backyard flock

There are a few diagnoses of avian tuberculosis every year. This recent case was found on investigation of two hens that were from a backyard flock of 18 birds. Both hens were found dead, with no preceding clinical signs. On post-mortem examination of the first hen, there were multiple, firm creamy white nodules and foci varying from 2mm to 5mm in diameter on the serosal and cut surfaces of the lung, liver, spleen, small and large intestines and on the mucosal surface of the colon. Similar lesions were identified in the second hen. Histopathological examination using special stains resulted in the detection of acid-fast bacteria in the granulomatous lesions, consistent with avian tuberculosis in both birds.

Avian tuberculosis is caused by infection with *Mycobacterium avium* ssp. *avium.* Transmission of this bacterium between birds is by oral ingestion leading to intestinal lesions (and dissemination to other organs) and shedding of the organisms in the faeces. Clinical signs can develop slowly over a period of weeks or months, with slow loss of condition, lethargy, a pale shrunken comb in chickens, diarrhoea and dull ruffled appearance. The mycobacteria are relatively resistant to a number of disinfectants, and can survive in the environment, including the soil, for many years, particularly in damp acidic conditions.

With these cases, it is advised that re-stocking should therefore be carefully considered as the remaining flock will likely have been exposed and some may be infected and shedding.

Disposal of carcases must be by an appropriate method, to ensure that the disease does not spread further. Ideally this would be through incineration or through a fallen stock site.

Mycobacterium avium ssp. *avium* can cause zoonotic infection, although this is rare. It is advisable that immunocompromised individuals, including the elderly, should not handle infected birds.

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 Q3 2023 there were no *Campylobacter* isolates identified by the APHA Starcross laboratory.

Scotland

SRUC Veterinary Services had a total of 79 *Campylobacter* isolates during Q3 2023 which were:

- Bovine – there was 1 *Campylobacter sputorum* isolate
- Canine – a total of 71 isolates: 52 *C. upsaliensis,* 17 *C. jejuni,* and 2 *C. Lari*
- Feline – a total of 7 isolates: 5 *C. upsaliensis*, 1 *C. jejuni,* and 1 *C. Lari*

2.2 Leptospirosis

Targeted surveillance by APHA for leptospirosis is variously achieved by analysis of results from:

1. RT(real-time)-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 July and September 2023, a total of 49 kidney specimens (kidneys from 11 cattle, 36 pigs, and 2 foxes) were examined by real-time PCR for pathogenic leptospires. There were no positive kidney test results. 6 of the submitted samples (2 cattle samples and 4 pig samples) were unsuitable for testing (these were too autolysed).

2. In Q3 2023, a total of 520 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. 111 canine sera were tested for export purposes and 41 for diagnostic purposes. 108 porcine samples were tested for *L.* Bratislava. 218 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, Q3 is the period from July to September
- 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 7.2 % of 111 canine export samples tested were positive for *L.* canicola antibodies

Species	Serovar	Total tested: Q3 2023	% Positive	Total tested: Q3 2022	% Positive
Canine E.	*L.* Canicola	111	7.2	137	6.6
Canine E.	*L.* Icterohaemorrhagiae	8	0	8	12.5
Canine D.	*L.* Australis	8	87.5	18	78.9
Canine D.	*L.* Autumnalis	8	0	16	0
Canine D.	*L.* Bratislava	34	5.9	34	8.8
Canine D.	*L.* Canicola	41	29.3	34	8.8
Canine D.	*L.* Copenhagenii	33	45.5	30	40
Canine D.	*L.* Grippotyphosa	4	25	11	9.1
Canine D.	*L.* Icterohaemorrhagiae	34	20.6	31	9.7
Canine D.	*L.* Pomona	5	0	10	0
Canine D.	*L.* Sejroe	1	0	4	25
Porcine	*L.* Bratislava	108	32.4	33	3
Bovine	*L.* Hardjo bovis	218	5.5	137	8.8

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 July and September 2023 there were 3 bulk milk *L.* Hardjo antibody tests (for monitoring purposes), which gave the following results: 0 (0%) were negative, 1 (33.3%) was low positive, 0 (0%) were mid positive, and 2 (66.7%) were high positive.

