



Department
for Environment
Food & Rural Affairs

www.defra.gov.uk

Zoonoses Report

UK 2011

December 2012



The 2011 UK Zoonoses Report working group has been led by the Health Protection Agency.

The report has been published by:

Department for Environment, Food and Rural Affairs
Nobel House
17 Smith Square
London SW1P 3JR

Tel: 020 7238 6000

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ZoonosesReport@defra.gsi.gov.uk

PB 13851

Contents

Preface	1
Executive Summary	2
Introduction	5
Notification and Reporting of Zoonotic Diseases.....	5
Surveillance and Recording of Zoonotic Diseases	6
Risk assessment and control of zoonoses	7
Disease profiles.....	8
Feature Article 1: The Human-Animal Infections and Risk Surveillance Group	9
Feature Article 2: Reducing Campylobacter in chicken	14
Feature Article 3: Hydatid disease – Out of sight, out of mind?	18
Feature Article 4: Psittacosis outbreak in Tayside, Scotland, Dec 2011-Feb 2012.....	22
Feature Article 5: The Creation and Role of the Animal Health and Veterinary Laboratories Agency.....	26
Zoonoses A-Z	28
Anthrax (<i>Bacillus anthracis</i>).....	28
Avian and animal influenza	29
Bovine tuberculosis (<i>Mycobacterium bovis</i>)	30
Brucellosis (<i>Brucella</i> spp.).....	33
Campylobacteriosis (<i>Campylobacter</i> spp.).....	35
Chlamydiosis and Psittacosis.....	38
Cryptosporidiosis (<i>Cryptosporidium</i> spp.).....	40
Echinococcosis	42
Leptospirosis (<i>Leptospira interrogans</i> serovars)	44
Listeriosis (<i>Listeria monocytogenes</i>)	48
Lyme Borreliosis (<i>Borrelia burgdorferi</i>).....	49

Pasteurellosis (<i>Pasteurella</i> spp.).....	51
Q Fever (<i>Coxiella burnetii</i>)	53
Rabies (<i>Rhabdoviridae</i>).....	55
Bat rabies (European Bat Lyssavirus).....	56
Salmonellosis (<i>Salmonella</i> species).....	57
Toxoplasmosis (<i>Toxoplasma gondii</i>).....	63
Trichinellosis (<i>Trichinella</i> spp.)	65
Variant Creutzfeldt-Jakob disease (vCJD) in humans and Bovine Spongiform Encephalopathy (BSE) in animals.....	66
Vero cytotoxin-producing <i>Escherichia coli</i> (VTEC).....	68
Yersiniosis (<i>Yersinia</i> spp.).....	70
Appendix 1: Notifiable and Reportable diseases in animals which are potential Zoonoses in the UK.....	72
Appendix 2: Notifiable zoonotic diseases and organisms in humans in 2011.....	75
Appendix 3: Relevant Legislation (covering statutory and non-statutory zoonoses)	77
Appendix 4: Laboratory confirmed cases of zoonotic disease in humans in the UK, 2002- 2011.....	82
Appendix 5: Laboratory confirmed cases of zoonotic disease in animals in GB (2002 – 2010) and UK (2011)	84
Appendix 6: Food vehicles associated with foodborne gastrointestinal outbreaks in the UK in relation to <i>Campylobacter</i> , <i>L. monocytogenes</i> , <i>Salmonella</i> , and VTEC O157	87
Appendix 7: Animal population	88
Appendix 8: Further reading	90
Appendix 9: List of Abbreviations/ Acronyms.....	91
Appendix 10: Acknowledgements.....	94

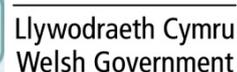
Preface

This annual report on zoonoses in the United Kingdom (UK) includes a summary of reported cases of zoonotic infection in humans and animals during 2011. The data have been compiled from statutory notifiable or reportable disease reports, national scanning surveillance systems, control programmes, research programmes and from data submitted to the European Community via the Trends and Sources Report, under the Zoonoses Directive 2003/99 by agencies contributing to the Report.

This report is a collaborative publication produced by:

- Health Protection Agency (HPA): lead organisation for the production of this year's report
- Department for Environment, Food and Rural Affairs (Defra)
- Food Standards Agency (FSA)
- Department of Health (DH)
- Animal Health and Veterinary Laboratories Agency (AHVLA)
- Health Protection Scotland (HPS)
- Scottish Government (SG)
- Scottish Agricultural College (SAC)
- Public Health Agency (PHA), Northern Ireland
- Department of Agriculture and Rural Development (DARD), Northern Ireland
- Public Health Wales (PHW)
- Welsh Government (WG)

Occasional corrections and amendments to the data, many of which are derived from dynamic databases, may occur following publication; these will result in minor changes to subsequent annual reports and have been marked with an ^a symbol.



Executive Summary

As well as a summary of reported cases of zoonotic infection in humans and animals during 2011, this report includes feature articles which highlight human and animal incidents and issues of public health significance. There were significant trends in a number of human and animal infections, which will continue to be monitored, and some of which are reported below. These emphasise the need for continued surveillance and collaboration between veterinary and human health practitioners. However, interpreting trends in veterinary data needs to be done with care, as the number of submissions to the AHVLA regional laboratories may vary from year to year for a number of reasons. These may include weather conditions, concerns about disease, various financial factors and are likely to affect livestock sectors and type of submissions differently.

Campylobacter

Campylobacter continues to be the most commonly reported human bacterial pathogen and in 2011 the number of laboratory confirmed cases again increased to reach a total of 72,150 reports across the UK. Although this represented almost a 3% increase overall, reports increased by 13% in Northern Ireland and 3% in England and Wales, but they fell by 3% in Scotland.

The reporting of foodborne *Campylobacter* outbreaks also continued to rise in England and Wales with 20 outbreaks reported compared to 18 in 2010. The majority of outbreaks were associated with consumption of poultry liver pâté/parfait at food service premises. Evidence showed that chefs continue to use undercooked chicken livers in the preparation of parfait or pâté despite specific food safety advice tailored for the catering sector.

A feature article outlines the Food Standards Agency's strategy for the reduction of *Campylobacter* on UK produced chickens. A Joint Government/Industry voluntary target has been agreed which aims to reduce the percentage of the most heavily contaminated chickens produced in UK poultry slaughterhouses from a baseline of 27%, set in 2008, to 10% by 2015. If successful, a reduction in *Campylobacter* food poisoning of up to 30% has been estimated, equivalent to about 111,000 community-cases per year. It is unlikely that a single intervention to control *Campylobacter* will lead to the target reduction levels specified and a range of interventions is being explored, targeted at different points in the food chain.

Cryptosporidiosis

In comparison, the number of human cases of Cryptosporidiosis reported in the UK in 2011 fell by over 20% compared to 2010 to 3,655. The fall was consistent across England, Wales and Scotland, with the exception of Northern Ireland which showed an increase. Although the number of cases fell, the number of outbreaks of *Cryptosporidium* reported in England and Wales increased to twelve, compared to seven reported in 2010. The most common outbreak settings in 2011 were petting/open farms, swimming pools and freshwater exposure.

Clinical cryptosporidiosis is common in animals in GB, with clinical infection with *Cryptosporidium* spp. diagnosed in 20% of cattle submissions and 3% of sheep submissions examined by government diagnostic laboratories during the year. There were 1381 diagnoses of clinical animal infection with *Cryptosporidium* recorded in the UK (1304 in cattle, 71 in sheep, two in pigs, three in birds and one in red deer), although not all animal infections are zoonotic.

Lyme disease

The number of reported human cases of Lyme disease in the UK has tended to increase in recent years, but fell in 2011 due to a 26% decline in cases reported from Scotland. There were 1,201 serologically confirmed cases of *B. burgdorferi* infection in humans in the UK in 2011 (959 in England and Wales, 229 in Scotland, and 13 in Northern Ireland), compared to 1,225 in 2010. In England and Wales, cases increased from 905 in 2010 to 959 cases, and over 20% are known to have acquired their infections overseas, with 76% of the indigenous cases being reported from the South East and South West regions.

Rabies

The UK Pet Travel Scheme was launched in 2000 to allow people to bring in or travel with their pets (dogs, cats and ferrets). The changes meant quarantine was no longer always mandatory, while ensuring the UK remained free from rabies and certain other exotic diseases. Since 2000, 864,707 pet animal entries to the UK have been recorded under the Scheme arrangements and there have been no cases of rabies in any of these animals. These controls made it easier to travel with pets. During 2011, 85,774 dogs, 8,279 cats, and 68 ferrets entered the UK under this scheme. Surveillance of animals that do need to be quarantined following arrival continues, and 31 animals that died whilst in quarantine in 2011 were tested for rabies and all were negative.

The UK harmonised its pet movement controls with the rest of the EU on the 1 January 2012 and this will be reported more fully next year.

Salmonella

The total number of laboratory confirmed human cases of salmonellosis in the UK continues to fall with 9,455 cases reported in 2011. *Salmonella* Enteritidis remained the most commonly reported serovar in 2011, accounting for 30% of cases. Although there was a significant fall in the number of cases in Scotland (25%) and Northern Ireland (29%), there was an increase (9%) in the number of cases in England and Wales. In the UK as a whole, reports of *Salmonella* Enteritidis PT4 fell by over a third between 2010 and 2011, to 304 cases. *S. Typhimurium* was the second most commonly reported serovar and increased by almost 10% from 2010.

Eighteen foodborne outbreaks of *Salmonella* were reported in the UK in 2011 compared with nine in 2010, and of these 11 were caused by *S. Enteritidis*. The most common food types associated with *Salmonella* outbreaks in 2011 were red meat and imported eggs.

There were 712 *Salmonella* incidents reported in cattle in GB during 2011, a 20% decrease compared with 2010. There was also almost a 50% decrease in the number of reported incidents in sheep, but no significant change in the number of incidents in pigs, although the trend of an increasing proportion of monophasic *S. Typhimurium* strains was again evident. In Northern Ireland there was also a large fall in the numbers of *Salmonella* isolates from cattle, sheep and pigs in 2011.

The different National Control Programmes (NCPs) for *Salmonella* in poultry have been operating for varying time periods. The breeding chicken NCP has the longest duration and was in its fifth year in 2011. All UK NCPs have achieved the EU set targets in each year of their operation, and the UK results have been significantly below the EU target. The UK chicken breeding sector is now effectively free of *S. Enteritidis* and *S. Typhimurium*.

Vero cytotoxin-producing *Escherichia coli* (VTEC)

In 2011, there were 1,407 laboratory confirmed cases of VTEC O157 reported in humans in the UK, a 31% increase on the 1,072 cases reported in 2010. However these figures include a large foodborne outbreak of VTEC O157 PT8 in Great Britain.

Over the summer of 2011, the world's largest outbreak of a novel strain of VTEC O104 occurred. Although this strain was not zoonotic in origin, the magnitude of the incident is worthy of mention. The outbreak began in Germany and ultimately was identified in more than 16 countries. There were over 900 cases of Haemolytic Uraemic Syndrome (including 34 deaths) and over 3,000 cases of Enterohaemorrhagic *E. coli* (16 deaths). In the UK, seven cases were identified, all of whom were linked to Germany. Trace-back investigations implicated fenugreek sprouted seeds that originated in Egypt as being the vehicle of infection.

In 2011, there were 10 non-foodborne VTEC O157 outbreaks reported in England and Wales. There were nine foodborne VTEC O157 outbreaks, including an outbreak of VTEC O157 PT8 which occurred between December 2010 and July 2011. In this outbreak there were 252 laboratory confirmed cases diagnosed in England, Wales and Scotland and infection was found to be associated with the handling of unwrapped leeks and potatoes in domestic kitchens.

Introduction

Zoonoses are defined by the World Health Organisation as “diseases and infections which are transmitted naturally between vertebrate animals and man”. Transmission may occur by a number of routes, from indirect contact through food or drink to direct contact through occupational exposure on farms, and from pets or through leisure pursuits. Data on zoonotic diseases in the human and animal populations is sourced from national surveillance schemes for outbreaks of infectious disease and laboratory-confirmed infections, enhanced surveillance schemes for specific zoonoses and notification of infectious diseases.

Notification and Reporting of Zoonotic Diseases

Some (but not all) zoonotic infections are statutorily notifiable or reportable under veterinary and/or human health legislation. A list of these can be seen in Appendices 1 and 2. Relevant animal legislation includes: the Animal Health Act 1981 and its subsequent amendments; the Zoonoses Order 1989; the Specified Animal Pathogens (Amendment) (England) Order 2008; the European Communities Act 1972 and the Transmissible Spongiform Encephalopathies (England) Regulations 2010, and the Devolved Administrations have equivalent legislation. The relevant human legislation includes the Public Health (Control of Disease) Act 1984 and the Public Health (Infectious Diseases) Regulations 1988. The Public Health (Control of Disease) Act 1984 was amended in 2010 to include a revised list of notifiable diseases, and for the first time a list of notifiable organisms (this revised list of notifiable diseases and organisms does not apply to Northern Ireland). In addition to the public health legislation, employers and the self-employed are required to report work-related incidents and diseases (including specified infections) to the Health and Safety Executive (HSE) under the Reporting of Injuries, Diseases, and Dangerous Occurrences Regulations (RIDDOR), 1995 (www.hse.gov.uk/riddor/). Further relevant legislation is listed in Appendix 3.

The significance of notification differs in human and veterinary contexts. In animals, there is an obligation for any person having in their possession, or under their charge, an animal affected or suspected of having a notifiable disease (as listed in the Specified Diseases (Notification and Slaughter) Order 1992, the Specified Diseases (Notification) Order 1996 or the Transmissible Spongiform Encephalopathies (England) Regulations 2010) to immediately notify the local AHVLA Field Office in England, Wales and Scotland (www.defra.gov.uk/animalhealth/) or the local Divisional Veterinary Office in Northern Ireland. Procedures for notification and control of specified diseases are outlined in the legislation detailed above.

For human cases, registered medical practitioners in England and Wales have a statutory duty to notify the proper officer of the local authority (usually the Consultant in Communicable Disease Control (CCDC) of the Health Protection Agency (HPA) in England or Public Health Wales) immediately on suspected clinical diagnosis of a notifiable disease. The list of notifiable diseases varies slightly between Scotland, Northern

Ireland, England and Wales and a summary is provided in appendix 2. For more detail of the specified notifiable diseases and causative organisms see:

Scotland: www.legislation.gov.uk/asp/2008/5/contents

Wales: www.legislation.gov.uk/wsi/2010/1546/contents/made

England: www.legislation.gov.uk/uksi/2010/659/contents/made

Northern Ireland: www.legislation.gov.uk/apni/1967/36/contents

Surveillance and Recording of Zoonotic Diseases

Humans

In addition to notification of specified infectious diseases, voluntary laboratory reporting and outbreak surveillance are conducted for each of the constituent countries of the UK (Appendix 4). Due to under-diagnosis and under-reporting, the cases recorded in national surveillance databases tend to be biased towards more clinically severe cases in high-risk groups, or outbreak related cases. New legislation outlined above in parts of the UK will place a statutory obligation on clinical microbiological laboratories to report the diagnosis of specified organisms.

The national surveillance centres also receive and collate reports of outbreaks of foodborne gastrointestinal disease from laboratories, health protection units and local authority environmental health (Public Protection) departments as required under article 8 of the EU Zoonoses Directive 2003/99/EC¹. The minimum dataset on each outbreak is then collected from the appropriate health authority/board through a standardised questionnaire. Surveillance provides information on specific risk factors associated with different pathogens and on trends in the importance of these factors. Enhanced surveillance schemes, either nationally or locally, provide information on specific aspects of a zoonosis.

Data from the surveillance schemes are reported on national surveillance centre websites and for England and Wales quarterly in the Health Protection Report available at www.hpa.org.uk/hpr/archives/Infections/2011/zoonoses_11.htm.

Health Protection Scotland and Northern Ireland's Public Health Agency provide surveillance data on their websites:

www.hps.scot.nhs.uk/giz/index.aspx

www.publichealth.hscni.net/directorate-public-health/health-protection/surveillance-data.

¹ OJ L 325, 12.12.2003, p. 31. Directive 2003/99/EC of the European Parliament and of the Council of 17 November 2003 on the monitoring of zoonoses and Zoonotic agents, amending Council Decision 90/424/EEC and repealing Council Directive 92/11/EEC.

Animals

In GB, livestock are monitored for the appearance of notifiable or novel diseases or changing trends in endemic diseases, including actual and potential zoonoses. This is done by the following: Animal Health and Veterinary Laboratories Agency (AHVLA), the Scottish Agricultural College (Veterinary Sciences Division) (SAC) and Food Standards Agency Operations. A similar function is performed by the Agri-Food and Biosciences Institute (AFBI) and the Department of Agriculture and Rural Development (DARD) in Northern Ireland. In addition, information may be available from universities, veterinary research organisations and other private veterinary laboratories.

The AHVLA undertake scanning surveillance on behalf of the Department for Environment, Food and Rural Affairs (Defra) and the Welsh Government (WG). The SAC perform a similar role for the Scottish Government (SG). Surveillance is achieved primarily through the collection, collation and analysis of disease data arising from material submitted for diagnostic purposes. The clinical diagnostic samples are submitted to the AHVLA Regional Laboratories and to the SAC Disease Surveillance Centres. The results are entered onto the Veterinary Investigation Diagnostic Analysis (VIDA) database and collated into reports covering GB which are published monthly, quarterly and annually. The results (summarised in appendix 5), include those that are available specifically relating to non-statutory zoonoses available on the internet http://vla.defra.gov.uk/reports/rep_surv.htm. SAC reports can be found at: www.sruc.ac.uk/info/120344/2011_monthly_reports. Appendix 5 also records results for notifiable zoonotic diseases.

Risk assessment and control of zoonoses

The UK Zoonoses, Animal Diseases and Infections (UKZADI) group provides a high-level strategic overview and a means of ensuring overall coordination of public health action on zoonoses across the UK. The multi-agency, cross-disciplinary Human Animal Infections and Risk Surveillance (HAIRS) group acts as a forum to identify and discuss infections with potential for interspecies transfer, (particularly zoonoses) (see feature article 1).

Control policies have been introduced to reduce the prevalence of pathogens in the food chain and other areas. These include the implementation of legislation relating to the production of drinking water and food. The UK Food Standards Agency (FSA), the HPA and Local Government Regulation (LGR) operate national microbiological food sampling programmes and carry out studies focusing on particular foods, food processes and the production environment. This work enables potential food safety issues to be identified, as well as establishing current levels of microbial contamination. Local authorities also carry out food sampling activities.

Under the auspices of the FSA, the Epidemiology of Foodborne Infections Group (EFIG) and the Advisory Committee on the Microbiological Safety of Food (ACMSF) bring together UK surveillance data on humans, animals, and food to consider foodborne risks.

Disease profiles

Details on the clinical signs and symptoms of each disease have been omitted from this year's UK Zoonoses Report. This information is available in many other places including previous years' Zoonoses Reports (especially the 2009 UK Zoonoses Report), available here:

www.defra.gov.uk/publications/files/pb13571-zoonoses2009-110125.pdf

<http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/zoonoses/reports.htm>

Further information on the human aspects of infection is available from the HPA webpages: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/

Information on the animal aspects of infection is available from the Defra webpages:

www.defra.gov.uk/animal-diseases/a-z/

Feature Article 1: The Human-Animal Infections and Risk Surveillance Group

Author: Dilys Morgan, Health Protection Agency

The Human Animal Infections and Risk Surveillance (HAIRS) group was started in early 2004, by the Health Protection Agency (HPA). The initial methods used for detecting, assessing and reporting potential threats were developed to fulfil the functions of the Chief Medical Officer's National Expert Panel on New and Emerging Infections (NEPNEI) [1]. In undertaking horizon scanning functions for the Panel, it became apparent that since most emerging infections are zoonotic in origin, detecting animal incidents of public health importance and assessing the zoonotic potential of animal infections was crucial. To do this, the HAIRS group was formed as a multiagency group and has continued to meet every month since 2004. It acts as a forum to identify and discuss infections with potential for interspecies transfer (particularly zoonotic infections). The group is chaired and organised by the Emerging Infections and Zoonoses section of the HPA and has members from: other Departments in the HPA; the Department for Environment, Food & Rural Affairs (Defra); Animal Health & Veterinary Laboratories Agency (AHVLA); Department of Health, Food Standards Agency (FSA); Public Health Wales/ Welsh Government; Health Protection Scotland/ Scottish Government; Public Health Agency Northern Ireland; Dept of Agriculture and Rural Development Northern Ireland, and the Chair of NEPNEI.

The activities of the group reflect the terms of reference and include:

1. Hazard identification

The group identifies and reviews zoonotic or potentially zoonotic/interspecies infectious incidents which may pose a change in risk to animal or human health, whether these are acute clusters, outbreaks or increasing trends in reports of known or new infections or syndromes. Members of HAIRS also bring concerns of their organisation to the group for consideration. If the incident discussed falls within the remit of another group, the HAIRS group will ensure that the relevant group is aware and considering the event. Incidents are identified using a variety of sources and can be within the UK or international.

2. Risk assessment

If a potentially zoonotic incident/ trend has been identified, the group discusses and assesses whether there might be a risk to animal or human public health. Based on their experience and expertise the group will decide whether:

- It presents negligible potential risk to public health
- It presents negligible potential risk to public health, but will be monitored
- More information is required to assess the incident
- A formal risk assessment should be undertaken

If a member of the group considers an incident to be of urgent public health significance, the HAIRS group will be convened as rapidly as possible to discuss the implications of the event and ensure all the relevant agencies are informed.

There has been a steady evolution and development of the risk assessment processes used by the group, and the following risk assessments are used:

Zoonotic potential algorithm

In situations where the zoonotic potential of a new or emerging infection in animals is unknown, the group assesses this using a systematic 'decision tree' approach [2]. This considers the key stages in the transmission of zoonotic infections and is used to categorise the zoonotic potential into one of four levels.

Emerging Infections Risk Assessment tool

This assesses the risk to the UK population from a new or emerging infection arising anywhere in the world [3]. The process deals with the *probability* that a new or emerging infection (either human or zoonotic) will affect the UK population, and the *impact* this would have on human health.

Risk summary and statements

On occasions it is more appropriate to issue a narrative risk statement or summary, which outline and describe the identified threats and these are used for communicating the risk.

The risk assessment processes can be carried out using the expertise available within the HAIRS group, or using expert in-put as necessary, or by convening an expert group if a specialist area of knowledge is required. Risk assessments are qualitative, and are used to rapidly communicate risk in a hierarchy of robust and consistent terms. Using an algorithmic approach allows the assessments to be transparent, systematic and objective as well as rapid and reproducible. They record current gaps in knowledge and assumptions, act as a log for decisions and actions and thereby ensure all decisions become easier to explain and justify.

3. Risk management

Depending on the outcome of the risk assessment process, the HAIRS group may 'sign off' the incident, or refer issues to other groups for risk management action.

4. Risk communication

The group contributes to the monthly *Infectious Disease Surveillance and Monitoring System for Animal and Human Health: Summary of notable events/incidents of public health significance*² and are responsible for preparing and communicating the conclusions

² www.hpa.org.uk/web/HPAweb&Page&HPAwebAutoListName/Page/1234254470752

and recommendations of any risk assessment processes within their own organisations and other agencies as necessary. Joint statements, Q&As etc are agreed and shared between Agencies.

An example of how the group functions: Schmallenberg virus - Is it a zoonosis?

A novel syndrome associated with disease in animals and since named Schmallenberg virus (SBV) was identified by the Friedrich-Loeffler Institute in Germany in November 2011. This followed the investigation of fever, poor general condition, anorexia and reduced milk yield in dairy cows in western Germany during the summer of 2011. Similar outbreaks of disease were reported from the Netherlands, where cases also had severe diarrhoea. In both countries, clinical signs disappeared after a few days and the animals appeared to recover unaffected. However, in early December, a high number of congenital malformations such as twisted neck, abnormal curvature of the spine, and limb contractures occurred in newborn lambs. Many were stillborn. Similarly malformed lambs were reported in Germany and Belgium, and deformed newborn calves were also reported. SBV was identified in many of the affected animals.

In the UK, several measures were put in place in August 2011 to detect the occurrence of suspect cases. Enhanced surveillance for abortions/stillbirths and malformations in cattle, sheep and goats started in December. Farmers and farm vets were informed and encouraged to report and submit affected animals for investigation.

The HAIRS group closely monitored developments and SBV was discussed at the monthly meetings in early December and January. The main discussion was whether SBV could be a zoonosis. The virus had been identified as being an orthobunyavirus, some of which can cause human disease, including some in the Simbu serogroup to which SBV belongs. However, the most closely related viruses in this group (Shamonda, Aino and Akabane) produce a similar clinical picture in livestock but have not been shown to cause disease in humans. It was therefore considered unlikely that Schmallenberg virus was zoonotic, but human infection could not be excluded. This was the opinion of colleagues across Europe, with whom members of the HAIRS group were in frequent communication.

On 23rd January 2012, AHVLA identified the first four affected farms in England; in Norfolk, Suffolk, and East Sussex. Because of the uncertainties over the zoonotic potential of SBV, the HPA worked closely with the AHVLA, and on 27th January 2012 follow-up of workers with an occupational exposure to the virus was started. Farmers, farm workers, veterinary staff or those handling or transporting fallen stock with exposure to either a confirmed or suspected animal case of SBV were given an information sheet about SBV. The information sheet also asked any workers who developed symptoms within 2 weeks after contact with malformed animals or their birth products to contact their local Health Protection Unit. Arrangements were made for blood to be sent to the Virus Reference Laboratory at Colindale for testing for acute infection by PCR and storage while a suitable antibody test was being developed. Workers were reassured that current evidence

suggested that SBV did not cause human disease and that the testing was being carried out as a precautionary measure.

Schmallenberg virus was discussed again at the HAIRS group meeting on January 30th with AHVLA veterinary experts currently working on the UK incidents in attendance. There remained many uncertainties and gaps in knowledge, but the group felt the potential zoonotic risk still needed to be defined. Discussions included that it was not yet known how long the virus had been circulating, but it did seem likely that this was a new disease. Also, the situation was expected to get much worse because lambing season had just started and the extent of spread of infection could only be determined as the lambing progressed. A useful serological test for human and animals was in development but not yet available. It was assumed that the virus was transmitted via *Culicoides* midges, although no positive vectors had been found. The affected UK counties were identified as potentially being at risk from infected midges blown across the Channel last summer, and this is thought to be the most likely cause of transmission for the initial UK cases.

Although many uncertainties and gaps in knowledge remained, the group issued and circulated a risk statement while undertaking the more detailed risk assessment. This was produced and put on the newly established SBV section on the HPA website with links to and from the Defra/ AHVLA websites, and the risk assessment was updated as information became available.

On 31st January, an additional seven premises were confirmed, and by 30th March, SBV infection was identified on 235 farms. From March onwards, studies in Germany and the Netherlands indicated that exposed workers did not show evidence of disease and infection – although the findings weren't put into the public domain until the summer of 2012 [4, 5].

In dealing with the potential public health effects of SBV, the HAIRS group provided the capability to bring together all relevant information regarding SBV from a range of disciplines, nationally and internationally with input from the national experts. This allowed a rapid assessment of the zoonotic potential of this new animal virus, although the gaps in knowledge were clearly stated. The established relationships within the group made it possible to rapidly implement precautionary surveillance of occupationally exposed groups, and give 'joined up' messages regarding SBV across Government.

References

1. Department of Health: National Expert Panel on New and Emerging Infections www.dh.gov.uk/health/about-us/public-bodies-2/advisory-bodies/nepnei
2. Palmer S, Brown D, Morgan D. Early qualitative risk assessment of the emerging zoonotic potential of animal diseases *Br Med J* 2005; 331:1256-60.
3. Morgan D, Kirkbride H, Hewitt K, *et al.* Assessing the risk from emerging infections. *Epidemiol Infect* 2009; 137 (11): 1521-1530

4. Ducomble T, Wilking H, Stark K *et al.* Lack of evidence for Schmallenberg virus infection in highly exposed persons, Germany, 2012. *Emerg Infect Dis.* 2012. 18(8):1333-5. doi: 10.3201/eid1808.120533
5. Reusken C, van den Wijngaard C, van Beek P, *et al.* Lack of evidence for zoonotic transmission of Schmallenberg virus. *Emerg Infect Dis.* 2012.18(11):1746-54. doi: 10.3201/eid1811.120650.

Feature Article 2: Reducing *Campylobacter* in chicken

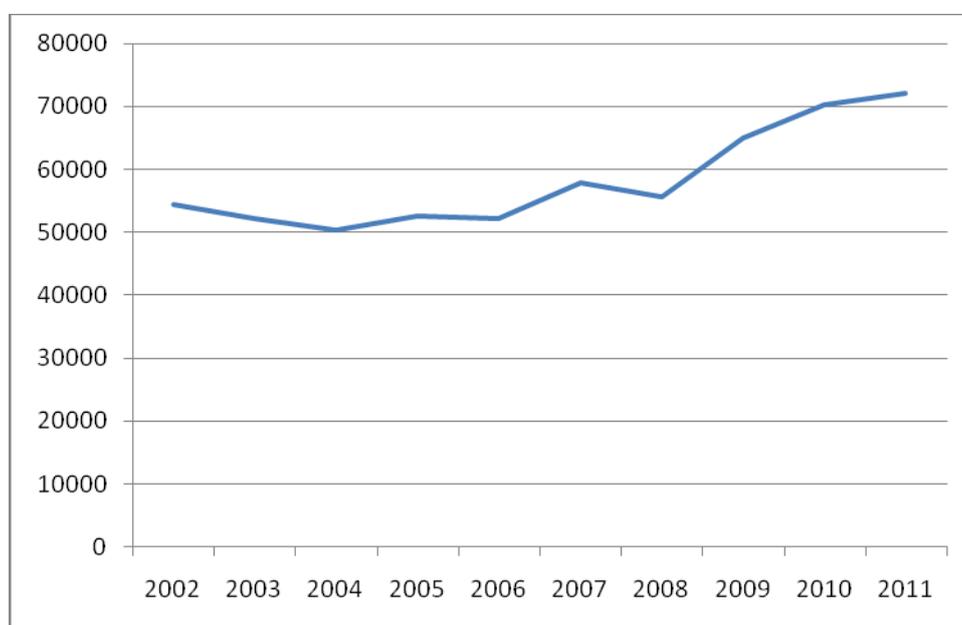
Author: Kathryn Callaghan, Food Standard Agency

Campylobacter continues to be the most commonly reported bacterial cause of infectious intestinal disease in the UK and is the leading cause of bacterial food poisoning. *Campylobacteriosis* is characterised by severe diarrhoea and abdominal pain. The majority of infections are caused by *C. jejuni* (approximately 90%) with the remainder *C. coli* and other minor species. There are many risk factors for *Campylobacter*, but attribution studies indicate that strains that are commonly found in chickens cause the majority of human infections. It has been estimated that between 60 and 80% of clinical infections may be attributed to the handling and/or consumption of chicken.

Trends in reporting

Between the years 2000 and 2004 there was a decrease in the number of laboratory-confirmed cases of *Campylobacter* in the UK (Figure). However since then there has been an increasing trend in the UK. There were 72,150 laboratory-confirmed cases of *Campylobacter* in 2011 compared with 70,298 in 2010.

Figure: Laboratory-confirmed cases of *Campylobacter* in the UK, between 2000 and 2011



A recent review of *Campylobacter* cases in England and Wales from 1989 to 2011 [1] reported large long-term changes in the epidemiology of *Campylobacter* cases, including an increase in the number of cases in spring, an increase in older people, higher numbers of cases in rural communities and fewer cases in people of low socio-economic status.

The majority of *Campylobacter* cases are sporadic (ie isolated cases) and, whilst historically *Campylobacter* outbreaks were regarded as rare, there has been a notable increase in reported outbreaks in the UK in recent years. Most of these have been associated with chicken liver pâté or parfait prepared in catering settings. The recent increase has been continuing since 2009 when the number reported in England trebled to nine (from three in 2008), and increased further in 2010 to 14. This trend stabilised in 2011 when there were 13 outbreaks linked to chicken or duck liver pate. The FSA has been working closely with the HPA and Local Authorities to advise caterers that chicken livers need to be cooked thoroughly to reduce the risk of *Campylobacter* food poisoning.

Reducing *Campylobacter* on UK-produced chicken

The UK Government is working in partnership with the British Poultry Council, the National Farmers Union and the British Retail Consortium to identify and implement interventions that will reduce contamination through a 5-year *Campylobacter* Risk Management Programme, implemented through a Joint Working Group on *Campylobacter* (JWGC). A Joint Government/Industry voluntary target has been agreed which aims to reduce the percentage of the most heavily contaminated chickens produced in UK poultry slaughterhouses (ie those >1000 cfu/g on the skin of slaughtered poultry) from a baseline of 27%, set in 2008, to 10% by 2015. If successful, a reduction in *Campylobacter* food poisoning of up to 30% has been estimated, equivalent to about 111,000 community-cases per year.

It is unlikely that a single intervention to control *Campylobacter* will lead to the target reduction levels specified and, as such, the JWGC is exploring a range of interventions, targeted at different points in the food chain:

- On farm - Implementing improved biosecurity measures to reduce the risk of *Campylobacter* colonisation of chickens

New on-farm standards were implemented throughout the UK by the Red Tractor Farm Assurance Poultry Standards in April 2011. A number of Government and industry funded projects have also started to determine the efficacy of biosecurity measures and the impact of model farms (implementing best practice biosecurity) on the levels of *Campylobacter* in flocks. An estimate of the reduction in the risk of contamination as a result of this intervention has been modelled. This estimates that the percentage of *Campylobacter* counts in the most heavily contaminated band should decrease from the baseline to 19% by 2013.

- In processing - Implementing best practice hygiene in processing plants

Some ongoing reduction in *Campylobacter* levels is expected through use of the slaughterhouse self-assessment tool which can help identify areas of a process where changes should assist in reducing levels of pathogens. Government and industry funded trials are also being undertaken for a range of interventions including the use of lactic acid, surface chilling techniques, and UV light to reduce *Campylobacter* levels on chicken.

- At retail, consumer/catering – Reducing risk through more hygienic packaging and handling of chicken

Retailers currently use leak-proof packaging for raw chicken portions to prevent drip-loss, and the FSA has encouraged this as the standard on whole birds as well. A new survey of whole raw chicken in retail in the UK, due to start 2013, will also sample chicken packaging to determine the extent of external packaging contamination. Consumer education of good hygiene continues to be a high priority and the FSA works closely with partners across the UK to promote the annual Food Safety Week initiative (2nd week of June) promoting simple principles of good food hygiene practice: cleaning; cooking; chilling; and cross contamination. Retailers have also worked with the FSA to include on pack messages for the safe handling of chicken, and in particular to advise consumers not to wash raw chicken, as it spreads *Campylobacter* around the kitchen.

FSA funded social science research is investigating consumer attitudes and acceptability of interventions effective in reducing contamination levels, in particular the use of lactic acid as a possible surface decontamination treatment and the use of rapid surface chilling processes. The findings will be reported spring 2013.

Progress in meeting the reduction target

Progress towards the joint target will be monitored through voluntary testing by the UK poultry industry and independent testing, funded by the FSA, of contamination levels present on birds at the end of the slaughter process. The reduction target recognises that while an early reduction in levels might be expected by 2013, for example due to improvements in on-farm biosecurity, the impact of improvements/implementation of successfully trialled interventions is likely to take a longer time to be realised, and is expected from 2014 onwards. A formal review is expected to be carried out in 2013.

Surveillance of chicken at retail

In addition to the monitoring of levels of *Campylobacter* in chickens at the end of slaughter for the voluntary target, it will be important to determine the levels beyond slaughter, at retail level, as this represents what the UK consumer is exposed to. The FSA is planning a new baseline survey of levels of *Campylobacter* in UK whole chicken at retail, to start in 2013. Repeat surveillance at retail level in the future will take account of interventions across the food chain including post slaughter, for example improved packaging technology.

Enhanced molecular surveillance of *Campylobacter*

The FSA is continuing to fund research to better understand the types of *Campylobacter* that cause illness in humans and determine their sources, e.g. animal or environmental. This will help identify whether the level of human cases of *Campylobacter* associated with chicken is changing as a result of the measures the poultry industry are putting in place. The work will also monitor the extent of changes in attribution to other sources that may be

contributing to human illness and assist in identifying those that may require targeted action for reduction, similar to the current priority to target reductions in *Campylobacter* in chicken.

Horizon Scanning

The 2013 review of the voluntary target and the wider work of the Campylobacter Risk Management Programme needs to be considered within the context of the European Commission's review of the meat inspection system and the recent EFSA Opinion relating to the inspection of poultry meat [2]. Such a system could be based on future European targets set for *Campylobacter* at slaughter/carcass or at flock level, if appropriate.

Elements of such an inspection system could possibly impose risk categorisation of flocks, with high risk flocks undergoing additional processing, for example, freezing or heat-based treatments. The UK Government is fully engaged with the European Commission in their consideration of these issues and the future of meat controls in Europe.

References

1. [Nichols](#) GL, [Richardson](#) JF, [Sheppard](#) SK *et al.* *Campylobacter* epidemiology: a descriptive study reviewing 1 million cases in England and Wales between 1989 and 2011. *BMJ Open* 2012 Jul 12; 2(4) pii: e001179. doi: 10.1136/bmjopen-2012-001179

<http://bmjopen.bmj.com/cgi/pmidlookup?view=long&pmid=22798256>

2. Scientific Opinion on the public health hazards to be covered by inspection of meat (poultry) www.efsa.europa.eu/en/efsajournal/doc/2741.pdf

Feature Article 3: Hydatid disease – Out of sight, out of mind?

Author: Arjen Brouwer, Welsh Government

Hydatid disease is caused by the tapeworm *Echinococcus granulosus*. Eggs laid by the adult tapeworm in dogs are passed in dog faeces that contaminate the environment. These eggs are ingested by grazing animals, e.g. cattle and sheep, or accidentally by humans. Each egg hatches in the intestine of the recipient and the early stage of the parasite is carried via the blood stream to various parts of the body – particularly to the liver and lungs but sometimes to the brain, heart and kidneys, where they slowly develop into hydatid cysts (fluid filled sacs).

Hydatid cysts can grow quite large and contain many young tapeworms. These cysts can be seen at slaughter in ruminants and can be recognised as rounded, white cysts in the liver and lungs.

If a dog is fed infected raw offal/meat or allowed to scavenge on infected carcasses, the young tapeworms are released from the cysts and grow to adult tapeworms inside the dog's intestine. These, in turn, produce more eggs and cause further spread of infection, completing the cycle.

Hydatid disease in humans has a long history in Great Britain (GB) with recognised historical hotspots in south Powys, adjoining Herefordshire and some Scottish isles. Prevalence of indigenous human hydatid disease in GB as recorded by the UK Zoonoses Reports has been in decline for the last two decades.

Historically abattoir post mortem (PM) food safety inspections and knowledge of the industry suggested that hydatid disease was widespread in GB in livestock. However, no recent studies have been carried out and animals slaughtered at abattoirs are no longer representative of local populations so that PM findings cannot be related to local geographic areas. Even so, the GB national figures collected from food safety PM inspection work, however imperfect, are very important trend indicators (data is presented in Echinococcosis section). Furthermore, they suggest that a risk of hydatid disease to humans in GB remains.

Following a south Powys campaign in the mid 1980s that provided free anthelmintics for dogs on farms for a number of years, follow-up studies in the early/mid 1990s determined that dog prevalence levels in that area had dropped to zero [1]. After the foot and mouth disease outbreak of 2001, it was hypothesised that dogs in the area might have had access to hydatid infected sheep carcasses from the disease control efforts and therefore were once again a source of infection to humans. A surveillance study carried out in 2002 [2] used a coproantigen ELISA test³ and found that the prevalence of infection in dogs in

³ Coproantigen ELISA indirectly detects the presence of *E. granulosus* adult, but not necessarily mature, tapeworms.

the historical risk area of South Powys had risen to 8.1%. As this is a level where transmission to humans might be expected the authors called for preventative measures to be taken.

In response, following the publication of the study in 2005, the then Welsh Assembly Government approved funding for a ten year awareness raising campaign and for the provision of free supervised anthelmintic treatment of all dogs on farms in south Powys.



Gall yr holl gŵn hyn drosglwyddo Clefyd Hydatid i bobl. Mae risg i blant yn enwedig
All these dogs can pass Hydatid Disease to humans. Children are particularly susceptible

Gall Clefyd Hydatid fod yn angeuol mewn pobl. Caiff ei drosglwyddo rhwng defaid a chŵn ac o faw cŵn i bobl.

- Holwch eich milfeddyg am driniaeth llyngyr reolaidd
- Peidiwch â bwyd'ch ci â chig amrwd
- Peidiwch â gadael i'ch ci grwydro neu fwyta carcasau defaid
- Golchwch eich dwylo ar ôl cyffwrdd cŵn neu lanhau cytiau cŵn
- Peidiwch â gadael i gŵn lyfu wynebau
- Rhowch wybod i'ch awdurdod lleol am ddefaid marw

Hydatid Disease can be fatal in humans. It is passed between sheep and dogs' faeces to humans.

- Ask your vet about regular worming
- Don't feed your dog raw meat
- Don't let your dog roam or scavenge on sheep carcasses
- Wash hands after handling dogs or cleaning kennels
- Don't let dogs lick faces
- Report dead sheep to your local authority

www.cymru.gov.uk/clefydauanifeiliaid
www.wales.gov.uk/animaldiseases
www.iechyd cyhoeddus cymru.wales.nhs.uk
www.publichealthwales.org

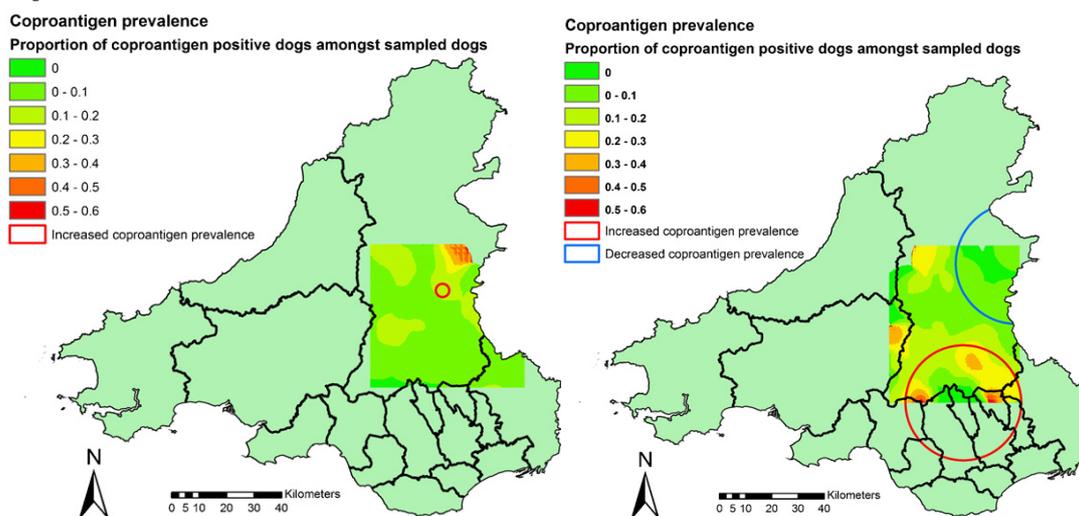



A pilot was set up to assess the success of the provision of free supervised anthelmintic treatment of all dogs on farms in south Powys and to determine a baseline prevalence for *E. granulosus* in dogs and to use it as a measure of this hazard to humans. The pilot study ran from 2008 to 2010.

The results of the baseline study [3], indicated that 1 in 10 dogs on farms (10.6%) in the pilot area tested positive, and that this reflected a risk to humans at 1 in every 5 farms (20.6%) in the area. It was shown that:

- pet and working dogs on farms are equally likely to be infected with the adult tapeworms and therefore act as a potential source of infection to people and ruminant intermediate hosts,
- analyses confirmed that the main risk factor associated with dog positivity was a dog's freedom to roam unsupervised and therefore have opportunity to scavenge and eat infected material.

Figure: The proportion of positive dogs, per km². Comparison between 2002 (left) and 2008 (right). A prevalence of 1 indicates that all dogs were positive, and a prevalence of 0 indicates that all were negative. The locations of clusters of high and low prevalence, as identified by the spatial scan statistic, are shown [3].