   For comparison, between July and September 2022 there were 9 bulk milk *L.* Hardjo antibody tests (for monitoring purposes), which gave the following results: 3 (33.3%) were negative, 1 (11.1%) was low positive, 2 (22.2%) were mid positive, and 3 (33.3%) 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 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.

Mycobacterium microti in an alpaca

Adult alpaca carcases that are submitted for post-mortem examination can be found to have lesions that raise concerns about TB infection. APHA Veterinary Investigation Officers perform these investigations wearing full personal protective clothing and use a respirator. Recently an adult alpaca carcase was found to have TB-like lesions which included a multifocal caseous lymphadenopathy and multifocal caseous nodules in the liver. No gross lesions were detected in the lungs. Samples were collected for statutory tuberculosis testing and PCR testing confirmed infection with *Mycobacterium microti*.

Alpaca and domestic cats seem to be particularly susceptible to *M. microti* infection. This bacterium is widespread in wild small rodent populations in the UK. There are sporadic reports of *M. microti* infection in other mammals.

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 3 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 Q3 (July to September 2023) a total of 49 samples (from 41 submissions) were tested for the presence of *Coxiella burnetii* by PCR. The samples comprised 23 placental samples, 10 foetal fluid samples, 1 spleen sample, 1 brain sample and 14 vaginal swabs. At the APHA Q fever National Reference Laboratory the *C. burnetii* PCR has been validated for placental and foetal fluid samples, although other samples are also tested.

These 49 samples were from 41 cattle submissions. 23 samples tested positive for *C. burnetii* which were 8 placental samples, 1 foetal fluid sample, 1 spleen sample and 13 vaginal swabs. The positive samples were from 16 submissions and these submissions were from 13 farms. Of the 13 farms 8 of these also had positive bulk milk samples (see below). For this quarter there were no diagnoses of fetopathy due to C. burnetii infection.

In addition, the detection of *C. burnetii* in 26 bovine bulk milk samples by PCR at an overseas laboratory (23 from English dairy farms, 3 from Welsh dairy farms) were reported to APHA.

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 July to September 2023 are shown below, with data for the previous two years (Q3 2022 and Q3 2021) for comparison.

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

Table notes:

- UT = untypeable
- 1/2 = is a recognised distinct serotype which reacts with both 1 and 2 antisera

	1/2	1	2	3	4	6	7	8	9	10	13	14	19	24	34	UT	Total
Q3 2021	-	7	6	1	1	-	4	1	2	-	-	-	-	-	-	-	**22**
Q3 2022	-	3	9	1	-	-	1	-	-	-	-	-	-	-	-	1	**15**
Q3 2023	1	1	4	1	-	-	3	-	-	-	-	-	-	-	-	1	**11**

Serotype 2 was the most common serotype in Q3 of 2023 and 2022, whereas serotype 1 was most common in Q3 of 2021. There was limited spread across serotypes for Q3 of each year.

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 Veterinary Investigation Centres. The findings presented below provide a summary of the serological status of samples submitted for diagnosis, monitoring and screening purposes during the period July to September 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 is diagnosed through antigen (PCR) testing of placental cotyledon.

During the period July to September 2023 there were 13 ovine samples and no caprine samples submitted for Toxoplasma serology. Of the 13 ovine samples, 10 were seropositive. 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 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.

There were no cryptosporidiosis investigations during Q3 2023.

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 (HSE). Determination of virulence factors, including shiga toxin genes 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 STECs or WGS types may be detected incidentally during the investigation of animal premises.

During the third quarter of 2023 APHA contributed to a multidisciplinary incident management team (IMT) to investigate a Shiga-toxigenic *Escherichia coli* (STEC) human outbreak that was epidemiologically linked to an animal-contact visitor attraction premises.

Human STEC infection can be asymptomatic, but cases may suffer a combination of diarrhoea, fever, and stomach cramps lasting up to two weeks. Haemolytic Uraemic Syndrome (HUS) is a life threatening and potentially life altering condition associated with STEC infection which results in kidney failure. HUS may affect a small proportion of cases, mainly children. Thrombotic thrombocytopaenic purpura (TTP) is a similar presentation which may affect a small proportion of adult patients.