Unpublished results [4] from further testing indicate that quarterly supervised anthelmintic treatment of dogs has been highly effective in preventing egg production. All coproantigen [5] ELISA positive dogs were tested with a PCR designed to detect the presence of *E. granulosus* eggs in faeces (pers. comm. P Craig, Salford). These test results indicated that no eggs were being produced whilst quarterly anthelmintic treatment was in operation, and that when these treatments ceased, egg output was once again detected with a rising trend. However, it should be noted that standard recommendations for protection against hydatid disease in humans remains to treat all dogs in your environment with a suitable anthelmintic every six weeks [6].

No recent work has been done on prevalence in livestock in GB, other than a small project on a Scottish island. The Welsh Government funded a sentinel surveillance study over 12 months that ended in September 2011, whereby post mortem findings of hydatid cysts in cattle at specified abattoirs in England and Wales were collated. The data has been combined with data from the cattle movement database to give an indication of regional risk across Wales and further afield. This work, undertaken in collaboration with the University of Liverpool Veterinary School, demonstrates that hydatid disease is still maintaining its lifecycle between dogs and livestock across Wales and England, with a particular unexplained locus in south Powys.

Although the current evidence suggests that untreated dogs in south Powys still represent a risk to human health, this risk (albeit at perhaps a lower level) is replicated across Wales and England. Studies found that areas adjacent to south Powys, sampled for comparison, appeared to have higher prevalences in dogs. Certainly, the prevalence level in dogs in south Powys is still not as high as it was prior to the eradication campaign efforts of the 1980s and the efforts of the Powys Health Authority and Mr T Walters (member of the Royal College of Veterinary Surgeons) in maintaining an educational campaign for over 15 years.

Even though human hydatid disease is not currently being detected and therefore may be “out of sight” and “out of major control/eradication consideration”, it is not “out of mind” and should not make us complacent. Health, education, agricultural and veterinary sectors should continue to cooperate and emphasise the need for dog owners to use appropriate anthelmintics; to keep dogs from roaming freely; not to feed raw offal and for farmers to promptly secure and appropriately dispose of dead livestock.

References

1. Palmer SR, Biffin AH, Craig PS, *et al.* Control of hydatid disease in Wales (1996) *BMJ* 312(7032):674-5
2. Buishi I, Walters T, Guildea Z, *et al.* Reemergence of Canine *Echinococcus granulosus* Infection, Wales (2005) *Emerg Infect Dis* 11(4): 568–571. doi: 10.3201/eid1104.040178
3. Mastin A, Brouwer A, Fox M, *et al.* Spatial and temporal investigation of *Echinococcus granulosus* coproantigen prevalence in farm dogs in South Powys, Wales (2011) *Veterinary Parasitology* 178: 100–107
4. Data held by the Welsh Government, Office of the Chief Veterinary Officer, Cathays, Cardiff, CF10 3NQ
5. Allan JC, Craig PS, Garcia Noval J, *et al.* Coproantigen detection for immunodiagnosis of echinococcosis and taeniasis in dogs and humans (1992) *Parasitology* 104(Pt 2):347–356
6. <http://wales.gov.uk/topics/environmentcountryside/ahw/disease/hydatiddisease/?lang=en>

Feature Article 4: Psittacosis outbreak in Tayside, Scotland, Dec 2011-Feb 2012

Author: Dr Chris McGuigan, Consultant in Public Health Medicine, NHS Tayside

Adapted from: McGuigan CC, McIntyre PG, Templeton K. Psittacosis outbreak in Tayside, Scotland, December 2011 to February 2012. *Euro Surveill* 2012;17(22):pii=20186.

Available online: www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20186

Psittacosis is a systemic infectious disease caused by *Chlamydophila psittaci*. Features of the illness usually include fever, malaise, unproductive cough, headache and atypical pneumonia. The incubation period is one to four weeks [1]. Outbreaks are rare, with sources that are predominantly avian but not necessarily psittacine (e.g. parrots, macaws, parakeets). No outbreaks have been recognised in Scotland in the last 10 years, although up to 10 sporadic cases have been laboratory confirmed each year [2].

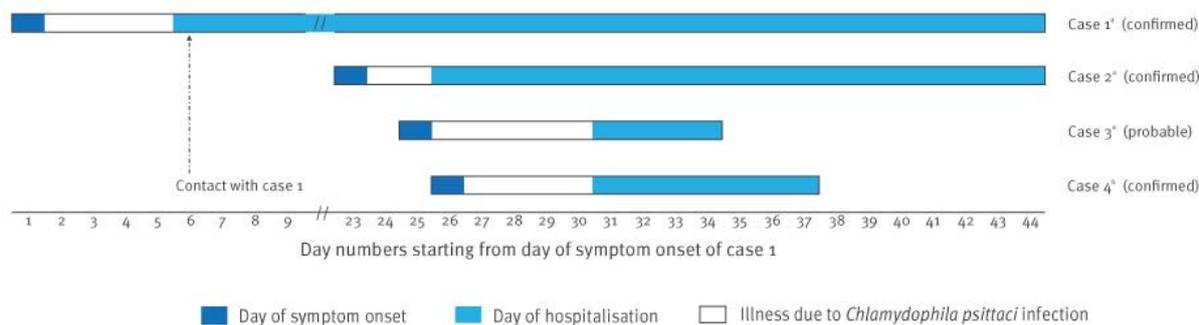
During February 2012, Tayside's Health Protection Team was notified of a cluster of pneumonia cases affecting a family and one healthcare worker (HCW). The onset of the first illness began in late December 2011.

An outbreak management team (OMT) was convened, and a case definition agreed [3]. A 'confirmed case' was a compatible clinical illness, with either *Chlamydophila* species detected in respiratory secretions (by culture or PCR) or a fourfold or greater increase in antibody titre (IgG or IgM) to *Chlamydophila* species by CFT (complement fixation test). Individuals who were epidemiologically linked to a confirmed case were considered to be a 'probable case' if they had a CFT antibody (IgG or IgM) titre of 256 or greater, or were considered to be a 'possible case' if they had a titre of 32 to 128. Any positive sample was further investigated by specific real-time PCR to *C. psittaci* or *C. pneumoniae* targeting a different region of the 16S ribosomal sequence. This enabled investigators to determine which *Chlamydophila* species was involved in a case.

The OMT identified three confirmed cases, and one probable case. These were in three females and one male with an age range of 41 to 65 years. The confirmed cases were shown to have been caused by *C. psittaci* strains which were indistinguishable by sequencing of PCR products. The probable case was CFT positive, but PCR negative, so the species could not be identified.

A further two possible cases were identified by the OMT but are not discussed further in this summary: a family member with mild respiratory illness and an unrelated patient from the same intensive care unit as the index case.

Figure: Time of symptom onset and clinical course of probable and confirmed cases, psittacosis outbreak in Tayside, Scotland, December 2011–February 2012



^a Cases 1, 2 and 3 were part of an extended family and had extensive and frequent contact with each other.

^b Case 4, a healthcare worker, had contact with case 1 on the sixth day of case 1's illness, as indicated by an arrow.

Since cases 1 to 3 were members of an extended family and had extensive and frequent contact with each other it was not possible to retrospectively identify particularly significant 'mutual exposure events'. Instead, shared exposures between the HCW (case 4) and the others were sought. The only spatial-temporal overlap was with case 1 and this occurred during the admission of case 1 to the ward where case 4 worked. Case 4 may have been exposed while caring for case 1 who required intensive medical support and investigation. It was not possible to explore direct contact between these two cases and so the exact mode of exposure remains undetermined.

Thus while the cases amongst the extended family might be explained by a putative persistent source to which family members were sequentially exposed, the infection of the HCW cannot. The time interval between the first and the HCW seemed to indicate that the disease may have spread from person-to-person. This is consistent with the incubation period of psittacosis, which ranges from one to four weeks. Although not a widely recognised route, person-to-person transmission of psittacosis has been previously suggested [3].

Extensive searches were made for possible avian sources of infection. Workplaces and residences of cases were plotted on an Ordnance Survey map. Cases 2 and 3 lived together a kilometre from case 1. Case 4 resided a further ten kilometres west. Although not within any of the cases' respective place of residence, two pigeon coops and a cage of small birds were found in the neighbourhood of where cases 1, 2 and 3 lived. None were within 500 m of case 1, but as these could be considered a plausible source, faecal samples were taken for PCR analysis.

Case 1's pet dog was reported to have rolled in the remains of a dead bird in December. Also, this case's workplace was reported to be affected by a large number of gulls. Searches in both areas revealed insufficient sample material. A PCR analysis of a pooled canine faecal sample was carried out, using an unpublished method, developed at the Animal Health and Veterinary Laboratories Agency, Weybridge. This PCR detects the presence of *C. psittaci* and *C. abortus* and was negative. No environmental source of any

Chlamydophila species was revealed by environmental investigations, however this is not unusual [4].

Aviary: Investigated, but not implicated in Psittacosis outbreak



It is difficult to explain all of the cases in this outbreak by exposure to a common non-human source. While inconclusive, features consistent with person-person spread are demonstrated. Clinicians and public health specialists should therefore keep an open mind to the possibility of person-to-person spread of psittacosis despite the received opinion that this generally does not occur.

References

1. Heymann DL, editor. Control of communicable diseases manual. 19th ed. Washington DC: American Public Health Association; 2008.
2. Health Protection Scotland (HPS). Chlamydia psittaci, Scotland, Annual Total as at 28 June 2011. Glasgow: HPS. [Accessed 24 May 2012]. Available from: www.documents.hps.scot.nhs.uk/giz/10-year-tables/psittaci.pdf
3. Centers for Disease Control and Prevention. Compendium of measures to control Chlamydia psittaci infection among humans (psittacosis) and pet birds (avian chlamydiosis), 2000 and Compendium of animal rabies prevention and control, 2000. National Association of State Public Health Veterinarians, Inc. MMWR Recomm Rep. 2000;49(RR-8):3-17.

4. Mulder MM, Heddema ER, Pannekoek Y *et al.* No evidence for an association of ocular adnexal lymphoma with *Chlamydia psittaci* in a cohort of patients from the Netherlands. *Leuk Res.* 2006;30(10):1305-7.

Feature Article 5: The Creation and Role of the Animal Health and Veterinary Laboratories Agency

Authors: Adrian Rogers and Andrew Frost, AHVLA

The Animal Health and Veterinary Laboratories Agency (AHVLA) was created on 1 April 2011. It was formed by the merger of two of Defra's existing agencies: Animal Health and the Veterinary Laboratories Agency (VLA), with an additional cadre of veterinary and scientific staff transferred into the new agency from Defra. AHVLA is tasked with safeguarding animal health and welfare and public health and its creation brought together services, expertise and scientific capability on animal health and welfare into one agency.

AHVLA provides both laboratory and field services for a range of customers, both in government and in farming and other industries. The merged organisation has a wide range of roles, from field activity on-farm and at markets through to providing specialist laboratory and scientific services across Great Britain. This includes functions such as research and consultancy, surveillance and the management of disease controls (e.g. TB testing, import and export controls, and the Pet Travel Scheme), and protecting the nation's food supply through egg marketing inspections. There are several other UK functions – notably acting as the reference laboratory for certain exotic and zoonotic diseases, and working to protect endangered wildlife by regulating the trade in species protected by the Convention on International Trade in Endangered Species.

AHVLA also maintains the key capability to respond to animal disease emergencies, both in the field in Great Britain and also, through its reference laboratory function, supporting the management of disease in Northern Ireland, the EU and world-wide.

A New Surveillance Model

Scientific work in the AHVLA is focused on the identification and reduction of threats to animal health and welfare, and public health. This approach ensures that the agency can focus on delivering work that has a measurable impact, and will help to build capability so that AHVLA can respond to new threats as they emerge.

A priority in 2011-12 was to identify ways to undertake veterinary surveillance both more effectively and at an affordable cost to the taxpayer. Veterinary surveillance seeks to identify new or re-emerging threats to our livestock population, and to public health. It involves a partnership approach between livestock keepers, private veterinary surgeons, industry bodies, AHVLA and others to effectively gather and assess intelligence. Surveillance has historically been based on in-depth investigation of disease incidents with an emphasis on post mortem examinations carried out at AHVLA's regional laboratories. This system is a key element in the Government's risk-based approach to the identification of animal disease related threats.

The post mortem-orientated model, although successful in identifying diseases in the past, can be improved upon. A review was commissioned prior to the formal creation of AHVLA and called the Sustainable Surveillance Project. This identified viable options for achieving better surveillance at the same or lower cost by, for example, moving towards risk and intelligence based surveillance and improving the value added by working more closely in partnership with vets and their farmer clients and other sources of intelligence data. As a follow on to this project an independent Surveillance Advisory Group was established in December 2011 to recommend a future delivery approach for veterinary surveillance in England and Wales, which is likely to be introduced in 2013-14.

Handling of zoonoses by AHVLA

A limited number of zoonotic infections are statutorily notifiable under veterinary legislation (see Appendix 1). The primary purpose of the veterinary notification system is to identify possible outbreaks and epidemics and initiate appropriate action as soon as possible. Accuracy of diagnosis is secondary, and clinical suspicion is generally all that is required. If the diagnosis later proves incorrect, the notification can be changed or cancelled.

AHVLA has well established procedures for investigating and controlling statutorily notifiable zoonotic diseases of animals, such as anthrax, rabies, avian influenza, bovine tuberculosis and brucellosis, and information on many of these is available on the Defra website (www.defra.gov.uk). AHVLA takes the lead in the operational aspects of containing and controlling an outbreak of a notifiable animal disease in Great Britain. (These aspects of AHVLA's responsibilities were formally undertaken by Animal Health before the creation of AHVLA on 1st April 2011).

Prior to 1st April 2011 the VLA was generally the first point of contact for issues relating to *Salmonella* and non-statutory zoonoses issues (e.g. corynebacteria, *Cryptosporidium*, Q fever and VTEC) in England and Wales. AHVLA has continued the former VLA responsibilities for such diseases, and has formal procedures for dealing with some of these, for example investigation of human outbreaks of VTEC O157 or *Cryptosporidium* infection, associated with animal contact. AHVLA involvement in such incidents is generally at the request of a Consultant in Communicable Disease Control leading an outbreak control team formed in response to an incident where a putative link to animals has been identified. The purpose of the AHVLA involvement is to assist the outbreak control team by advising on control measures that fall within a veterinary remit and, where appropriate, undertaking sampling of animals to confirm putative animal sources of human infection. The latter is achieved in collaboration with HPA Colindale by comparing animal isolates with those from human cases using phage typing and molecular profiling.

Zoonoses A-Z

Anthrax (*Bacillus anthracis*)

Anthrax is caused by the bacterium *Bacillus anthracis*. Under certain environmental conditions *B. anthracis* can convert into a spore, which may survive in the environment for many decades in an inert state. In this form the organism shows great resistance to the effects of heat, drying, UV light and many disinfectants.

Anthrax can occur in all mammalian species, and has also been reported in some birds. The clinical presentation in animals varies between species with three forms of anthrax recognised; peracute/apoplectic, acute and chronic. In recent years sporadic anthrax cases have occurred in cattle in the UK, presumably from exposure to anthrax spores present in soil and originating from cases that occurred decades earlier.

Anthrax infection in humans classically causes one of three types of disease which affect either the lungs (inhalation/ pulmonary), the digestive tract (intestinal) or the skin (cutaneous). In 95% of naturally-acquired human cases, the infection is cutaneous. Recent human cases of anthrax in the UK have been associated with animal hide drums that use imported hides, or with contaminated heroin.

Infection in humans

Between 2001 and 2008, four human cases were confirmed, including two associated with animal hide drums. In December 2009, an outbreak of anthrax amongst heroin users started in Scotland, believed to be due to the circulation of a batch of heroin contaminated with anthrax spores. The outbreak lasted for a year and involved 47 confirmed cases in Scotland (of whom 13 died), and five confirmed cases in England and Wales (including four deaths)⁴.

There were no human cases in 2011 in the UK.

Infection in animals

The last cases of anthrax in animals in GB occurred in 2006 when six cattle died on one farm in Wales (two confirmed and four suspected cases). The cause was thought to be river flooding/damage to a floodplain grazing field. In Northern Ireland the last case of anthrax was in 1990, affecting one cow on a farm in County Antrim.

There were no cases of anthrax detected in animals in the UK in 2011.

⁴ www.documents.hps.scot.nhs.uk/giz/anthrax-outbreak/anthrax-outbreak-report-2011-12.pdf

Avian and animal influenza

Influenza is a respiratory infection caused by viruses of the orthomyxoviridae family. Animal adapted influenza viruses do not readily infect people. However, spontaneous mutation or re-assortment of influenza virus genes between human and animal strains can occur. Some of these strains have the potential to be readily transmitted between people and can lead to pandemic spread in humans.

Avian influenza (AI), also referred to as 'Fowl Plague' or 'Bird Flu', is a disease of birds caused by type A influenza viruses. It is one of the most important poultry diseases as it is highly infectious, can produce significant mortality and can affect many species of birds. Avian influenza viruses are classified according to the severity of disease (pathogenicity) they cause in kept birds. They are either highly pathogenic or of low pathogenicity. Highly pathogenic avian influenza (HPAI) can cause severe disease in poultry, with a high flock death rate of up to 100% in affected flocks. HPAI disease can develop so rapidly that birds may die without showing any previous signs of disease. Low pathogenicity avian influenza (LPAI) viruses result in milder, less significant disease, but can mutate into highly pathogenic strains. Only HPAI is notifiable in birds. There are other influenza A viruses that affect other species of animals. None of these infections are notifiable and different virus strains can cause varying degrees of disease in their specific animal host. Most generally cause mild disease in comparison to the severity associated to HPAI infection in poultry.

The highly publicised H5N1 HPAI strain has been responsible for considerable poultry losses across Asia and between 2005-2007 in Europe and other parts of the world. The UK has maintained a high vigilance for avian influenza due to the westward spread of H5N1 from Asia and occasional incursion of other influenza viruses to European poultry.

Infection in humans

Human cases of avian influenza in the UK are very rare. In 2006, there was one confirmed case of H7N3 in a farm worker. In 2007, there were four cases in owners who kept birds, associated with a H7N2 poultry outbreak. All viruses were of low pathogenicity for poultry. There have been no deaths reported as a result of avian influenza in the UK.

There were no human cases reported in 2011 in the UK.

Infection in animals

There were no cases of highly pathogenic avian influenza (HPAI) in birds in the UK in 2011.

The last case of HPAI in the UK was in Oxfordshire in June 2008 when H7N7 infected a single laying hen flock. Active surveillance of UK poultry stocks for viruses of H5 and H7 subtypes has been undertaken annually since 2003. Infrequently, antibodies to H5 or H7 infection subtypes have been detected in a small number of sampled birds, which is most likely indicative of prior exposure to LPAI virus strains, and in ducks these are most likely

to indicate non-specific reactions. During 2011, five of 433 holdings sampled in the UK had birds with antibodies to avian influenza viruses of subtypes H5 or H7. This compared with four detections from 453 holdings sampled in 2010.

During 2011, changes to the European Commission guidelines for AI surveillance in wild birds were implemented in the UK, targeting the EU-mandated AI wild bird surveillance activities on dead wild birds. As a result, sampling during routine wildfowl trapping activities ceased during 2011. Wild bird surveillance activities include patrols of designated reserves and wetlands around the UK and the investigation of wild bird 'mass mortalities' (defined as five or more wild birds of any species in any location of GB. In Northern Ireland individual dead gulls, waders, ducks, geese and swans are tested in addition to five or more deaths of any wild bird species). In 2011, a total of 607 wild birds were sampled in the UK. The majority of birds (90%) sampled were found dead by the public or warden patrols of wetlands and reserves while the remainder were birds that were live trapped. H5N1 HPAI (notifiable in wild birds since 2003) was not detected, but other influenza A viruses were found in one dead bird and one wild bird that was sampled as part of wildfowl trapping activities. This is consistent with continual maintenance in these reservoir populations.

The most significant non-avian influenza in recent years has been swine influenza. The number of diagnoses of swine influenza remained high in 2011. This was partly attributed to the introduction of a more sensitive screening assay leading in part to an increase in the number of case submissions but also an apparent increase in disease activity. The predominant strains of swine influenza circulating in the pig population in 2011 were A(H1N1)pdm09, and the endemic H1N2 subtype. Co-circulation of multiple strains raises questions as to the long term dynamics of virus strain dominance or coexistence; particularly the potential for further genetic re-assortment. A first generation re-assortment between H1N2 and A(H1N1)pdm09 was detected in a single case and the situation will be monitored through ongoing surveillance.

Further information:

Great Britain AI Wild Bird Surveillance data for 2011:

http://vla.defra.gov.uk/reports/docs/rep_survrep_qtlyw0411.pdf

Bovine tuberculosis (*Mycobacterium bovis*)

The *Mycobacterium tuberculosis* complex includes *M. tuberculosis*, *M. bovis*, *M. africanum* and other mycobacteria that cause TB in mammals. Bovine tuberculosis (bTB) is caused by *M. bovis*, a zoonotic organism that can give rise to a form of tuberculosis in humans that is virtually indistinguishable from the disease caused by *M. tuberculosis*, which is the major cause of human TB.

Infection with *M. bovis* most often occurs when airborne droplets of moisture (aerosols) containing the organism are inhaled, but can also occur by eating or drinking contaminated

foodstuffs and, more rarely, through contamination of skin wounds. The consumption of unpasteurised milk or dairy products from infected cows was an important cause of childhood tuberculosis in the UK until pasteurisation became widespread in the mid-20th century.

Bovine TB is one of the most serious animal health problems for the cattle industry in the UK, costing the taxpayer around £133m in 2010/11 in England and Wales (including research). *M. bovis* infection has also been found in many mammal species as well as cattle, including other livestock, wildlife, domestic cats and dogs. However, only badgers and cattle are considered maintenance hosts for *M. bovis* TB in the UK. Other mammals behave as spill-over hosts, although wild deer may also act as maintenance hosts in isolated areas in some circumstances⁵.

A compulsory eradication campaign for bTB began in GB and Northern Ireland in 1950 and 1959 respectively. This was underpinned by routine screening of herds using the comparative tuberculin skin test, slaughter of all test reactors and cattle movement restrictions in infected herds. This programme gradually reduced the incidence infection in cattle herds to a very low level by the early 1980s. However, since then, the number and geographical distribution of new incidents of TB in cattle herds ('breakdowns'⁶) have steadily increased in England and Wales. This trend accelerated immediately after the foot and mouth disease outbreak in 2001, during which the routine TB testing and slaughter programme was suspended for almost ten months, but the rate of increase has slowed down in more recent years.

M. bovis is currently endemic in cattle and badgers in most of Northern Ireland and large tracts of the west of England and south and mid-Wales. Scotland was declared an officially TB free region of the UK by the European Commission in 2009 (Decision 2009/761/EC) and, as such, it implements strict controls regarding the movement of cattle from the rest of the UK.

Infection in humans

In recent years, *M. bovis* has accounted for approximately 0.5% of all culture-confirmed *M. tuberculosis* complex diagnoses in humans in the UK annually.

In 2011, there were 31 culture-confirmed cases of human TB caused by *M. bovis* in the UK: 22 in England and Wales, seven in Scotland, and two in Northern Ireland. This is similar to the numbers seen in 2010 (n=30; 23 in England and Wales, six in Scotland, and one in Northern Ireland).

⁵ Delahay, RJ *et al.* 2007. Bovine tuberculosis infection in wild mammals in the South-West region of England: a survey of prevalence and a semi-quantitative assessment of the relative risks to cattle. *Veterinary Journal* 173, 287-301

⁶ Incidents of bovine TB are also known as 'breakdowns', ie herds in which at least one animal was identified as a reactor to the tuberculin skin test or where one or more *M. bovis* culture-positive tuberculous lesions were detected by meat inspection during commercial slaughter of a non-reactor animal.

A country of birth was given for 21 out of the 22 cases in England and Wales, all of whom were of white ethnicity and UK-born. Twenty of these were over 50 years old (95.2%), some of which are likely to be attributable to reactivation of latent infection, probably acquired prior to widespread implementation of disease controls.

Infection in animals

There were 80,454 cattle herds registered in GB at the end of 2011. A total of 4,894 new bTB incidents were recorded in GB in 2011, a 3.6% increase on the 4,723 new bTB incidents recorded in 2010. More than 97% of the new bTB incidents that occurred in GB during 2011 occurred in England and Wales. Post-mortem evidence of lesions characteristic of bTB and/or culture of *M. bovis* was detected in 3092 (63.2%) of the new bTB incidents for GB. A total of 34,250 cattle were slaughtered as tuberculin skin or interferon-gamma (blood) test reactors in 2011, an increase of 7.2% from 2010 (n=31,951).

In Northern Ireland there were 25,677 cattle herds with 1.6 million cattle registered during 2011. There were 1,386 new TB reactor herds and 8,136 reactor animals, and at the end of the year 1,347 herds (5.2%) were still under bTB restriction. This is a significant rise in animal disease control parameters. However, in terms of zoonotic risk, it is an increase of less than 1% in herd population terms and about a 0.1% increase in animal population terms.

In Scotland, there were 45 new bTB incidents in 2011, an equal number to those in 2010. Of the new incidents in 2011, 8 were post-mortem and/or culture-confirmed, the same number as in 2010⁷. The majority of these bTB incidents in Scotland were due to inward movements of cattle from high risk areas elsewhere in the UK and Ireland.

One hundred and thirty three⁸ incidents of *M. bovis* infection in non-bovine domestic animals (mainly sheep, goats, pigs, camelids, dogs, cats and farmed deer) and wild deer in GB were confirmed by culture of the bacterium during 2011. This compares to 134 incidents during 2010.

Further information

For historical annual bTB incidence and charts (1998-2011):

www.defra.gov.uk/statistics/foodfarm/landuselivestock/cattletb/regional/

The GB data provided above on animal incidents was accessed on 17 October 2012 from this link (all TB data in this Defra TB database are provisional and subject to change as more data becomes available).

⁷ The 2010 figure has been updated from 15 to 8

⁸ These figures represent submissions from individual animals, not premises, ie several submissions may be from the same premises.

Brucellosis (*Brucella* spp.)

The cattle population of GB has been Officially Brucellosis Free (OBF) since 1985; while Northern Ireland has not yet achieved this status. Bovine brucellosis was largely eradicated from Northern Ireland during the 1980s and only sporadic outbreaks occurred during 1990 to 1996. In 1997, three primary outbreaks resulted in secondary and tertiary spread to more than 60 farms. The presence of *B. abortus* in cattle in Northern Ireland continues to constitute a risk to public health but its prevalence has fallen since the peak of infection in 2002.

Infections with *B. ovis*, *B. melitensis*, *B. suis* and *B. microti* have never been detected in the animal population in the UK. The marine species *B. ceti* and *B. pinipedalis* have occasionally been isolated from marine mammals washed up on the coast around the UK.

As a result of the low prevalence in cattle in the UK, brucellosis in humans is generally acquired abroad (usually *B. melitensis*). Cases of *B. abortus* are occasionally acquired in Northern Ireland, peaking in 2002 along with the peak of infection in cattle. Most human cases of brucellosis are acquired through the consumption of unpasteurised milk and dairy products. However, where disease exists in cattle, infection is often as a result of occupational exposure through the handling of infected afterbirths and the products of conception (e.g. farmers, veterinarians and abattoir workers).

Infection in humans

Between 2000 and 2010 an average of 20 cases of acute brucellosis were identified in humans each year. This level of infection has remained relatively stable, with a slight decline in recent years.

In 2011, 25 cases of brucellosis in humans were identified in the UK (Table 1): 17 in England and Wales, six in Scotland and two in Northern Ireland. Twelve of the cases were known to be infected with *B. melitensis* (all in England and Wales), and three were infected with *B. abortus*. Whilst the sources or countries of infection were not consistently reported, 13 of the English and Welsh cases were believed to have been acquired overseas, as were two of the Scottish cases.

Neither of the two cases from Northern Ireland were travel-associated. The incidence of brucellosis in humans in Northern Ireland closely corresponds to trends in the percentage of positive herds in Northern Ireland during the period 2000-2011 (see Figure 1) and has shown an overall decrease since 2000.

Table 1: Reports of *Brucella* infection in humans in the UK, 2011

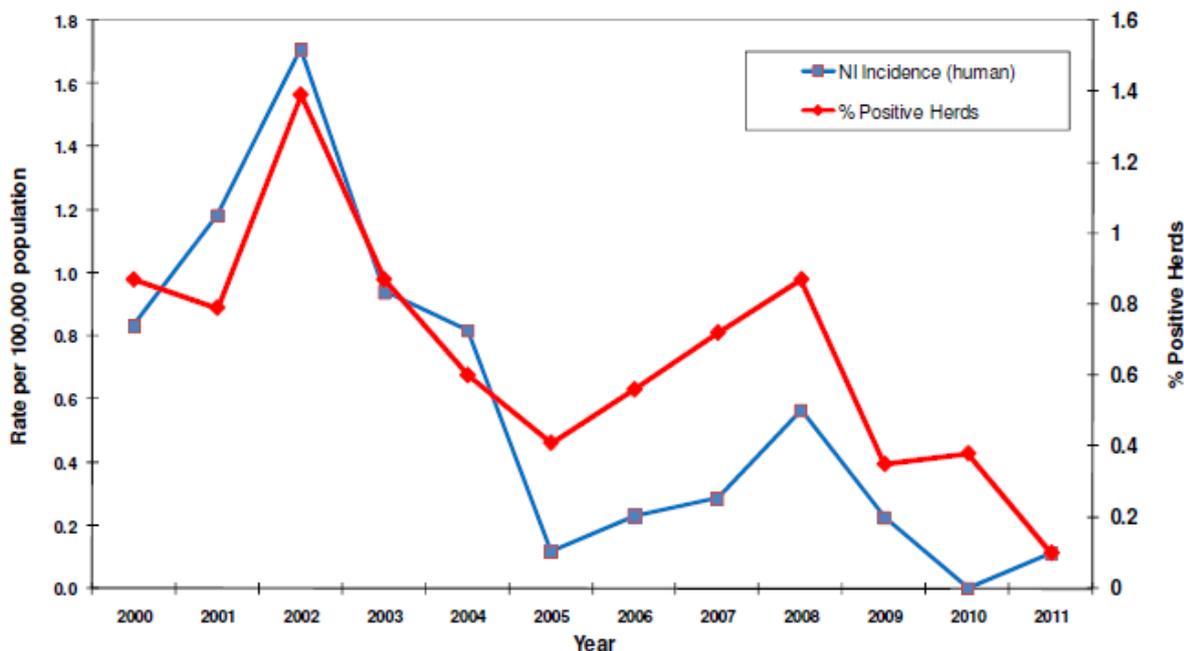
	England & Wales	Scotland	Northern Ireland	UK Total
<i>B. abortus</i>	1	0	2	3
<i>B. melitensis</i>	12	0	0	12
Other <i>Brucella</i> spp.	4	6	0	10
Total	17	6	2	25

Infection in animals

A programme of surveillance is carried out in GB to ensure that the OBF status is not compromised. OBF status underpins international trade and it is important to detect an incursion as quickly as possible should one occur. Cattle surveillance includes targeted post-import testing of breeding cattle, risk-based investigations of cattle abortions and premature calvings and testing of bulk milk samples from all dairy herds. An annual survey to specifically demonstrate the absence of *B. melitensis* in sheep and goats, as required by EU Council Directive 91/68/EEC, is conducted in the UK. Evidence of absence of *B. melitensis* is also supported through the testing of submissions of abortion samples from sheep and goats.

No cases of brucellosis were detected in animals in GB during 2011. Tests were carried out on 66,413 bulk milk samples, 6,229 cattle abortions and premature calvings, 2,137 post importation tests of breeding cattle and 4,296 tests of imported cows at their first calving following importation. The annual sheep and goat survey which tested 21,634 small ruminants from 1,341 sheep flocks and 658 goats from 151 herds, found no evidence of *B. melitensis*.

Figure 1: Incidence of *Brucella abortus* in humans and percentage of positive herds in Northern Ireland, 2000-2011



In Northern Ireland in 2011, 890,263 eligible animals in 22,453 cattle herds were tested for *B. abortus*. Twenty-five herds (0.1%) were positive (lower than in 2010, 0.4% of herds) and, of these, 21 new herds were positive. A total of 247 cattle were positive (0.03%), with 6 herds confirmed by bacteriological culture. These results support the continued decline in *B. abortus* in Northern Ireland.

Campylobacteriosis (*Campylobacter* spp.)

Campylobacter jejuni and *C. coli* can be found in a wide range of livestock and wildlife species, but do not generally cause disease in animals. *Campylobacter fetus* is a common cause of abortion in sheep and may occasionally cause serious systemic disease in humans. Other species, such as *C. sputorum*, *C. hyointestinalis* and *C. lari* are present in mammals and birds in the UK, but are not generally considered of public health importance.

Campylobacter is the most commonly reported bacterial gastrointestinal pathogen in humans in the UK. *Campylobacter jejuni* accounts for approximately 90% of human infection⁹. However, most laboratories do not routinely speciate strains isolated from human clinical specimens, so changes in relative prevalence may not be detected.

⁹ The Second Study of Infectious Intestinal Disease in the Community 2011. FSA London.

Campylobacter was found to cause illness in 1972, by 1986 it had replaced salmonella as the most commonly reported gastrointestinal pathogen in the UK. Transmission to humans is through the faecal-oral route, usually by the consumption of contaminated foods or water.

Infection in humans

National laboratory report surveillance for *Campylobacter* began in 1982. Relatively small dips in reporting were recorded in the period 2000-2004 and in 2008, but otherwise there has been an upward trend.

In 2011, there were 72,150 laboratory reports of *Campylobacter* in the UK. This is an increase of 2.6% from 2010. However, whilst reports increased by 13.0% in Northern Ireland and 3.1% in England and Wales, they fell by 3.3% in Scotland (Table 2). See also feature article 2.

Table 2: Number of *Campylobacter* reports in humans 2008-2011

Year	England & Wales	Scotland	Northern Ireland	UK
2008	49,883	4,878	848	55,609
2009	57,651	6,415	977	65,043
2010	62,657	6,601	1,040	70,298
2011*	64,604	6,371	1,175	72,150

*These figures are provisional and may be subject to change due to delayed reporting

The Second Study of Infectious Intestinal Disease in the Community established that the ratio of unreported human *Campylobacter* infection to reports to national surveillance is 9.3 to 1¹⁰. This suggests that in 2011, there were approximately 740,000 *Campylobacter* cases in the UK.

The reporting of foodborne *Campylobacter* outbreaks continues to rise in England and Wales. In 2011, 20 outbreaks were reported compared to 18 in 2010. The majority of outbreaks were associated with consumption of chicken liver pâté/parfait (n=13) at food service premises¹¹. Evidence gained from outbreaks during 2011 shows that chefs

¹⁰ Tam CC, *et al.* Longitudinal study of infectious intestinal disease in the UK (IID2 study): incidence in the community and presenting to general practice (2012) *Gut* Jan; 61(1):69-77.

¹¹ HPA. *Campylobacter* now the leading cause of general foodborne outbreaks in England and Wales. *HPR* 5(19) (13 May 2011). www.hpa.org.uk/hpr/archives/2011/hpr1911.pdf

continue to use undercooked chicken livers in the preparation of parfait or pâté despite specific food safety advice tailored for the catering sector. A summary of foodborne outbreaks by zoonotic pathogen, broken down by food vehicle category is given in appendix 6. *Campylobacter* is targeted by a FSA Strategy. More detail is provided in the second feature article in this report.

Infection in animals

The majority of livestock derived samples were from ruminant abortion investigations. One hundred and thirteen (70.2%) of the ovine isolates were *C. fetus fetus*, compared to 76% in 2010, with the remaining 48 (29.8%) a mixture of enteric strains (24% in 2010). Of the 89 bovine isolates, 37 (41.6%) were identified as *C. fetus venerealis* compared to 45% in 2010 and 11 (12.4%) were *C. fetus fetus* (8% in 2010). All but one isolates from pet animals were from testing undertaken by SAC, with the exception of one isolate of *C. jejuni* from a cat.

Table 3: Number of *Campylobacter* isolates identified by Government laboratories in animal derived samples in the UK in 2011

	Total units tested positive for <i>Campylobacter</i>	<i>C. coli</i>	<i>C. jejuni</i>	<i>C. lari</i>	<i>C. upsaliensis</i>	<i>Campylobacter</i> spp, unspecified	<i>C. fetus- C. fetus</i> subsp fetus	<i>C. fetus- C. fetus</i> subsp venerealis	<i>C. hyointestinalis</i>	<i>C. mucosalis</i>
Cattle	89	1	7	0	1	32	11	37	0	0
Pigs	7	5	1	0	0	0	0	0	1	0
Sheep	161	12	26	0	1	8	113	0	1	0
Birds (a rhea)	1	1	0	0	0	0	0	0	0	0
<i>Gallus gallus</i>	6	1	3	0	0	0	0	0	0	2
Turkeys	1	1	0	0	0	0	0	0	0	0
Cats	17	0	6	0	5	6	0	0	0	0

Dogs	126	4	36	3	31	52	0	0	0	0
Rabbit	1	0	0	0	0	1	0	0	0	0
Total	409	25	79	3	38	99	124	37	2	2

Chlamydiosis and Psittacosis

Ovine chlamydiosis (*Chlamydophila abortus*)

Ovine chlamydiosis caused by infection with *Chlamydophila abortus* results in enzootic abortion in ewes, goats and occasionally cattle. The main route of transmission to humans is through the inhalation of aerosols and contaminated dusts.

This infection can cause serious zoonotic disease in pregnant women, resulting in stillbirth or abortion. However, human infections appear to be rare.

Infection in humans

It has been generally accepted that there are only one or two cases of *C. abortus* each year in pregnant women in the UK. However the number of human cases of *C. abortus* occurring annually is uncertain as routine serological testing does not distinguish between *C. abortus* and other *Chlamydophila* species. Diagnosis of *C. abortus* is dependent primarily on clinical suspicion in a person with positive serology for chlamydial infection and relevant exposure to sheep/lambing.

There were no human cases reported in 2011 in the UK.

Infection in animals

In 2011, *C. abortus* was identified in sheep and goats in UK in 451 submissions with abortion as the presenting sign (Table 4). This represents 40.2% of small ruminant abortion submissions where a diagnosis was reached by UK government laboratories. (The percentage of GB abortion submissions in 2010 where *C. abortus* was 35.8%). There were no confirmations in abortion material from cattle in 2011, compared to three cases diagnosed in GB in 2010.

Table 4: Laboratory confirmed reports of *C. abortus* in animals in the UK, 2011

	GB	NI	UK Total
Sheep and goat abortions submissions to AHVLA and SAC in GB, and AFBI in NI, where a diagnosis is reached	858	263	1121
Isolation of <i>C. abortus</i> in goat abortion material	1	1	2
Isolation of <i>C. abortus</i> in sheep abortion material	389	60	449
<i>C. abortus</i> confirmed as cause of abortion	390	61	451

Psittacosis (*Chlamydophila psittaci*)

Psittacosis (also known as ornithosis or chlamydiosis) is an infection caused by *Chlamydophila psittaci*. It has been described in over 130 species of birds but is most common in psittacines (parrots and parakeets). Other birds commonly affected include pigeons and doves, whilst turkeys, ducks and geese can also be infected.

Transmission of *C. psittaci* from birds to humans most often occurs via infectious aerosols, so the presence of strong air currents may be a factor in its spread¹². It is likely that most, if not all, cases of psittacosis are attributable to exposure to birds or bird products.

Infection in humans

In 2011, there were 41 laboratory reports of human infection with *C. psittaci* in the UK; 40 cases in England and Wales and one in Scotland. No cases were diagnosed in Northern Ireland. This compares with 58 cases reported in 2010 in the UK. However, a lack of specific serological testing means that reported cases could have been caused by *Chlamydophila* species other than *C. psittaci*.

The outbreak of psittacosis in Scotland described in feature article 4 began in December 2011, but most of the cases occurred in 2012, and will therefore be reflected in next year's numbers.

Infection in animals

Tests used on animal samples do not differentiate between different strains of *Chlamydophila*, so it is not possible to report the number of *C. psittaci* infections in animals in 2011. However, eight cases of chlamydiosis were diagnosed by government

¹² www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Psittacosis/GeneralInformation/psiControlofPsittacosis/

laboratories following testing of samples from birds during 2011 in GB (the same number as in 2010).

Cryptosporidiosis (*Cryptosporidium* spp.)

Cryptosporidiosis is a disease caused by protozoan parasites of the genus *Cryptosporidium*. *Cryptosporidium hominis* is normally only recovered from humans and *C. parvum* is found in both animals and humans. Together, these *Cryptosporidium* species are responsible for up to 96% of cases in the UK and have different risk exposures, seasonal and geographical distributions¹³.

Young calves (particularly those aged between 10-20 days) are considered to be the major animal reservoir for *C. parvum*, but infection can also be acquired from other species, particularly lambs and goat kids. *C. parvum* is considered to be endemic on the majority of cattle holdings in the UK, and is also common in sheep flocks and deer. Clinical disease (diarrhoea) is seen in young animals, but may not always be apparent.

Human infection is acquired through the consumption of contaminated food or water, contact with infected animals, exposure to faeces in the environment or person-to-person spread. Confirmed reports of cryptosporidiosis in humans in the UK follow a bimodal seasonal pattern, with higher incidence occurring in spring and early autumn. The spring peak consists predominantly of *C. parvum* cases, which are most likely acquired from animal sources. In contrast, the larger, early autumn peak has a greater rise in *C. hominis* cases, many of which are associated with travel outside the UK¹³.

Infection in humans

The Second Study of Infectious Intestinal Disease in the Community indicated that the ratio of unreported human cryptosporidiosis in the community to reports to national surveillance is approximately 8.2 to 1¹⁴. This suggests that, in 2011, there were approximately 34,000 cases of cryptosporidiosis in the UK.

The number of cases diagnosed and reported in the UK in 2011 was 3,655. This is over 20% less than in 2010, and the fall was consistent across England, Wales and Scotland (see Table 5). However an increase of 17.6% in reporting was recorded in Northern Ireland.

¹³ Chalmers RM, *et al.* Epidemiology of anthroponotic and zoonotic human cryptosporidiosis in England and Wales, 2004 to 2006. *Epidemiology and Infection* 2011; 139(5): 700-712.

¹⁴ Tam CC, *et al.* Longitudinal study of infectious intestinal disease in the UK (IID2 study): incidence in the community and presenting to general practice (2012) *Gut* Jan; 61(1):69-77.

Table 5: Number of *Cryptosporidium* reports in humans 2010-2011

Year	England & Wales	Scotland	Northern Ireland	UK
2010	4,095	584	119	4,798
2011	3,074	441	140	3,655

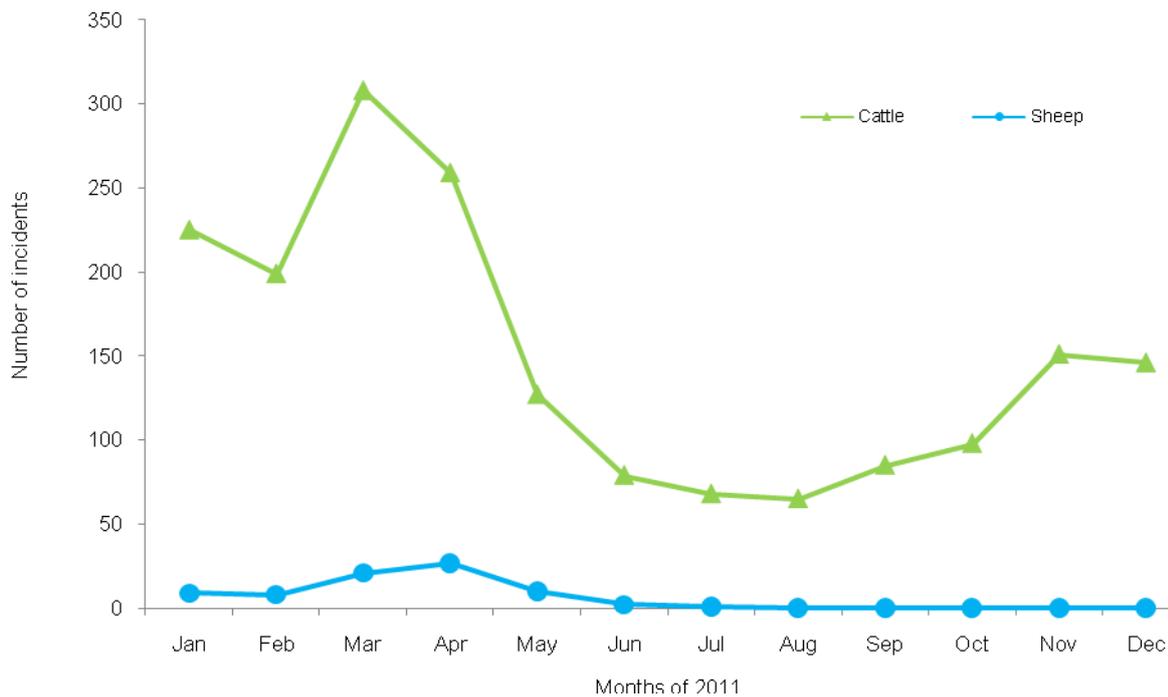
In 2011, there were twelve outbreaks of *Cryptosporidium* reported in England and Wales, compared to seven reported in 2010. The most common outbreak settings in 2011 were petting/open farms, swimming pools and freshwater exposure.