Both STEC O157 and STEC O26 were implicated in this outbreak. There was a strong epidemiological link established for the cases with an animal-contact visitor attraction premises. After ruling out other possible exposure routes, the IMT epidemiological investigation was focused on the visitor attraction premises. This included visits from Local Authority (LA) environmental health officers and an advisory and sampling visit by an APHA veterinary specialist.

Environmental sampling at the premises by food, water and environment scientists resulted in the detection of STEC O26 in a children's play area, and other areas were also PCR positive for STEC.

The animal investigation involved the collection of 32 samples of freshly voided animal faeces by APHA from an epidemiologically appropriate range of animals and enclosures. The animal species included goats, sheep, cattle, pigs, rabbits, and guinea pigs. *E. coli* was detected and confirmed in all 32 samples. Some STECs were detected, although STEC O157 and STEC O26 were not detected in any of the samples. PCR testing also identified some samples with the eae (*E. coli* attachment effacement) gene.

STEC can be carried asymptomatically in animals, which may shed the organism intermittently, and a negative sample does not mean it was not present, only that it was not detected on the day of sampling.

As soon as the premises were made aware of potentially linked human illness, it closed voluntarily. The LA visits and the APHA visit all identified deficiencies in compliance with the Industry Code of Practice: Preventing or Controlling Ill Health from Animal Contact at Visitor Attractions. Compliance with the code of practice is important to minimise the risk of human exposure to zoonotic pathogens of animal origin. The most commonly identified deficiencies at animal contact visitor attractions generally include: suboptimal handwashing facilities (number, accessibility, appropriateness); suboptimal supervision of animal contact; contamination of walkways with soiled animal bedding or faeces; and unclear demarcation of animal contact versus non-contact areas.

Work was undertaken by the premises to rectify the identified deficiencies. This premises satisfied the IMT in making improvements following which there was a phased reopening.

The outbreak has been declared over and an update will be provided in the next Zoonoses and Veterinary Public Health Quarterly report.

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

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 (link above).

During Q3 2023 APHA were involved with assisting the UKHSA Health Protection Teams with nine toxigenic *Corynebacterium ulcerans* incidents, of which three were human index cases and six were animal index cases.

The first human case had two dogs, which both tested negative on surveillance swabbing. The second case had a dog, however testing was not possible. The third case had injured their arm, which became infected, and it was established that there had been no contact with pets, thus no pets to follow up.

The six animal index cases where all from different households and comprised two cats, two dogs, a horse and a hedgehog. One of the dogs and one of the cats were euthanased due to neoplasia and severe abscessation, respectively. The horse had an ocular infection and is reported to have recovered, testing negative on clearance swabs.

The toxigenic *C. ulcerans* case involving the hedgehog comprised a wild young adult female hedgehog that had been rescued and was undergoing rehabilitation. The hedgehog presented at the private veterinary practice with chronic bilateral ear infections, which initially resolved following treatment with an ear drop preparation that contained an antibiotic, antimycotic and corticosteroid combination. Unfortunately, the infection recurred

and bacterial culture of an ear swab by a private veterinary laboratory detected *C. ulcerans*. This isolate was sent to the UKHSA Respiratory and Vaccine Preventable Bacteria Reference Unit and was confirmed toxigenic. The hedgehog had also been treated for mange and had a leg amputated due to a closed fracture. No surveillance of other hedgehogs in the rescue setting was undertaken as there was strict separation and they were reported to be clinically well.

Further treatment of the hedgehog comprised an injectable cephalosporin and the antibiotic, antimycotic and corticosteroid ear drop combination. Oropharyngeal surveillance swabbing, nearing the completion of antibiotic treatment of the hedgehog, did not detect *C. ulcerans*. Clearance swabs of both ears and throat also resulted in no detection of *C. ulcerans* and the hedgehog was reported to have made a full recovery.

This case highlights the importance of hygiene and biosecurity measures, including wearing personal protective equipment, such as gloves, and thorough hand washing after handling captive wild animals to reduce the risk of zoonotic disease transmission. Infection of wild hedgehogs with toxigenic *C. ulcerans* has been previously reported in Europe (Berger et al., 2019; Martel et al., 2021).

3.4 Q fever *(Coxiella burnetii)*

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

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 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.