Infection in animals

Clinical cryptosporidiosis is common in animals in GB. Examination of VIDA data indicates that of clinical material examined by government diagnostic laboratories in GB, clinical infection with *Cryptosporidium* spp. was diagnosed in 19.6% of cattle submissions and 3.1% of sheep submissions tested.

There were 1,095 diagnoses of clinical animal infection with *Cryptosporidium* recorded in GB (1,033 in cattle, 56 in sheep, two in pigs, three in birds and one in red deer), and 286 in Northern Ireland in 2011 (271 in cattle and 15 in sheep). Recorded incidents in cattle and sheep show a distinct seasonal distribution, with a peak in the spring (Figure 2).

Figure 2: Recorded diagnosis of cryptosporidiosis in cattle and sheep in UK, 2011



Echinococcosis

Cystic hydatidosis (*Echinococcus granulosus*)

Echinococcus granulosus is a tapeworm which inhabits the small intestine of canines. At least nine *E. granulosus* strain genotypes are now recognised worldwide, of which two are present in UK in indigenous animals: a sheep adapted strain involving a dog to sheep life-cycle, and a horse adapted strain involving a dog to horse life-cycle. The latter is the only strain present in Northern Ireland.

The main cycle of infection in GB is between farm dogs and sheep (see feature article 3). Sheep acquire hydatidosis by grazing on pastures contaminated with dog faeces containing the cestode eggs or by ingesting other contaminated feed. Cattle can also be infected with the sheep strain, but resultant cysts are usually sterile. Dogs are infected by ingesting animal viscera containing viable cysts.

Humans can act as an accidental intermediate host through direct contact with infected dogs or their faeces. Developing cysts may grow for 20 or more years before becoming large enough to cause a range of symptoms depending on the affected organ and the location of the cyst.

Infection in humans

The number of indigenously acquired human cases in the UK is usually very low, with an average of one new case identified approximately every five years.

During 2011, 15 confirmed cases of hydatid disease in humans were reported in the UK (compared with seven in 2010); 12 in England and Wales, three in Scotland, and none in Northern Ireland. All 12 cases in England and Wales and one of the Scottish cases had a travel history suggesting that they contracted their disease outside of the UK.

Infection in animals

The following figures are reported findings of hydatid disease at post mortem inspection of sheep and cattle for human consumption at licensed abattoirs in GB during 2011. There was a throughput of 14,450,396 sheep, of which 56,782 (0.4%) were recorded as being affected with hydatid cysts (0.5% in 2010). Of a throughput of 2,856,081 cattle, 1,402 (0.05%) were recorded as affected with hydatid cysts (0.06% in 2010).

In Northern Ireland there was a throughput of 301,401 sheep and 451,716 cows during 2011. There was one ovine case of hydatid disease reported in 2011. Prior to 2011 the last recorded detection in Northern Ireland was in June 2006.

In 2008, the Welsh Government launched a Wales-wide hydatid disease awareness campaign and a South Powys pilot eradication scheme, which continued throughout 2009 and finished in 2010. This was focussed in the same area as a previous dog worming campaign in South Powys, Wales undertaken in the eighties, and was initiated following evidence¹⁵ to suggest a rising trend of dog infestation.

Data from the South Wales pilot eradication scheme indicated an initial prevalence of 9% of farm dogs sampled. One or more dogs on 20% of farms tested positive, representing a potential human health risk. The study helped confirm that worming dogs regularly remains highly effective and a key personal health protection measure. Refer to feature article 3 for additional information.

Alveolar echinococcosis (*Echinococcus multilocularis*)

Echinococcus multilocularis causes alveolar hydatid disease, which has a wide geographical distribution across the Northern hemisphere throughout North America, Asia and Europe. Alveolar hydatid disease is a much more invasive disease in man than cystic hydatidosis. The life-cycle normally involves foxes and raccoon dogs as definitive hosts and small rodents, particularly voles, as intermediate hosts. Dogs, cats and wolves may also act as definitive hosts to a lesser extent.

¹⁵ Buishi I, *et al.* (2005) Re-emergence of canine *Echinococcus granulosus* infection, Wales. *Emerg Infect Dis.* 11(4):568-71

Echinococcus multilocularis is not known to be present in indigenous animals in the UK, although rarely cases have been identified in imported animals in previous years. Dogs entering the UK from mainland Europe are required to receive treatment for *E. multilocularis* under the 'Pets Travel Scheme'.

There is evidence that the distribution of *E. multilocularis* is spreading in northern Europe^{16,17,18}. Particular concern has been expressed in relation to the increase in the number of urban foxes. In Sweden (previously thought to be *E. multilocularis* free) a small number of foxes have tested positive since December 2010¹⁹. In April 2012 Denmark reported a fox tested positive for *E. multilocularis* (using samples collected in November 2011) after several years of surveillance found no evidence of infection^{20,21}.

The European Commission adopted Regulation (EU) No 1152/2011 of 14 July 2011, as regards preventive health measures for the control of *E. multilocularis* infection in dogs²². It states the requirements for implementing a pathogen-specific surveillance programme regarding the sampling, the detection techniques and the reporting which allows the UK, Ireland, Finland and Malta to maintain disease free status. Under this regulation, a programme is in place to carry out surveillance in foxes sufficient to detect not more than 1% prevalence with a confidence of 95% (at least 300 foxes sampled). This ongoing surveillance in the UK has demonstrated that the UK fox population remains free of *E. multilocularis* in 2011-2012.

Leptospirosis (*Leptospira interrogans* serovars)

Leptospirosis is a zoonotic disease caused by the bacterium *Leptospira interrogans*, of which only some strains are pathogenic. *Leptospira Icterohaemorrhagiae* is the main serovar causing human disease.

Leptospire are widespread amongst feral and domesticated mammals. The serovars encountered most frequently in farm livestock in the UK are *L. Hardjo* (cattle), *L. Bratislava* (pigs) and *L. Icterohaemorrhagiae* (which affects a wide range of wild and domestic species). Leptospirosis is a major cause of economic loss to intensive cattle and pig

¹⁶ Takumi K, *et al.* Evidence for an increasing presence of *Echinococcus multilocularis* in foxes in The Netherlands. *Intl J for Parasitology* 2008; 38(5):571-578.

¹⁷ Berke O, *et al.* Emergence of *Echinococcus multilocularis* among red foxes in northern Germany 1991-2005. *Veterinary Parasitology* 2008; 155(3-4):319-322.

¹⁸ Vervaeke M, *et al.* Spatial spreading of *Echinococcus multilocularis* in red foxes across nation borders in Western Europe. *Preventive Veterinary Med.* 2006; 76(3-4):137-150.

¹⁹ www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20215

²⁰ OIE (2012)

www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapEventSummary&reportid=11865

²¹ OIE (2012)

www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=12539

²² OJ L 296, 15.11.2011, p.6.

http://eur-lex.europa.eu/JOIndex.do?year=2011&serie=L&textfield2=296&Submit=Search&_submit=Search&ihmlang=en

industries in developed countries²³. Clinical disease in animals in GB is less common than in the past although it remains a significant problem in Northern Ireland.

Humans mainly acquire infection by direct contact with the urine of chronically infected carrier animals. Infection occurs when spirochaetes in contaminated water or soil enter micro-abrasions in healthy intact skin or intact mucous membranes or conjunctiva. They may also cross the nasal mucosa and pass through the lungs (from inhalation of aerosolised body fluids)²⁴. Most reported cases occur in men, probably due to greater occupational and recreational exposures.

Infection in humans

During 2011, 52 cases of leptospirosis were reported in the UK (Table 6). The following serovars were determined by the *Leptospira* Reference Unit: *L. Icterohaemorrhagiae* (n=10); *L. Hardjo* (n=4); *L. Saxkoebing* (n=2); *L. Australis* (n=2); *L. Autumnalis* (n=1); other serovars (n=2). The infecting serovar was not determined for the remaining 31 cases.

Table 6: Laboratory confirmed reports of leptospirosis in UK residents, 2008-2011

Year	England & Wales	Scotland	Northern Ireland	UK
2008	62	13	1	76
2009	52	4	0	56
2010	39	3	0	42
2011	44	5	3	52

Thirty seven of the UK cases were acquired indigenously, and 15 were acquired through travel (mostly from South-East Asia and Australasia). Fourteen of the indigenous infections were likely to have been acquired through occupational activities (including three farmers, one slaughterhouse worker, and a waterways worker). Sixteen further cases were likely to have been acquired through recreational or non-occupational exposures to rodent-infected or contaminated environments. There was no risk factor information available for the remaining cases. There were no fatalities reported. Over half of the infections occurred in the last quarter of the year.

²³ Ellis, WA (1998) Leptospirosis. In: Zoonoses. Palmer SR *et al.* Oxford, Oxford University Press, p115-126.

²⁴ Smith, RM *et al.* (2011) Leptospirosis. In: Zoonoses (2nd Ed). Palmer SR *et al.* Oxford, Oxford University Press, p.224-231.

Infection in animals

Countries within the UK use different diagnostic methods, and the diagnostic criteria required for disease confirmation have also changed in recent years. It is therefore difficult to make comparisons between countries and time periods.

In 2011, 346 specimens from a range of mammalian species (mainly cattle and pig foetal kidneys) in England and Wales were examined by real-time PCR for pathogenic leptospires. Of the 280 samples suitable for testing, one (0.6%) of 172 bovine samples (0.7% in 2010) and two (1.9%) porcine samples (0.8% in 2010) were positive.

There is no evidence to suggest that leptospirosis is a significant clinical animal health problem in England or Wales, although this will be in part because of the level of vaccination currently undertaken. The level of uptake of the available vaccines is difficult to assess. During 2011 the AHVLA tested 10,667 serum samples from a range of species for diagnostic, monitoring and export (mainly dogs) purposes. A summary of the positive samples is given in Table 7, however it should be noted that only a few samples were examined for the full range of serovars. These data only indicate serological evidence of exposure and/or vaccination (which is widely practiced) and not clinical disease.

Serological testing of dairy herds in England and Wales in 2011 to monitor *L. Hardjo* status continued to show evidence of potentially active infection and/or extensive vaccination in about 58% of herds²⁵. In Northern Ireland, of 860 suitable samples (including cattle samples) examined by the fluorescent antibody test and there were 46 confirmed cases (5.3%).

²⁵ FZ2100 report: http://vla.defra.gov.uk/reports/docs/rep_zoo0410.pdf

Table 7: Detection of antibody (possibly vaccination associated) to pathogenic leptospires in serum samples submitted to AHVLA for testing using the Microscopic Agglutination Test, 2011

	Dogs	Cattle	Pigs	Horses
Total samples	3,609	3,742	611	103
Positive <i>L. Canicola</i>	1,267*	0	0	0
Positive <i>L. Icterohaemorrhagiae</i>	570*	0	0	2
Positive <i>L. Hardjo</i>	0	786*	0	0
Positive <i>L. Bratislava</i>	10	0	97	1
Positive <i>L. Copenhageni</i>	34	0	0	0
Positive <i>L. Pomona</i>	0	0	12**	0
Positive <i>L. grippityphosa</i>	0	0	0	3

It should be noted that results only reflect the serological tests requested for each submission, and therefore significant titres to other *Leptospira* serovars could be missed.

* Serovars for which a vaccine is available in this species.

** All 12 samples from pigs from one farm. See also the text below

In 2011, investigations in a breeder-finisher herd that had been experiencing increasing reproductive problems revealed serological evidence of exposure to *L. interrogans* serogroup *pomona* in a number of sows and detection of pathogenic leptospires in kidney tissue taken from a jaundiced neonatal piglet. The epidemiology of this incident and subsequent isolation of an organism identified as *L. pomona* from wild rodents and insectivores living around the unit suggested that a wildlife-adapted strain was responsible. Reports of similar infection and disease in other herds adjacent to or associated with this herd were not received and this incident was not considered to be consistent with evidence of infection with *L. interrogans* serogroup *pomona* serovar *pomona* genotype *kennewicki* which is the strain associated with severe disease in countries such as the USA and Canada.

Listeriosis (*Listeria monocytogenes*)

Listeria monocytogenes is widely distributed in the environment, including in soil, decaying vegetation and fodder such as silage in which the bacteria can multiply. In animals, listeriosis is mainly a disease of farmed ruminants, with cattle and sheep considered the most important species. Infection occurs due to direct ingestion of soil or through soil-contaminated feed, notably spoiled silage.

In humans, the disease most commonly occurs in pregnant women, neonates and people over the age of 60 years with underlying medical conditions. Consumption of foods contaminated with *L. monocytogenes* is the main route of transmission to humans. Zoonotic infection acquired directly from animals is also possible, although cases reporting animal contact are rare.

Infection in humans

There were 164 cases in the UK in 2011, a decrease of 7.9% when compared with 2010. Twenty-nine of the cases were pregnancy-associated (Table 8).

Table 8: Laboratory reports of listeriosis in humans in the UK, 2008-2011

		2008	2009	2010	2011
England and Wales	Pregnancy associated cases	20	34	19	27
	Others	162	180	140	120
	Total cases	182	214	159	147
Scotland	Pregnancy associated cases	0	1	1	2
	Others	15	16	16	12
	Total cases	15	17	17	14
Northern Ireland	Total cases	11	4	2	3
	Total	208	235	178	164

In 2011, one outbreak of listeriosis was reported in England. The vehicle of infection was found to be sandwiches served in hospital²⁶. A summary of foodborne outbreaks by zoonotic pathogens, broken down by food vehicle category is given in appendix 6.

Infection in animals

The majority of cases in the UK occur between January and April when many animals, especially cattle, are housed. This peak in cases is considered to be linked to the feeding of soil-contaminated silage. During 2011, 145 diagnoses of listeriosis in animals were made in the UK (Table 9). Of these, 126 occurred in GB compared to 215 in 2010, a decrease of 58.6%. The reason for the decrease is uncertain but may be associated with the particularly dry summer in many areas of the country which facilitated making good quality silage. The risk of contamination with *Listeria* spp. increases if silage is made during wet weather, which may explain the variation in the incidence of disease over successive years. The number of diagnoses in Northern Ireland during 2011 (19 cases, 17 of which were *L. monocytogenes*) was similar to the 2010 total of 22 positives (19 of these were *L. monocytogenes*).

Table 9: Confirmed *Listeria* cases in animals in the UK, 2011

Animal	<i>Listeria</i> (all species)
Birds (at farm)	3
Cattle	36
Sheep and goats	102
Other	4
Total	145

Lyme Borreliosis (*Borrelia burgdorferi*)

Lyme borreliosis, known as Lyme disease, is caused by the bacterium *Borrelia burgdorferi* and is transmitted to humans and animals through the bite of an infected tick (*Ixodes* species). It is the most common tick-borne infection in the temperate northern hemisphere and numbers have increased within the UK since 2001. The majority of UK cases are

²⁶ Coetzee N, *et al.* A cluster of *Listeria monocytogenes* infections in hospitalised adults, Midlands, England, February 2011. *Euro Surveill.* 2011; 16(20). www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19869

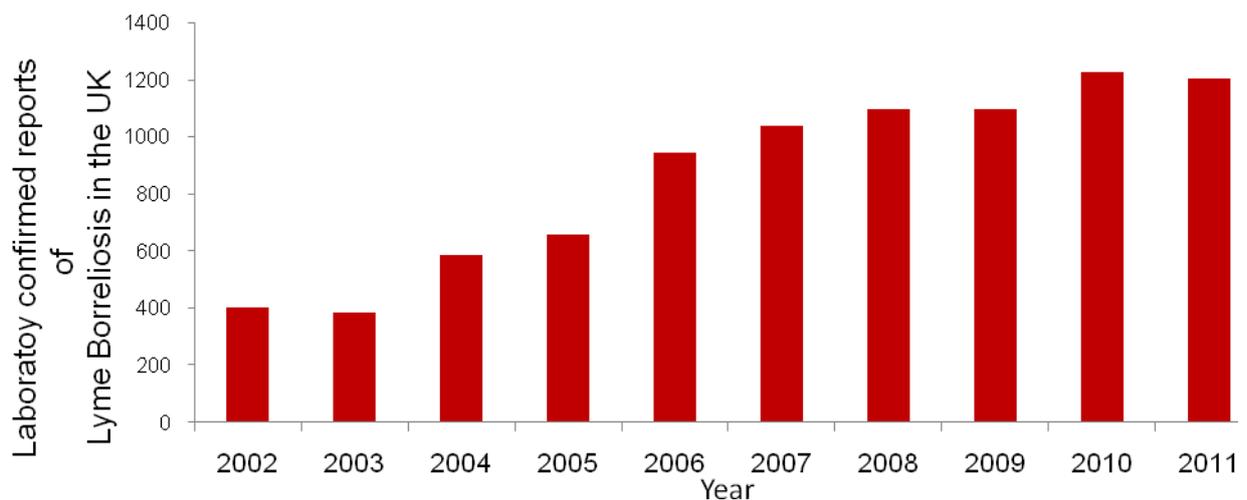
indigenously acquired, usually through recreational activities including country or hill walking, running, orienteering or gardening.

Well known regional foci of Lyme borreliosis include the New Forest, Salisbury Plain, Exmoor, the South Downs, parts of Wiltshire and Berkshire and Thetford Forest. Similar foci are known on the west coast and Highlands and Islands of Scotland.

Infection in humans

The number of reported cases of Lyme disease has tended to increase in recent years, but fell in 2011 due to a 25.6% decline in Scotland. There were 1,201 serologically confirmed cases of *B. burgdorferi* infection in humans in the UK in 2011 (959 in England and Wales, 229 in Scotland, and 13 in Northern Ireland), slightly less than in 2010 (n=1,225) (Figure 3).

Figure 3: Number of laboratory confirmed human cases of Lyme borreliosis in the UK, 2002-2011



Of the 959 cases in England and Wales, 197 (20.5%) are known to have acquired their infections overseas (compared with 18.1% in 2010). The seasonal pattern in 2011 was similar to previous years, with infections reported throughout the year and with a peak in the third quarter. This is consistent with the major tick feeding period which occurs in the late spring and early summer months.

In England and Wales, reports were received from all regions, with the South East and South West contributing 44% and 32% respectively of the total reports.

Further information

British Infection Association Position Statement on Lyme disease in the UK:

www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1309968694565

A detailed review of Lyme borreliosis cases in England and Wales during 2011 is available on the HPA website:

www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/LymeDisease/EpidemiologicalData/lym010Lymeborreliosis2011/

An update on the changes to Lyme diagnostic services is available at:

www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/LymeDisease/LymeDiseaseDiagnosticServices/lym010LymeDiagnosticServices/

Pasteurellosis (*Pasteurella* spp.)

Pasteurellosis is a zoonotic bacterial disease with a worldwide distribution. *Pasteurella multocida* is found in the upper respiratory tract of many animal species including cats, dogs, chickens, turkeys, cattle, pigs, rabbits and rodents. It can cause disease in wild and domesticated animals, including 'avian cholera' in birds and poultry, respiratory disease and septicaemia in cattle, mice and rabbits, and atrophic rhinitis in pigs.

In humans, *P. multocida* is the species most commonly associated with infection. The most common mode of zoonotic transmission to humans is via dog or cat bites and scratches. These frequently lead to a cutaneous infection, which may be severe.

Infection in humans

There were 668 laboratory confirmed reports of human pasteurellosis in the UK in 2011, a 14.0% increase on the 586 cases reported in 2010 (Table 10).

In 2011, 538 cases were reported in England and Wales (387 of which were *P. multocida*), compared to 466 (including 344 *P. multocida*) in 2010. There were 129 cases reported in Scotland in 2011 (63 of which were *P. multocida*) compared to 120 (including 76 *P. multocida*) in 2010. One case was reported in Northern Ireland in 2011 compared to no cases in 2010.

Table 10: Laboratory confirmed reports of pasteurellosis in humans in the UK, 2011

Serovar	England and Wales	Scotland	Northern Ireland	UK total
<i>P. aerogenes</i>	2	0	0	2
<i>P. haemolytica</i>	3	0	0	3
<i>P. multocida</i>	387	63	0	450
<i>P. pneumotropica</i>	20	10	0	30
<i>P. other named</i>	16	18	0	34
<i>Pasteurella spp</i>	110	38	1	149
Total	538	129	1	668

Infection in animals

There were 464 cases of *P. multocida* diagnosed in animals in the UK during 2011 (Table 11). The difference in the number of incidents diagnosed in 2011 compared to 2010 is non-significant when considered alongside the differing submission levels in the two years.

Table 11: Laboratory confirmed reports of *P. multocida* in animals in the UK, 2010-2011

Year	2010			2011		
	GB	NI	UK	GB	NI	UK
Cattle	199	99	298	142	112	254
Sheep	96	2	98	104	29	133
Pigs	51	28	79	55	7	62
Birds	19	9	28	6	0	6
Miscellaneous / wildlife	2	4	6	5	0	5
Goats	1	0	1	4	0	4
Total	368	142	510	316	148	464

Q Fever (*Coxiella burnetii*)

Q fever is caused by the bacterium *Coxiella burnetii*. It can survive for long periods in the environment and is generally transmitted in aerosols or by fomites, including dust particles. *Coxiella burnetii* infection occurs mainly in domesticated ruminants (cattle, sheep and goats), where it can cause abortion. Most cases of abortion due to Q fever in livestock are sporadic, although larger outbreaks can occur.

Transmission to humans mostly occurs through exposure to aerosols containing *C. burnetii*. This may arise via bacterial shedding in products of abortion or normal parturition, or result from contaminated dust particles or bedding. Most human infections are asymptomatic, but cases may present as acute or chronic disease, and relapses may occur. Since 1999, HPA data shows that an average of 16% of cases diagnosed annually are chronic.

Infection in humans

In 2011, routine laboratory surveillance identified 37 cases in England and Wales, while seven cases were reported in Scotland and one in Northern Ireland (Table 12).

Enhanced surveillance data for England and Wales based on diagnoses from HPA reference laboratories identified 104 cases, compared to 52 in 2010 (an increase of 100%). The increase occurred across most regions of England and Wales, and the ratio of

males to females was slightly higher in 2011 than in previous years (2.5:1, compared with 2.1:1 in 2010). There is some evidence of an increase in testing that might account for the finding, and further investigations are being undertaken.

Table 12: Laboratory confirmed reports of Q fever in humans in the UK, 2008-2011

Year	Scotland	Northern Ireland	England & Wales (Enhanced Surveillance*)	UK total**	England & Wales (Routine Surveillance)
2008	1	11	56	68	37
2009	2	2	27	31	15
2010	3	0	52	55	23
2011	7	1	104	112	37

*Acute and chronic cases from the Enhanced surveillance database in England and Wales. Data have been updated following a data cleaning project.

**The UK total includes the enhanced surveillance data but not routine surveillance data for England and Wales, as cases reported routinely may also be reported to enhanced surveillance.

There were two small incidents of Q fever in humans in the UK in 2011 worthy of note. The first occurred in Devon in January and consisted of a husband and wife, and the infection was probably acquired from the slaughter house where the husband worked. The second occurred in August and was a cluster of five cases in Yorkshire where no source was identified.

Infection in animals

In 2011, six cattle and two sheep were diagnosed with Q fever from abortion specimens submitted to AHVLA. There were no confirmed diagnoses of Q fever in Scotland from abortion specimens submitted to SAC and no reported cases of Q fever in Northern Ireland.

Further information

Information on Q fever infection risks during the lambing season are available at:

www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/QFever/GeneralInformation/qfevQFeverRisksLambingSeason/

Q fever information for farmers is available at:

Rabies (*Rhabdoviridae*)

Rabies is an acute viral infection of the central nervous system, caused by a lyssavirus in the family *Rhabdoviridae*. It affects all mammals, including humans, cats, dogs, wildlife and farm animals. In animals, three forms are classically described; prodromal, excitement (furious) and paralytic (dumb). The disease is absent from land mammals in the UK. The last case of rabies in an animal outside of quarantine in GB was a dog in Newmarket in 1970²⁷. In Northern Ireland the last case was reported in 1923. The last case of rabies in quarantine was reported in 2008 in England.

The virus is present in the saliva of affected animals, and the most frequent method of transmission to humans is by bites, scratches or licks to broken skin or mucous membranes. In humans, post exposure treatment with vaccine, and if indicated rabies immunoglobulin, is very effective in preventing disease. Once symptoms develop in untreated individuals, death is almost inevitable with very few documented survivors²⁸.

Infection in humans

The last case of human terrestrial rabies acquired in the UK was in 1902, however occasional travel-related cases do occur. Between 2000 and 2010, there were four cases of imported human rabies in the UK. The last of these was in December 2008 and resulted from a dog bite in South Africa two years earlier²⁹.

There were no human cases of rabies infection in 2011 in the UK.

Infection in animals

In 2011, 18 cats, 11 dogs, one pet chinchilla and one captive aardwolf died in quarantine and samples from each were submitted to the AHVLA for laboratory testing. None of the samples were positive.

The UK Pet Travel Scheme was launched in 2000 to allow people to bring in or travel with their pets (dogs, cats and ferrets), while ensuring the UK remains free from rabies and certain other exotic diseases. During 2011, 85,774 dogs, 8,279 cats, and 68 ferrets entered the UK under this scheme. In total, 864,707 pet animals have entered the UK since 2000 under the UK Pet Travel Scheme arrangements and there have been no cases of rabies in any of these animals.

²⁷ [Pethece CK, Hopes R](#). A case of rabies at Newmarket. [Vet Rec](#). 1970 Mar 7;86(10):299.b

www.ncbi.nlm.nih.gov/pubmed/5461596

²⁸ Jackson AC. Why does the prognosis remain so poor in human rabies? *Expert Rev. Anti Infect. Ther.* 2010; 8(6): 623-625

²⁹ Hunter M, *et al.* Immunovirological correlates in human rabies treated with therapeutic coma. *Journal of Medical Virology* 2010; 82: 1255-1265.

The UK harmonised its pet movement controls with the rest of the EU on the 1 January 2012. These controls make it easier to travel with pets. Under the EU scheme, the risk of rabies entering the UK remains very low.

Further information

Further information on pet movement rules can be found at: www.defra.gov.uk/pets

Bat rabies (European Bat Lyssavirus)

European Bat Lyssaviruses (EBLVs) 1 and 2 are commonly referred to as 'bat rabies'. EBLVs have been known to infect other animals and humans, presumably through a bite or scratch from an infected bat. Since 1977, there have been five human deaths in Europe (three confirmed, two possible) from EBLVs. In all cases the person had not received rabies vaccination either before or after the incident.

Infection in humans

In 2002, it was recognised that UK bats carry European Bat Lyssavirus 2 (EBLV-2) when the only case of EBLV-2 occurred in a human in the UK. This was when a bat handler was infected following a bite from a Daubenton's bat (*Myotis daubentonii*) in Scotland³⁰.

There were no human cases of bat rabies infection in 2011 in the UK.

Infection in animals

A seroprevalence study conducted in England between 2003 and 2006 found EBLV-2 antibodies in 2.2% of Daubenton's bats, and EBLV-1 antibodies in <1% of Serotine bats³¹.

Nine bats have tested positive through AHVLA's passive lyssavirus surveillance scheme since 1996 (Table 13). In 2011, 430 dead bats from the UK were submitted to the scheme. None tested positive for EBLV-2.

³⁰ Crowcroft N. Rabies-like infection in Scotland. *Euro Surveill.* 2002;6(50):pii=1984. Available online: www.eurosurveillance.org/ViewArticle.aspx?ArticleId=1984

³¹ Harris SL, *et al.* Targeted surveillance for European bat lyssaviruses in English bats (2003-06). *J Wildlife Disease* 2009; 45(4):1030-41.

Table 13: Isolations of EBLV-2 in bats in the UK (all were *M. daubentonii*)

Date	No. isolations	Location	Sex
1996	1	Newhaven, East Sussex	Adult female (Pregnant)
2002	1	Carnforth, Lancashire	Juvenile, Female
2004	2	Staines, Surrey	Juvenile, Female
		Blackburn Lancashire	Adult male
2006	1	Abingdon, Oxon	Juvenile Female
2007	1	Stokesay Castle, Shropshire	Adult Female
2008	2	Teddington, Surrey	Adult Female
		Stokesay Castle, Shropshire	Juvenile, Male
2009	1	Linlithgow, West Lothian	Adult Female

Further information

General information including guidance on post exposure prophylaxis is available from the HPA:

www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Rabies/

Advice for bat workers and their GPs can be found at:

www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1194947347180

Information on bats is available online from the Bat Conservation Trust at:

www.bats.org.uk

Results of the Scottish Natural Heritage bat lyssavirus monitoring programme:

www.snh.org.uk/press/detail.asp?id=2104

Salmonellosis (*Salmonella* species)

Overall, there are more than 2,600 *Salmonella* serovars, but salmonellosis in humans and animals is largely caused by the subspecies *Salmonella enterica* Subsp. *enterica*. Over 1,500 serovars belonging to this subspecies have been identified. In domestic animal

species, clinical cases of salmonellosis are most common in cattle. Subclinical carriage is most common in pigs, poultry and reptiles.

Most human salmonellosis is acquired via the foodborne route. *Salmonella* Typhi and *S. Paratyphi A* are adapted to humans and are thus not considered to be zoonoses. Illness in humans associated with other *Salmonella* serovars is known as non-typhoidal salmonellosis. Two of these serovars, *S. Enteritidis* and *S. Typhimurium*, account for over half of all human salmonellosis cases.

Infection in humans

In 2011, 9,455 cases of laboratory confirmed salmonellosis were reported in the UK. For every laboratory confirmed report of disease made to national surveillance schemes, there are estimated to be 4.7 unreported cases³². This means the total number of cases in the UK in 2011 was approximately 54,000.

Salmonella Enteritidis remained the most commonly reported serovar in 2011, accounting for 31.0% of cases. Although there was a significant fall in the number of cases in Scotland (24.7%) and Northern Ireland (29.2%), there was a small increase (9.2%) in the number of cases in England and Wales. In the UK as a whole, reports of *Salmonella* Enteritidis PT4 fell by over a third between 2010 and 2011, to 304 cases (Figure 4, Table 14). *S. Typhimurium* was the second most commonly reported serovar and increased by 9.7% from 2010. Reporting shows a consistent seasonal pattern with a distinct peak of infection observed in the third quarter of the year.

³² Tam CC, *et al.* Longitudinal study of infectious intestinal disease in the UK (IID2 study): incidence in the community and presenting to general practice (2012) *Gut* Jan; 61(1):69-77.

Figure 4: Laboratory reports of human *Salmonella* cases in the UK, 1984-2011

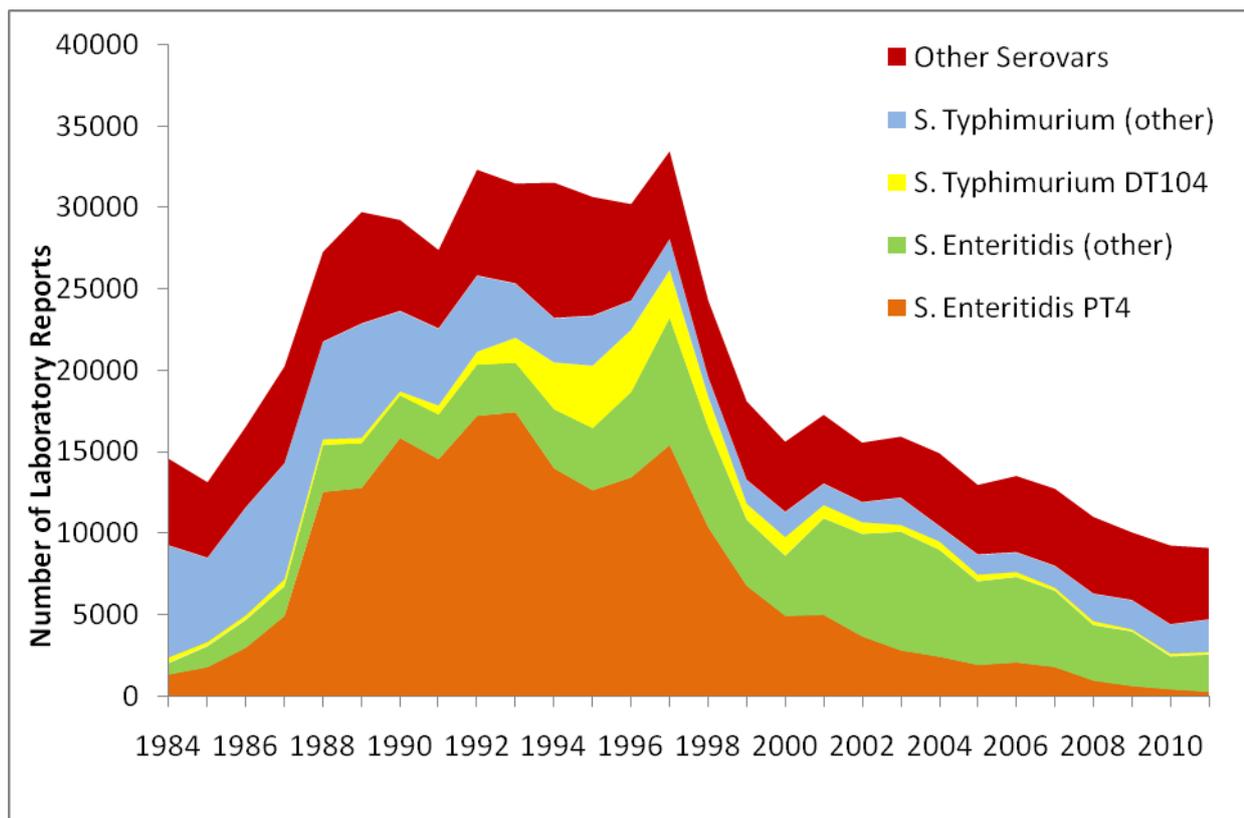


Table 14: Surveillance of salmonellosis in the UK in 2011

Serotype	England & Wales	Scotland	Northern Ireland	UK	
	Cases	Cases	Cases	Total cases	Change from 2010
S. Enteritidis (TOTAL)	2,670	225	34	2,929	1.6%
S. Enteritidis PT4	289	13	2	304	-34.5
S. Typhimurium	2,239	178	63	2,480	9.7%
Other serovars	3,625	350	71	4,046	-8.7%
All	8,534	753	168	9,455	-1.5%

Eighteen foodborne outbreaks of *Salmonella* were reported in the UK in 2011 compared with nine in 2010, and of these eleven were caused by *S. Enteritidis*. The most common food types associated with *Salmonella* outbreaks in 2011 were red meat and imported

eggs. A summary of foodborne outbreaks by zoonotic pathogen, broken down by food vehicle category is given in appendix 6.

Infection in animals

The majority of *Salmonella* incidents in farm livestock in the UK are detected as a result of testing diagnostic samples from clinically diseased cattle (the farmed species most commonly clinically affected by a *Salmonella* infection) or as a result of statutory surveillance under legislative programmes to control *Salmonella* in flocks of domestic fowl and turkeys. The poultry *Salmonella* National Control Programmes (NCPs) are required under EU regulation. The primary goal of the legislation is to reduce the *Salmonella* prevalence at farm level and thereby reduce the risk of transmission to humans. All NCPs focus on reducing the prevalence of the most important types of *Salmonella* that can affect human health - *Salmonella* Enteritidis and *Salmonella* Typhimurium, including the monophasic Typhimurium strains. In the breeding chickens' NCP *Salmonella* Hadar, *Salmonella* Infantis and *Salmonella* Virchow are also included in the reduction target. Specific reduction targets are set and reviewed regularly for each NCP scheme by the European Commission. *Salmonella* NCPs have been implemented in the breeding chicken, laying chicken, broiler and turkey industry sectors (see the feature article on the NCPs in the 2010 UK Zoonoses Report for further detail on these programmes).

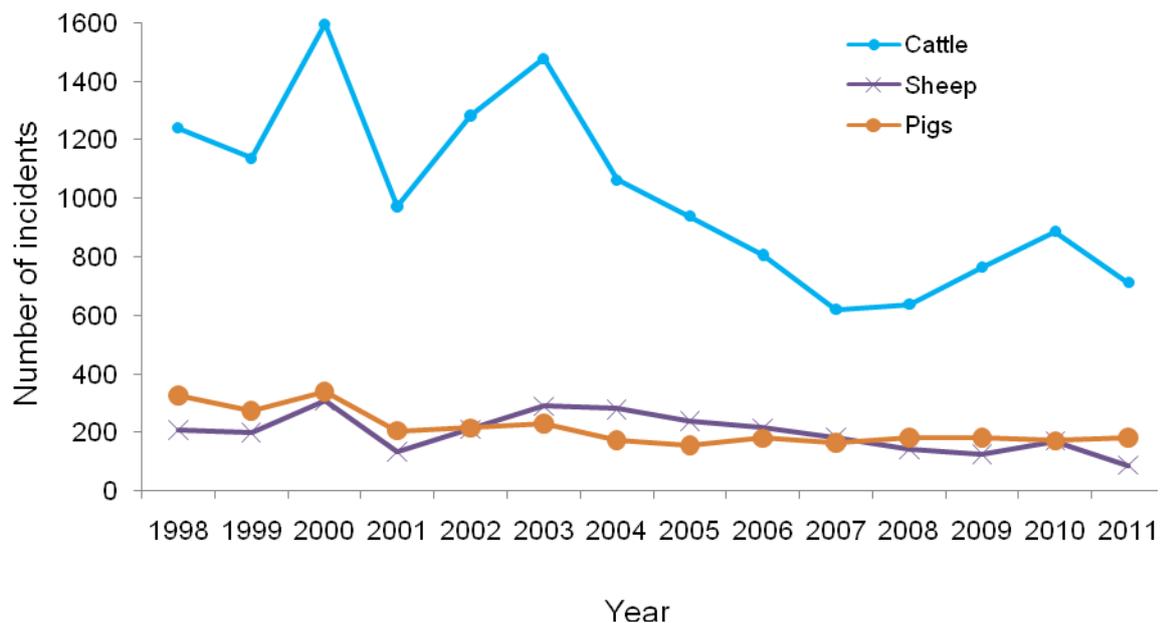
For the animal species subject to a *Salmonella* NCP, results are reported as the number of positive flocks detected under the programmes. Animal data for *Salmonella* for other livestock species are usually reported as "incidents" rather than the total number of isolates, since multiple isolates may be obtained from a number of samples taken simultaneously from a premises, group or animal environment. An incident is defined as the first isolation and all subsequent isolations of the same serovar (or serovar and phage type combination) of a particular *Salmonella* from an animal or epidemiologically distinct group of animals occurring on a single premises, usually within a 30 day period. A different approach is used in Northern Ireland so some references to isolates appear in this section. Trends in the number of *Salmonella* reports need to be treated with caution in view of the inherent biases associated with the data, e.g. the level of diagnostic and surveillance testing carried out.

Farmed mammals

There were 712 *Salmonella* incidents reported in cattle in GB during 2011, a 19.7% decrease compared with 2010 (n=887) (Figure 5). There was also a 47.9% decrease in the number of reported incidents in sheep (88 compared to 169 in 2010), but no significant change in the number of incidents in pigs (182 compared to 173 in 2010).

In Northern Ireland, there were 103 confirmed *Salmonella* isolates from cattle, 34 from pigs and 11 from sheep in 2011. This compares to the 2010 figures of 186 isolates from cattle, 62 from pigs and 19 from sheep.

Figure 5: Number of laboratory-confirmed incidents of *Salmonella* in animals in GB, 1998-2011



S. Dublin (which seldom causes disease in humans) accounts for most of the incidents diagnosed in cattle (where testing is undertaken due to clinical disease). There were 463 reports of *S. Dublin* throughout the year compared with 589 reports during 2010. There were also 52 reports of *S. Typhimurium*, 27 reports of *Salmonella* 4,5,12:i:-, four reports of *Salmonella* 4,12:i:-, six reports of *S. Enteritidis* and three reports of *S. Infantis* from cattle during 2011.

Reports from sheep almost halved, from 169 reports during 2010 to 88 reports during 2011. *S. enterica* subspecies *diarizonae* 61:k:1,5,(7) (also not common in humans) was, as usual, the most frequently reported serovar in sheep. There were single reports of *S. Typhimurium* DT104 and *Salmonella* 4,5,12:i:- from sheep. There were no reports of *Salmonella* from goats in 2011. There were 43 reports of *Salmonella* from horses during 2011, which is roughly comparable to 2010 when there were 37 reports.

In pigs, *S. Typhimurium* was the most commonly recorded serovar, accounting for 77 (42.3%) of incidents (less than in 2010 when it amounted to 57.2%). The monophasic *S. Typhimurium* variant, *S. 4,5,12:i:-*, (40 cases) represented 22.0% of incidents (up from 11 incidents in 2009 which rose to 30 incidents in 2010, representing 17.3% of total pig incidents in 2010). The *S. 4,12:i:-* variant accounted for 20 reports (11.0% of total pig incidents in 2011, compared with 13 reports, 7.5% of total pig incidents in 2010). These results continue the shift from fully typeable to monophasic *S. Typhimurium* strains in pigs. Monophasic strains of *Salmonella Typhimurium* have emerged rapidly over the past few years, most significantly in pigs. Testing in pigs is not restricted to animals with clinical disease. Approximately 90% of pigs are produced under an assurance scheme that includes a programme aimed at reducing the level of *Salmonella* in pigs - the Zoonosis National Control Programme for *Salmonella* in pigs (ZNCP).

Further background to the pig ZNCP initiative is available at the British Pig Executive's website: www.bpex-zap.org.uk

Poultry

Results for the Salmonella National Control Programmes

The different NCPs have been operating for varying time periods. The breeding chicken NCP has the longest duration and was in its fifth year in 2011 whereas the turkey NCP is the most recent addition and was only in its second year. All UK NCPs have achieved the EU set targets in each year of their operation, and the UK results have been significantly below the EU targets. The UK chicken breeding sector is now effectively free of *S. Enteritidis* and *S. Typhimurium*. During 2011 there was only one small niche market broiler parent flock in the country detected positive for *S. Typhimurium*, resulting in an overall prevalence result for the UK of 0.07%. In laying flocks during 2011, only five flocks were detected positive for *S. Enteritidis* and two flocks positive for *S. Typhimurium* out of the total 3,998 flocks included in the programme during the year, giving an overall prevalence of 0.18%. The prevalence of the target serovars in broiler flocks was 0.01% in 2011, with only two broiler flocks detected positive for *S. Typhimurium* and one flock positive for monophasic *Salmonella* 4,5,12:i:- out of a total of approximately 33,500 flocks tested. No flocks were detected positive for *S. Enteritidis* during the year.

The turkey NCP includes targets for both fattening and breeding turkey flocks. The 2011 prevalence of the target serovars was 0.2% (7/3,078) in fattening flocks. *S. Typhimurium* was detected in two fattening flocks and a further five fattening flocks tested positive for monophasic *Salmonella* Typhimurium, namely *S. 4,12:i:-* (x4) and *S. 4,5,12:i:-* (x1). These data are out of a total of 3,078 fattening flocks tested under the programme. No fattening or breeding turkey flocks were detected positive for *S. Enteritidis* during the year, and no breeding flocks tested positive for *S. Typhimurium* in 2011.