During Q3 2023 APHA attended an IMT meeting to discuss with UKHSA colleagues one farm where *C. burnetii* had been detected by PCR in a placental sample from an aborted cow. On this farm four cows had recently aborted and there had also been four premature (near-term) calvings in a group of 250 autumn calving dairy cows.

The farm was not usually open to the public, however they had held an open day in the summer. The IMT were aware that *C. burnetii* is present on many farms around the country, as shown by wider bulk milk sampling, and were also aware of the need to consider proportionality of the public health response to avoid undue panic while ensuring awareness in order to identify any human cases.

The consensus of the IMT was to raise awareness with local GPs and hospitals in the region about Q fever symptoms in humans, so it can be considered as a differential diagnosis (both as an acute and chronic infection) in those people who present with influenza-like symptoms. This included highlighting groups at particular risk, and advice on testing and treatment.

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. Avian chlamydiosis (in psittacines) is reportable to APHA. Further information on psittacosis infection is available online at:

Psittacosis - Public Health England guidance

Psittacosis - HSE factsheet

In Q3 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.* APHA, in liaison with health protection agencies across Great Britain, has been involved in investigating these incidents. The UK Chief Veterinary Officer advised on this potential zoonotic disease in a letter published in the Vet Record in February 2021. Amendments to the Zoonoses Order in 2021 added dogs to the list of animals for which brucellosis is a reportable disease in Great Britain.

Further information is available in APHA's Canine Brucellosis: Summary information sheet and in our list of frequently asked Brucella canis testing questions.

General information for the public and dog owners is available on the GOV.UK website: Brucella canis: information for the public and dog owners.

The Human Animal Infections and Risk Surveillance group (HAIRS) Brucella canis risk assessment outlines the current risk to the UK human population from canine brucellosis.

In the third quarter (Q3) of 2023, there were 62 epidemiologically separate incidents where there was strong evidence of infection with *Brucella canis*. 61 incidents were considered to have moderate to high risk factors (that is, positive serology and at least one other risk factor) for *B. canis* infection, and one incident was considered confirmed due to the isolation of *B. canis*. In addition, there was a positive dog that was a traced contact from an incident reported in the previous quarter.

All incidents in Q3 were reported to the relevant public health authorities and investigations into these incidents has resulted in the testing of 63 dogs in total (inclusive of index), of which 63 dogs were found to be serologically positive for *B. canis*. All but one incident involved a single dog. This may be subject to change if further information becomes available.

All but one incident identified within this quarter were associated with the importation of dogs into the UK. Index dogs originated from Bosnia (2), Brazil (1), Bulgaria (1), China (1), Cyprus (1), Greece (3), Macedonia (1), Romania (41), Serbia (1), Spain (3), Tunisia (1), USA (1), Yugoslavia (1), and 3 were imported from an unknown source. The dog in which *B. canis* was isolated from a blood sample originated from within the UK. This dog was also seropositive.

Clinical signs of infection have varied between the Q3 62 seropositive index dogs: 4 dogs presented with clinical signs consistent with infection, 39 dogs were asymptomatic, and for 19 dogs the clinical signs were unknown. For dogs presenting with clinical signs, one or more of the following clinical signs were reported: lameness or joint pain, discospondylitis, vaginal discharge.

5. Imported disease summaries for dogs and cats

In recent years, there has been an increase in the number of companion animals imported into the UK. In some cases, little is known about the medical history of these animals and therefore the risk of importing diseases, which are not endemic in the UK, is increasing. Additionally, with the change in climate there is also the risk of the change in distribution of vectors. APHA's Imported disease summaries for Dogs and Cats (August 2022) document provides a short summary of some of the diseases that could be imported into the UK with the importation of dogs and cats. This list is by no means exhaustive, but provides a useful summary and signposts to further information for some conditions of concern.

Within the document there is information with additional links for a range of diseases, many parasitic. The following diseases are included: Babesiosis, *Dirofilaria repens*, *Echinococcus multilocularis*, *Ehrlichiosis*, Heartworm, Leishmaniasis, *Onchocerca lupi* parasitosis, Rabies, Sporotrichosis, Thelaziasis and Tongue worm (*Linguatula serrata*).