Ducks/geese

There were a total of 27 incidents in ducks during 2011 in GB, which represents a 65.4% decrease relative to 2010 (78 reports). These included 13 incidents involving *S. Typhimurium* and one incident of *S. Enteritidis*. In Northern Ireland, there were no reports of *Salmonella* isolation from ducks during 2011 (compared to two reports in 2010).

There have been very few reports of *Salmonella* from geese in recent years, with no reports in 2011, four in 2010, two in 2009, and one report in both 2008 and 2007.

Animal feed surveillance for Salmonella

Feedstuff contaminated with *Salmonella* may be a source of infection for animals. Due to the large quantity of feed that is consumed such contamination is considered to be a significant risk. In order to reduce this risk, *Salmonella* is monitored and controlled, according to guidelines described in Codes of Practice, at a number of points in the feed production process. The isolation rate of *Salmonella* from animal feedstuffs and feedstuff

ingredients in GB has continued to remain stable. In GB in 2011, 0.9% of samples were positive (420 *Salmonella* isolates from 47,311 samples).

Further information

A description of *Salmonella* data collection and reporting in animals in Great Britain is included in the *Salmonella* in Livestock Report:

http://vla.defra.gov.uk/reports/rep_salm_rep11.htm

Toxoplasmosis (*Toxoplasma gondii*)

Toxoplasmosis is caused by the protozoan parasite *Toxoplasma gondii*. Cats are the definitive host for the organism although many warm-blooded animal species can be infected as intermediate hosts. The resistant oocysts excreted by cats can survive in the environment for many months.

Humans are infected with *T. gondii* by four routes:

- Ingesting sporulated oocysts from water, food or soil contaminated with the faeces of infected cats
- Ingesting or handling undercooked or raw meat (mainly pork or lamb) that contains tissue cysts
- Transmission from a newly infected mother to the foetus
- Receiving organ transplants or blood products from donors with toxoplasmosis, although this is rare

Infection in humans

A total of 113 laboratory confirmed cases of toxoplasmosis were reported in the UK by routine surveillance during 2011 (Table 15).

An enhanced surveillance system in England and Wales that records cases diagnosed by the national *Toxoplasma* Reference laboratory in Swansea was introduced in 2008. In 2011, 341 cases of toxoplasmosis were reported through this scheme of which 231 cases had acute infection (67.7%). Twenty five cases had reactivated infection (7.3%), and the remaining 85 were undetermined (24.9%).

In Scotland, the 2011 total includes only those cases with evidence of recent or current infection, unlike previous years which includes all laboratory positive results.

Table 15: UK confirmed human cases of toxoplasmosis, 2008-2011

Year	Scotland	Northern Ireland	England & Wales (Enhanced Surveillance)	UK total*	England & Wales (Routine Surveillance)
2008	48	4	405	457	75
2009	69	3	422	494	86
2010	67	2	345	414	114
2011	23	0	341	364	113

*The UK total includes the enhanced surveillance data but not routine surveillance data for England and Wales, as cases reported routinely may also be reported to enhanced surveillance. (Note this is a change from last year's report.)

Infection in animals

In 2011, exposure to *Toxoplasma* was confirmed in 44.3% of diagnostic sheep sera sampled in the UK (Table 16). This compares with 53.2% in 2010. This testing does not distinguish between vaccinal antibody and that produced by natural infection, so these figures could be influenced by vaccination. However, since most of these samples will have been taken from sheep with a recent history of abortion it is likely that the majority of positives were associated with infection. In a separate AHVLA project, the seroprevalence of *T. gondii* in breeding ewes in Great Britain was measured. Of 3,539 blood samples collected from 227 flocks, 2,619 (74.0%) were found to be positive for toxoplasma antibodies. Prevalence of positive flocks was estimated at 96.0%³³.

³³ Hutchinson, J.P., Wear, A.R., Lambton, S.L. *et al.* (2011). *Veterinary Record*. 169, 582.

Table 16: Sera testing of Toxoplasmosis in animals in the UK, 2011

Sera testing	GB	NI	UK
No. separate sheep submissions*	152	276	428
No. sheep samples sera tested	655	627	1282
No. positives <i>T. gondii</i>	285	283	568
No. separate goat submissions*	12	1	13
No. goat samples sera tested	46	1	47
No positives <i>T. gondii</i>	25	0	25
No. separate pig submissions*	0	7	7
No. pig samples sera tested	0	7	7
No. positives <i>T. gondii</i>	0	0	0
No. separate dog submissions	2	0	2
No. dog samples sera tested	2	0	2
No. positives <i>T. gondii</i>	1	0	1

*Each submission may contain a number of samples

In 2011, toxoplasmosis remained the second most commonly diagnosed cause of abortion in sheep and goats in GB, accounting for 145 (17.8%) of all incidents of fetopathy investigated by government veterinary laboratories where a diagnosis was subsequently reached. This compares to 22.5% in 2010 (n=216).

Trichinellosis (*Trichinella* spp.)

Trichinellosis is caused by a small parasitic worm (*Trichinella* spp.) known as ‘the muscle worm’, which can infect many species of mammals and some birds. It is a foodborne parasitic disease that is spread primarily by the consumption of raw or undercooked meat products from horses and pigs containing trichinae, the infective, immature (larval) stage of the worm.

There are nine species of *Trichinella*, of which *T. spiralis* is the most common in Europe³⁴. The ninth species has been recently identified in South America³⁵. *Trichinella spiralis* was found in two foxes in Northern Ireland in 2007 and 2009. In humans, European outbreaks of trichinellosis are regularly reported mainly linked to the consumption of raw or undercooked meat from wild boar or back yard pigs. In contrast there have been no human cases acquired from meat produced in the UK for over 30 years.

Infection in humans

Ten cases of trichinellosis were diagnosed in the UK between 2000 and 2010, including an outbreak of eight cases in England and Wales in 2000 associated with the consumption of imported meat products. The remaining two cases were travel related: one in England and Wales in 2001, and the other in Scotland in 2010 in a person who had eaten partially cooked meat in France.

There were no human cases in 2011 in the UK.

Infection in animals

Pigs and horses are routinely monitored for the presence of *Trichinella*. In 2011, 232,757 breeding sows and boars (including 138,101 from non controlled housing) were tested together with 2,569,269 fattening pigs (including 383,080 from non controlled housing). In addition, 8,614 horses, 852 farmed wild boar and 522 feral wild boar in GB were tested. All samples examined were negative.

An ongoing UK monitoring programme for *Trichinella* in foxes is also carried out, and from 2006 other susceptible wildlife have additionally been tested. In 2011, 847 foxes, 69 badgers and 26 seals were tested and none were positive for *Trichinella*.

Further information

European outbreaks are reported at:

www.eurosurveillance.org/ViewArticle.aspx?ArticleId=590

Variant Creutzfeldt-Jakob disease (vCJD) in humans and Bovine Spongiform Encephalopathy (BSE) in animals

Variant Creutzfeldt-Jakob disease (vCJD) in humans

Creutzfeldt-Jakob disease (CJD) is a rare and fatal transmissible spongiform encephalopathy (TSE) of humans. Sporadic CJD is the most common form and was

³⁴ Pozio E. World distribution of *Trichinella* spp. Infections in animals and humans. *Vet Parasitol.* 2007; 149(1-2) p3-21

³⁵ S. J. Kivrokapich *et al.* *Trichinella patagoniensis* n. sp. (Nematoda), a new encapsulated species infecting carnivorous mammals in South America (2012) *Int J Parasitol* 42(10):903-10.

initially described in 1921. In 1996, a new variant, vCJD, was recognised and was strongly linked to BSE, which was first recognised in cattle in 1986.

There have been no cases of vCJD in those born after the 1980s. The government introduced leucodepletion of blood in 1999, and in 2004 implemented a policy that people who had received a blood transfusion in the UK since 1980 would no longer be able to give blood. There have been four probable secondary infections associated with blood transfusion in the UK.

There were five deaths from definite or probable vCJD in the UK in 2011, bringing the total number recorded since 1995 to 176. The number of deaths per year peaked at 28 in 2000.

Further information

The Department of Health:

www.dh.gov.uk/en/Aboutus/MinistersandDepartmentLeaders/ChiefMedicalOfficer/CMOtopics/FeaturesBrowsableDocument/DH_4102718

The National Creutzfeldt-Jakob Disease Research & Surveillance Unit:

www.cjd.ed.ac.uk/

Report on the incidence of variant Creutzfeldt-Jakob disease diagnoses and deaths in the UK, January 1994 – December 2011:

www.cjd.ed.ac.uk/documents/cjdg72.pdf

Bovine Spongiform Encephalopathy (BSE) in animals

BSE is a TSE disease of domestic cattle. BSE has caused a major epizootic in cattle and smaller epizootics in exotic ruminants and domestic and exotic felines. Worldwide there have been two naturally occurring cases of BSE in goats: one in France and one in the UK. The transmissible agent in TSEs is widely suspected to be an abnormal form of a host-encoded protein called the 'prion protein', although some research^{36,37} suggests that in some TSEs, infectivity may be associated with low levels of detectable abnormal prions, or that abnormal prion protein may not always be infectious.

The UK BSE epidemic peaked in 1992 with over 37,000 cases in cattle and has since declined steadily. The annual incidence of BSE cases in the EU has declined since targeted surveillance started in 2001. There have been a small number of cases in North America, the Middle East, and Asia.

In 2011, seven cases of BSE were diagnosed in cattle in the UK.

³⁶ Barron RM, *et al.* High titres of TSE infectivity associated with extremely low levels of PrP^{Sc} in vivo. (2007) *J. Biol. Chem.* 282:35878-35886

³⁷ Piccardo P, *et al.* Accumulation of abnormal prion protein that is not infectious. (2007) *PNAS* 104: 4712-4717

Vero cytotoxin-producing *Escherichia coli* (VTEC)

Escherichia coli (*E. coli*) is a bacterium which normally inhabits the guts of animals and humans. Although many strains are considered to be harmless, there are a number of subgroups that are associated with human disease. Verocytotoxin-producing *E. coli* (VTEC) are only known to cause disease in humans. VTEC O157 is the most common zoonotic serogroup affecting people in the UK, but other serogroups such as O26 and O111 may be important in some countries.

Many animals can carry VTEC without clinical symptoms or disease. Cattle are the main reservoir of VTEC O157 in the UK, but the organism may also be found in other ruminant species, particularly sheep, and it has been isolated from a wide range of other livestock and wildlife species.

VTEC O157 can be transmitted to people in several ways. These include:

- Consumption of contaminated food or water
- Direct or indirect contact with animals, their faeces or contaminated environments
- Person-to-person spread

Approximately 80% of human cases appear to be sporadic and unattributed to an identifiable source, although case-control studies suggest that contact with farm animals and the rural environment may be a major contributing factor.

Infection in humans

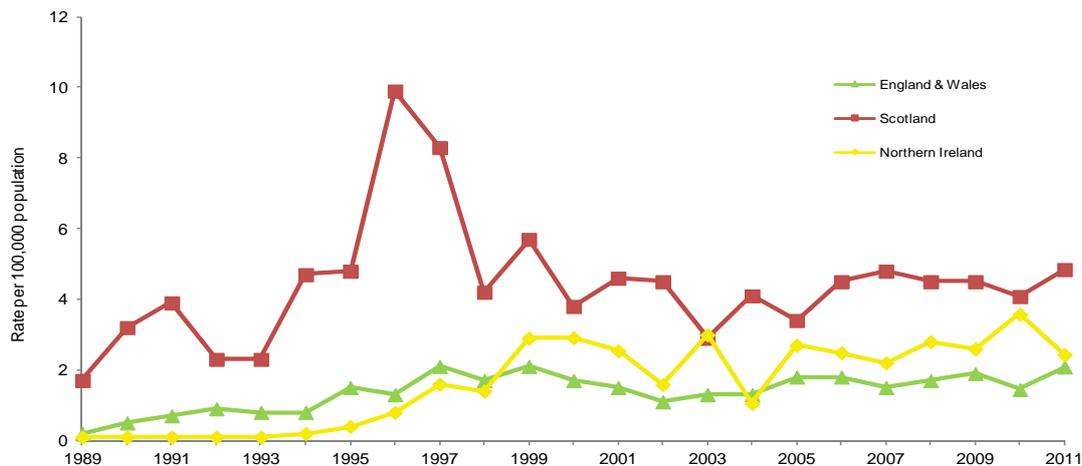
In 2011, there were 1,407 laboratory confirmed cases of VTEC O157 reported in humans in the UK (1,110 in England and Wales, 253 in Scotland and 44 in Northern Ireland), a 31.3% increase on the 1,072 cases reported in 2010. However these figures include a large foodborne outbreak of VTEC O157 PT8 which affected 252 individuals in Great Britain.

There are clear differences in the geographical distribution of laboratory confirmed cases within the UK, and Scotland has consistently recorded the highest rates of infection per 100,000 head of population since the late 1980's (Figure 6). The 1996 and 1997 Scottish figures were increased due to a large outbreak in central Scotland.

The Second Study of Infectious Intestinal Disease in the Community established that the ratio of unreported human VTEC O157 infection to reports to national surveillance is approximately 7.4 to 1³⁸. This suggests that in 2011, there were approximately 12,000 cases in the UK.

³⁸ Tam CC, *et al.* Longitudinal study of infectious intestinal disease in the UK (IID2 study): incidence in the community and presenting to general practice (2012) *Gut* Jan; 61(1):69-77.

Figure 6: Annual rates of laboratory confirmed reports of human VTEC O157 infections in the UK, 1989–2011



Over the summer of 2011 the world’s largest outbreak of a novel strain of VTEC O104 occurred. The outbreak began in Germany and ultimately was identified in more than 16 countries. There were over 900 cases of Haemolytic Uraemic Syndrome (including 34 deaths) and over 3,000 cases of Enterohaemorrhagic *E. coli* (16 deaths). In the UK, seven cases were identified, all of whom were linked to Germany. Trace-back investigations implicated fenugreek sprouted seeds that originated in Egypt as being the vehicle of infection.

In GB, an outbreak of VTEC O157 PT8 occurred between December 2010 and July 2011, with 252 laboratory confirmed cases diagnosed in England, Wales and Scotland. Infection was found to be associated with the handling of unwrapped leeks and potatoes in domestic kitchens.

In 2011, there were 10 non-foodborne VTEC O157 outbreaks reported to the HPA in England and Wales. Three were linked to animal contact at open/petting farms and agricultural shows, although no animals were confirmed as being the source, and seven were attributed to person-to-person spread. There were nine foodborne VTEC O157 outbreaks, a summary of all foodborne outbreaks by zoonotic pathogen, broken down by food vehicle category is given in appendix 6.

Infection in animals

VTEC O157 infection is widespread in cattle in the UK. However, because it does not cause disease in cattle and shedding of the organism is intermittent, prevalence figures are of limited help in assessing the degree of risk to humans. For risk assessment, the general principle of assuming an animal is infected with VTEC O157 is used.

During 2011, AHVLA assisted the HPA with the investigation of five possible outbreaks of human VTEC O157 infection potentially linked to an animal source. Two of these were on open farms, one related to an open zoo, one with pet animals kept at the site of a food business and one involved a family household. At four premises VTEC O157 was not

identified in the animal samples that were tested, and at one of the open farms animal sampling was not undertaken. Further information regarding these outbreak investigations is given in the AHVLA non-statutory zoonoses reports at: www.defra.gov.uk/vla/reports/rep_surv_zoonoses.htm.

Further Information

Advice leaflets on minimising the risk of infection with VTEC can be found at:

- www.defra.gov.uk/foodfarm/farmanimal/diseases/vetsurveillance/documents/vtec-leaflet.pdf
- www.hse.gov.uk/pubns/ais23.pdf
- www.scotland.gov.uk/Publications/2005/03/20839/54388

Yersiniosis (*Yersinia* spp.)

Yersinia enterocolitica, *Y. pseudotuberculosis* and *Y. pestis* (which causes plague) are zoonoses. Plague does not occur in the UK.

Yersinia enterocolitica has been isolated from many domestic and wild mammals, birds and some cold-blooded animals. More than 50 serotypes have been identified, not all of which cause disease in animals and man. *Yersinia pseudotuberculosis* has been isolated from various species of wild and domestic mammals, birds and reptiles. Yersiniosis in humans is mostly caused by *Yersinia enterocolitica*, and humans usually acquire infection through food contaminated with the faeces of infected animals.

Infection in humans

In 2011 there were 55 cases of human yersiniosis reported in the UK, compared to 58 in 2010 (Table 17).

Table 17: Confirmed human cases of yersiniosis in the UK, 2010 and 2011

	England & Wales		Scotland		Northern Ireland		UK total	
	2010	2011	2010	2011	2010	2011	2010	2011
<i>Y. enterocolitica</i>	34	43	4	4	0	0	38	47
<i>Y. other species</i>	17	8	3	0	0	0	20	8
Total	51	51	7	4	0	0	58	55

Infection in animals

During 2011, 44 cases (22 in GB, and 22 in Northern Ireland) of yersiniosis were diagnosed in animals in the UK (Table 18). This is an increase from the 23 cases reported in 2010 (15 in GB, and 8 in Northern Ireland). Part of the increase is because no diagnoses in samples derived from cattle had been reported in previous years, whereas in 2011 ten cattle cases were identified in Northern Ireland.

Table 18: Laboratory confirmed cases of yersiniosis in animals in the UK, 2011

Sheep	Goats	Birds	Wildlife & Miscellaneous	Cattle	Total
16	2	6	10	10	44

Further information

Reports on *Yersinia* in animals are produced by the AHVLA in the Non-Statutory Zoonoses Reports, which can be found at:

www.defra.gov.uk/vla/reports/rep_surv_zoonoses.htm

Appendix 1: Notifiable and Reportable diseases in animals which are potential Zoonoses in the UK

Notifiable diseases are those where there is a statutory requirement to report a suspicion of a clinical case of disease.

Reportable diseases (in animals) are those where there is a statutory requirement to report laboratory confirmed isolation of organisms of the genera *Salmonella* and *Brucella* under the Zoonoses Order 1989. The report is to be made by the laboratory which isolated the organism from an animal derived sample.

Disease	Main species	Last Occurred in UK ³⁹	Notifiable to AHVLA (formerly AH) in GB, Veterinary Service in NI	Reportable
Anthrax (<i>Bacillus anthracis</i>)	Cattle/other mammals	2006	✓	
Avian Influenza (HPAI)	Poultry/ waterfowl	2008	✓	
Bovine Spongiform Encephalopathy	Cattle	Present	✓	
Brucellosis (<i>Brucella abortus</i>)	Cattle⁴⁰	2004 GB/ 2011 NI⁴¹	✓	✓
Brucellosis (<i>Brucella melitensis</i>)	Sheep and goats	Never	✓	✓
Chlamydiosis	Sheep and goats	Present	⁴²	

³⁹ Figures taken are correct as at 12th November 2012.

⁴⁰ In the Zoonoses Order 1989 *Brucella* reporting relates to (a) "animal" meaning cattle (bull, cow, steer, heifer, calf), horse, deer, sheep, goat, pig or rabbit; and (b) "bird" meaning a domestic fowl, turkey, goose, duck, guinea-fowl, pheasant, partridge, quail or pigeon.

⁴¹ Present in NI; outbreak in Scotland in 2003 and Cornwall, England in 2004.

⁴² Legislative veterinary powers under The Psittacosis or Ornithosis Order 1953 (S.I. 1953 No. 38) give discretionary powers to serve notices to impose movement restrictions and require cleansing and disinfection of affected premises so AHVLA (formerly Animal Health) may be involved in the control of Psittacosis, even though it is not a notifiable disease in animals or birds in Great Britain. Ornithosis (including psittacosis) is notifiable in Northern Ireland in poultry.

Contagious Epididymitis (<i>B. ovis</i>)	Sheep and goats	Never	✓	✓
Equine Viral Encephalomyelitis	Horses	Never	✓	
Glanders & Farcy (<i>Burkholderia mallei</i>)	Horses	1928	✓	
Newcastle disease and paramyxovirus infection	Poultry and pigeons	2006	✓	
Rabies (Terrestrial)	Dogs and other mammals	1970⁴³	✓	
Rabies (EBLV)	Bats	2009⁴⁴	✓	
Rift Valley Fever	Cattle, sheep and goats	Never	✓	
<i>Salmonella</i>	All species	Present	⁴⁵	✓
Trichinella	Pigs, horses and other mammals	Present⁴⁶		
Tuberculosis (<i>Mycobacterium bovis</i>)	Domestic cattle, buffalo, bison and deer	Present⁴⁷	✓ ⁴⁸	✓
Vesicular stomatitis virus	Cattle/ other	Never	✓	

⁴³ A quarantine case was confirmed in 2008, however this does not affect the national disease status.

⁴⁴ European bat Lyssavirus type 2 was isolated from a Daubenton's bat in 2009.

⁴⁵ *Salmonella*, when carried in animals or poultry, which the Department considers to be a risk to human health, is notifiable in Northern Ireland.

⁴⁶ *Trichinella* is known to be present in wildlife in Northern Ireland following the identification of a single positive fox in 2007 and again in 2009 during wildlife surveillance. *Trichinella* does not appear to be present in animals in GB.

⁴⁷ Scotland has been officially free since October 2009, although sporadic incidents continue to be identified in cattle herds.

⁴⁸ In addition to any bovines and deer with suspect clinical signs of tuberculosis, under the Tuberculosis (England) Order 2007, the Tuberculosis (Wales) Order 2011, and the Tuberculosis (Scotland) Order 2007 (as amended), there is a statutory requirement in Great Britain to notify to the local AHVLA office (formerly Animal Health) of the presence of suspect TB lesions in the carcasses of any bovine animals or other farmed or companion (pet) mammals. Furthermore, identification of *Mycobacterium bovis* in samples taken from any mammal (other than man) is also notifiable to AHVLA (formerly VLA) Weybridge unless the organism was present in the sample as a result of an agreed research procedure. Notifying the suspicion of TB in a living domestic animal in the course of clinical examination, surgery, by radiography or in biopsy material is not mandatory (except for cattle or deer), but submission of clinical samples from such cases to AHVLA is encouraged.

(VSV)	mammals			
West Nile Virus	Horses	Never	✓	

Appendix 2: Notifiable zoonotic diseases and organisms in humans in 2011.

Disease	Notifiable in humans under public health legislation in			Reportable under RIDDOR* to HSE
	England & Wales	Scotland	Northern Ireland	
Anthrax	✓	✓	✓	✓
Acute infectious hepatitis/Hepatitis unspecified: viral (e.g. Hepatitis E)	✓		✓	✓
Botulism	✓	✓		
Brucellosis	✓	✓		✓
Chlamydiosis (avian)				✓
Chlamydiosis (ovine)				✓
Cholera	✓	✓	✓	
Diphtheria	✓	✓	✓	
Dysentery			✓	
Clinical syndrome due to <i>E. coli</i> O157 infection		✓		
Gastro-enteritis (persons under 2 years of age only)			✓	
Haemolytic uraemic syndrome	✓	✓		
Food poisoning	✓		✓	

Infectious bloody diarrhoea	✓			
Leptospirosis			✓	✓
Lyme disease				✓
Plague	✓	✓	✓	
Q fever				✓
Rabies	✓	✓	✓	✓
<i>Streptococcus suis</i>				✓
Tetanus	✓	✓	✓	✓
Tuberculosis (including bovine TB)	✓	✓	✓	✓
Tularaemia		✓		
Viral haemorrhagic fevers	✓	✓	✓	
West Nile Virus		✓		
Yellow fever	✓	✓	✓	

* RIDDOR: Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (not including Part II: Diseases additionally reportable in respect of offshore work places)

The table above lists notifiable diseases only; further organisms are notifiable when isolated in laboratories. The lists of notifiable organisms can be found here:

Scotland: www.legislation.gov.uk/asp/2008/5/contents

Wales: www.legislation.gov.uk/wsi/2010/1546/contents/made

England: www.legislation.gov.uk/uksi/2010/659/contents/made

Northern Ireland: www.legislation.gov.uk/apni/1967/36/contents

Appendix 3: Relevant Legislation (covering statutory and non-statutory zoonoses)

Note that other associated legislation not listed below may exist in Devolved Administrations (Wales, Scotland and Northern Ireland).

Human legislation

Control of Substances Hazardous to Health (COSHH) Regulations 1999

Health and Safety at Work etc Act 1974

Health and Services and Public Health Act 1968

Health and Social Care Act 2008

The Health Protection (Local Authority Powers) Regulations 2010

The Health Protection (Local Authority Powers) (Wales) Regulations 2010

The Health Protection (Notification) Regulations 2010

The Health Protection (Notification) (Wales) Regulations 2010

The Health Protection (Part 2A Orders) Regulations 2010

The Health Protection (Part 2A Orders) (Wales) Regulations 2010

Public Health (Control of Disease) Act 1984 (as amended)

Public Health etc. (Scotland) Act 2008

The Public Health (Ships) Regulations 1979

The Public Health (Aircraft) Regulations 1979

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995

Animal legislation

Animal Boarding Establishments Act 1963

Animal Boarding Establishment Regulations (NI) 1974

Animal Health Act 1981(as amended)

Diseases of Animals (NI) Order 1981 (as amended)

Animal Health and Welfare (Scotland) Act 2006

Anthrax Order 1991

Anthrax Order (NI) 1969 (as amended)

Avian Influenza and Influenza of Avian Origin in Mammals (England) Order 2006

Avian Influenza and Influenza of Avian Origin in Mammals (England) (No 2) Order 2006

Avian Influenza and Influenza of Avian Origin in Mammals (Northern Ireland) Order 2007

Avian Influenza and Influenza of Avian Origin in Mammals (Scotland) Order 2006

Avian Influenza and Influenza of Avian Origin in Mammals (Wales) Order 2006

Avian Influenza and Influenza of Avian Origin in Mammals (Wales) (No 2) Order 2006

The Avian Influenza (Preventive Measures) (England) Regulations 2006

The Avian Influenza (Preventive Measures) (Wales) Regulations 2006

The Avian Influenza (Preventive Measures) (Scotland) Regulations 2007

The Avian Influenza (Preventive Measures) Regulations (Northern Ireland) 2007

Brucellosis (England) Order 2000

Brucellosis (England and Wales) Order 1981 (as amended) (current Welsh legislation)

The Brucellosis (Scotland) Order 2009 (as amended)

Brucellosis (Examination and Testing) Scheme Order (Northern Ireland) 2004

Brucellosis Control Order (Northern Ireland) 2004 (as amended)

Control of Salmonella in Broiler Flocks Order 2009

The Control of *Salmonella* in Broilers (Wales) Order 2009

The Control of *Salmonella* in Poultry (Breeders, Layers and Broiler Flocks) (Scotland) Order 2009

The Control of *Salmonella* in Broiler Flocks Scheme Order (Northern Ireland) 2009

Control of Salmonella in Poultry Order 2007

The Control of *Salmonella* in Poultry Order (Wales) 2008

The Control of *Salmonella* in Poultry Order (Scotland) 2008

The Control of *Salmonella* in Poultry Scheme Order (Northern Ireland) 2008

Control of Salmonella in Turkey Flocks Order 2009

The Control of Salmonella in Turkey Flocks (Scotland) Order 2009

The Control of Salmonella in Turkey Flocks (Wales) Order 2009

The Control of Salmonella in Turkey Flocks Scheme Order (Northern Ireland) 2010

Dangerous Wild Animals Act 1976

Diseases of Animals Act (Northern Ireland) 2010

The Diseases of Poultry (England) Order 2003

Diseases of Poultry (Scotland) Order 2003

Diseases of Poultry (Wales) Order 2003

Diseases of Poultry Order (Northern Ireland) 1995 as amended by Diseases of Poultry (Amendment) Order (Northern Ireland) 2003

Dogs Act 1906

EU Zoonoses Directive 2003/99/EC

EU Zoonoses Regulation (EC) no 2160/2003

Infectious Diseases of Horse Order 1987

Litter (Animals Droppings) Order 1991

Non-Commercial Movement of Pet Animals Regulations 2004

Pet Animals Act 1951 and 1983

Prevention of Damage by Pests Act 1949

Psittacosis or Ornithosis Order 1953

Rabies Control Order 1974

Rabies Control Order (NI) 1977

Rabies (Importation of Dogs, Cats and other Mammals) Order 1974 (as amended)

Specified Animal Pathogens Order 2008

Specified Animal Pathogens (Wales) Order 2008

Specified Diseases (Notification and Slaughter) Order 2006

Specified Diseases (Notification) Order (NI) 2004

Transmissible Spongiform Encephalopathies (England) Regulations 2010

Transmissible Spongiform Encephalopathies (NI) 2010

Transmissible Spongiform Encephalopathies (Scotland) Regulations 2010

Transmissible Spongiform Encephalopathies (Wales) Regulations 2008

Tuberculosis (England) Order 2007

Tuberculosis (Scotland) Order 2007 (as amended)

Tuberculosis (Wales) Order 2010 (as amended)

Tuberculosis (Wales) Order 2011

Tuberculosis (NI) Control order 1999 (as amended)

Tuberculosis (Deer) (Order) 1989

Zoonoses (Monitoring) (England) Regulations 2007 (equivalent NI legislation in 2008)

Zoonoses (Monitoring) (Wales) Regulations 2007

Zoonoses (Monitoring) (Scotland) Regulations 2007

Zoonoses Order 1989

Zoonoses Order (NI) 1991

Food legislation

EC Regulations 852/2004, 853/2004, 854/2004

Food and Environment Protection Act 1985

Food Safety Act 1990

The Food Safety Act 1990 (Amendment) Regulations 2004

Food Safety (1991 Order) (commencement) Order (NI) 1991

The Food Hygiene (England) Regulations 2006 (as amended)

The Food Hygiene (Wales) Regulations 2006 (as amended)

The Food Hygiene (Scotland) Regulations 2006 (as amended)

Food Hygiene regulations (NI) 2006 (as amended)

The Official Feed and Food Controls (England) Regulations 2009 (as amended)

The Official Feed and Food Controls (Wales) Regulations 2009 (as amended)

The Official Feed and Food Controls (Scotland) Regulations 2009 (as amended)

The Official Feed and Food Controls Regulations (Northern Ireland) 2009 (as amended)

The Poultrymeat (England) Regulations 2011

The Poultrymeat (Wales) Regulations 2011

The Poultrymeat (Scotland) Regulations 2011

Poultrymeat Regulations (Northern Ireland) 2011

Regulation EC 2075/2005, laying down specific rules and controls for Trichinella in meat

The General Food Regulations 2004 (as amended)

General legislation

Animal By-Products (Enforcement) (England) Regulations 2011

Animal By-Products (Enforcement) Regulations (Northern Ireland) 2011

Animal By-Products (Enforcement) (Scotland) Regulations 2011

Animal By-Products (Enforcement) (Wales) Regulations 2011

Environmental Protection Act 1990

EU Directive 64/432/EEC as amended (EU Consolidated Text, CONSOLEG: 1964L0432)

European Regulations (EC) No 1069/2009 and (EU) No 142/2011 (ABP legislation)

Riding Establishment Act 1964 and 1979

Riding Establishment Regulations (NI) 1980

The Water Supply (Water Quality) Regulations 2010 (as amended)

Zoo Licensing Act 1981

Appendix 4: Laboratory confirmed cases of zoonotic disease in humans in the UK, 2002-2011⁴⁹

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Anthrax	0	0	0	0	1	0	1	13	39	0
Avian Influenza	0	0	0	0	1 ⁵⁰	4 ⁵¹	0	0	0	0
<i>Mycobacterium bovis</i>	12	17	16	23	28	22	21	24	30	31
Brucellosis	36	24	31	12	16	15	15	18	12	25
<i>Campylobacter</i>	54,372	52,126	50,388	52,686	52,134	57,849	55,609	65,043	70,298	72,150
<i>Cryptosporidium</i>	3,663	6,626	4,197	5,288	4,360	3,671	4,909	5,587	4,798	3,655
Hantavirus	0	0	0	0	0	0	0	0	0	1 ^{**}
Hydatid disease	10	5	8	11	14	10	18	9	7	15
Leptospirosis	58	28	32	60	50	81	76	56	42	52
Listeriosis	160	247	230	220	208	255	208	235	178	164
Lyme disease	384	347	586	691	939	1,034	1,098	1,093	1,225	1,201
Orf	4	6	3	2	2	2	3	1	4	1
<i>Pasteurella</i>	318	388	402	425	490	457	497	559	586	668
Psittacosis	113	118	76	74	40	54	66	60	58	41
Q fever (acute and chronic infections)	184 [*]	96 [*]	61 [*]	61 [*]	200 ^{*52}	71 [*]	68 [*]	31 [*]	55 [*]	112 [*]
Rabies 'classical'	0	0	0	1	0	0	1	0	0	0
Rabies EBLV	1	0	0	0	0	0	0	0	0	0
<i>Salmonella</i>	16,569	16,920	15,797	13,707	13,787	13,289	11,518	10,479	9,670	9,455
<i>Strep suis</i>	1	2	0	3	4	2	7	2	4	1

* Includes Enhanced England & Wales data.

** An indigenously acquired case in an adult male who lives on a farm.

⁴⁹ This is not a definitive list of zoonotic pathogens that are reported each year, but covers zoonotic diseases reported annually in the UK Zoonoses Report.

⁵⁰ Case of H7N3

⁵¹ Cases of H7N2

⁵² 111 confirmed with a further 28 probable and 5 possible in an outbreak in Scotland.

<i>Taenia</i>	89	100	103	77	89	101	100	73	114	94
<i>Toxocara</i>	4	3	6	5	2	1	2	4	12	4
<i>Toxoplasma</i>	147	100	100	114	123	146	457*	494*	414*	364*
<i>Trichinella</i>	0	0	0	0	0	0	0	0	1	0
vCJD ⁵³	17	18	9	5	5	5	1	3	3	5
VTEC O157	852	874	926	1,169	1,287	1,120	1,237	1,306	1,072	1,407
West Nile Virus	0	0	0	0	1 ⁵⁴	1 ⁵⁴	0	0	0	0
Yersiniosis	44	95	70	64	62	73	62	61	58	55

Please note that an extensive data cleaning exercise has been undertaken on the data from England and Wales, and as a result many of the historical figures in this table have been updated.

* Includes Enhanced England & Wales data.

⁵³ Defined as deaths from definite or probable cases.

⁵⁴ Infection imported from Canada

Appendix 5: Laboratory confirmed cases of zoonotic disease in animals in GB (2002 – 2010) and UK (2011)

	GB data									UK data
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Anthrax*	1	0	0	0	2	0	0	0	0	0
Avian Influenza^{55*}	0	0	0	0	0	1 ⁵⁶	2 ⁵⁷	0	0	0
Positive <i>Mycobacterium bovis</i> submissions^a from cattle herds	542 ^a	1126 ^a	4241 ^a	5469 ^a	4817 ^a	4797 ^a	5974 ^a	5140 ^a	5302 ^a	6528
<i>Mycobacterium bovis</i> incidents in non-bovine animals (data excludes badgers)	18	35	56	64	78	68	119	144	134	144
<i>Mycobacterium</i> species in non-bovine animals (excluding <i>M. bovis</i>)*	NA	18	25	55	138	104	77	122	130	140
<i>Brucella abortus</i>	0	0	0	0	0	0	0	0	0	70

^a There has been an amendment to the figure printed in last year's report.

* Confirmed cases were notifiable to Animal Health during 2010, and since 1st April 2011 should be notified to AHVLA.

** Confirmed cases obtained through scanning surveillance/ VIDA database.

*** Confirmed cases statutorily reportable under Zoonoses Order 1989.

⁵⁵ Only highly pathogenic strains of avian influenza were notifiable to Animal Health during 2010 (since 1st April 2011 suspect cases should be notified to AHVLA). Table shows number of incidents per year.

⁵⁶ H5N1 isolates were found in samples from one turkey farm in 2007.

⁵⁷ H7N7 isolates were reported from samples taken from an egg laying chicken farm in 2008, and isolates of H5N1 were reported in a cluster of 10 wild mute swans and 1 Canada goose found dead.

<i>Brucella melitensis</i>	0	0	0	0	0	0	0	0	0	0
<i>Brucella sp</i> ***	6	6	5	2	0	30	6	5	0	1
BSE^{58*}	1,137	611	343	225	114	67	37	12	11	7
<i>Campylobacter</i> **	168	223	284	150	170	217	155	152	237 ^a	407
Chlamydiosis (<i>Chlamydomphila abortus</i>) fetopathy**	506	559	390	473	462	532	349	373 ^a	347	451
Cryptosporidium **	1,086	1,237	1,156	1,229	1,146	841	1,330	1,346	1,667 ^a	1,381
Hydatid **	1	0	1	0	0	0	0	0	1 ⁵⁹	0
Leptospirosis **	217	93	38	46	45	93	39	5	5 ^a	3
Listeriosis **	150	210	214	193	200	134	196	176 ^a	220 ^a	145
Orf **	30	39	37	27	38	45	44	37	40	35
<i>Pasteurella multocida</i> **	435	587	511	471	452	347	281	317 ^a	367 ^a	316
Psittacosis (<i>C. psittaci</i>) **	23	17	9	5	2	2	1	3	8	8
Q fever **	6	3	3	6	7	4	5	3	5 ^a	7
Rabies 'classical' *	0	0	0	0	0	0	1 ⁶⁰	0	0	0
Rabies EBLV *	1	0	2	0	1	1	2	1	0	0

^a There has been an amendment to the figure printed in last year's report.

* Confirmed cases were notifiable to Animal Health during 2010, and since 1st April 2011 should be notified to AHVLA.

** Confirmed cases obtained through scanning surveillance/ VIDA database.

*** Confirmed cases statutorily reportable under Zoonoses Order 1989.

⁵⁸ Figures for BSE are obtained through scanning and targeted surveillance.

⁵⁹ Confirmed case obtained via scanning surveillance and identified in a zoo-kept imported Philippine spotted deer.

⁶⁰ Rabies case was in a quarantined animal.

Salmonella (all types) ***	1560	1942	1429	1261	1255	2035 ^a	1852 ^a	2376 ^a	3098 ^a	2671
Streptococcus suis **	49	59	68	48 (91)	63 (73)	54 (104)	92 (115)	69 (116)	108 ^a	119
Swine Influenza **	9	21	10	20	11	9	17	14	38 ^a	35
Toxoplasma **	279	352	335	376	310	338	201	206 ^a	218 ^a	146
Trichinella ⁶¹	0	0	0	0	0	1	0	1	0	0
Yersiniosis **	21	28	34	36	29	24	32	33	15 ^a	22

^a There has been an amendment to the figure printed in last year's report.

* Confirmed cases were notifiable to Animal Health during 2010, and since 1st April 2011 should be notified to AHVLA.

** Confirmed cases obtained through scanning surveillance/ VIDA database.

*** Confirmed cases statutorily reportable under Zoonoses Order 1989.

Note: this table is not a definitive list of all zoonotic pathogens that are reported each year, but covers those for which data are available (notifiable/reportable and those recorded by VIDA system).

Survey data

Survey data is available for Hantavirus and West Nile Virus, which are not routinely recorded and reported by AHVLA/SAC. See the quarterly reports of the GB Wildlife surveillance partnership:

www.defra.gov.uk/vla/reports/rep_surv_wildlife.htm

Outbreak investigations

Isolations of VTEC are not routinely recorded and reported by AHVLA/ SAC. A list of outbreak investigations and further references can be found within the VTEC A-Z section of this report.

Unavailable data

Annual data for *Toxocara* and *Taenia* are unavailable as they are not recorded on the VIDA database.

⁶¹ Figures provided by FSA.

^a There has been an amendment to the figure printed in last year's report.

Appendix 6: Food vehicles associated with foodborne gastrointestinal outbreaks in the UK in relation to *Campylobacter*, *L.* *monocytogenes*, *Salmonella*, and VTEC O157

Food vehicle category	<i>Campylobacter</i> ⁶²	<i>L. monocytogenes</i>	<i>Salmonella</i>	VTEC O157
Poultry meat	17	0	3	0
Red meat	0	0	5	2
Vegetables & fruits	0	0	1	2 [‡]
Rice	0	0	2	0
Eggs & egg dishes	0	0	3	0
Composite/Mixed foods	0	1	3	2
Crustacea & Shellfish			2*	1
Potable water	0	0	0	0
Unknown	3	0	3	2
Total*	20	1	22	9

“The total differs from the total number of foodborne outbreaks reported as more than one food vehicle may be identified in a single outbreak.

* One outbreak had fish as the vehicle (Sushi).

‡ One VTEC O157 outbreak associated with Vegetables (Leeks and Potatoes) was UK-wide.

⁶² HPA. *Campylobacter* now the leading cause of general foodborne outbreaks in England and Wales. *HPR* 5(19) (13 May 2011). Available at: www.hpa.org.uk/hpr/archives/2011/hpr1911.pdf

Appendix 7: Animal population

Number of livestock for each country in 2011

	England	Wales	Scotland	N. Ireland	UK
Cattle	5,558,860	1,128,817	1,799,257	1,590,452	9,877,386
Sheep	14,325,847	8,619,414	6,801,134	1,887,573	31,633,968
Pigs	3,599,559	25,809	389,995	425,268	4,440,631
Poultry	247,231,904	13,269,712	20,233,231	19,136,279	299,871,126
Goats	79,382	8,040	3,756	3,067	92,245
Farmed Deer	20,925	884	5,977	4,832	32,618
Horses	871,409	113,163	73,062	12,040	1,069,674

*Source: Radar Veterinary Surveillance database (Defra)

Cattle data is for 1st June 2011 and obtained from the GB Cattle Tracing System on 10th June 2012

Pig, sheep and goat numbers come from the June Agricultural Surveys for 2011

Poultry data is for 31/12/2011 obtained from the GB Poultry Register on 10th June 2012

Farmed deer numbers come from the June Agricultural Survey for 2011

Horse population data obtained from the National Equine Database on 6th April 2012

Northern Ireland data provided by Department of Agriculture and Rural Development Northern Ireland, current at 3rd June 2012

Note that figures in the above table are a snapshot of the population at a specific time during the year, as shown in the table footnotes. For further information on data quality including accuracy and comparability contact: vetsurveillance@defra.gov.uk

Number of pets owned in the UK in 2011⁶³

PFMA research shows that in 2011, 45% of UK households owned at least one pet. This would be approximately 12 million households with pets, out of approximately 27 million UK households in total. The table below shows the estimated population of UK pets, as well as a breakdown of the most popular pets, in 2011.

Species	Approximate number of pets (millions)
Dogs	8
Cats	8
Rabbits	1
Birds (indoor)	1
Guinea Pigs	1
Hamsters	0.5
Outdoor fish	20
Indoor fish	20
Domestic fowls	0.5

⁶³ Source: Pet Food Manufacturers' Association: www.pfma.org.uk/pet-population-2008-2011/

Appendix 8: Further reading

General further reading

Advisory Committee on the Microbiological Safety of Food: Report on microbial antibiotic resistance in relation to food safety. The Stationery Office, ISBN 0 11 322283 1.

<http://acmsf.food.gov.uk/acmsfreps/acmsfreports>

Defra - Zoonoses web pages www.defra.gov.uk/animal-diseases/zoonotic/

Defra Publications - Zoonoses Reports UK

www.defra.gov.uk/animal-diseases/zoonotic/

Food Standards Agency: A report on the study of Infectious Intestinal Disease in England, The Stationery Office, ISBN 0 11 322308 0

www.food.gov.uk/science/research/foodborneillness/microfundus/intestinal

Food Standard Agency – Foodborne Illnesses web pages

www.food.gov.uk/safereating/microbiology/58736

Health Protection Agency - Zoonoses web pages

www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Zoonoses/

Health Protection Agency - Zoonoses newsletters

www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Zoonoses/ZoonosesNewsletters

HSE Agriculture Information Sheet 2 'Common zoonoses in agriculture' available free from HSE Books, tel. 01787 881165

www.hse.gov.uk/pubns/ais2.pdf

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

www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1240530336599

VLA - Non-Statutory Zoonoses Reports

www.defra.gov.uk/vla/reports/rep_surv_zoonoses.htm

Oxford Textbook of Zoonoses: Biology, Clinical Practice and Public Health Control, 2nd Ed. (Palmer, Soulsby, Torgerson and Brown) OUP ISBN 9780198570028

Disease specific further information:

Can also be found at the end of each A-Z section.

Appendix 9: List of Abbreviations/ Acronyms

ACMSF	Advisory Committee on the Microbiological Safety of Food
AFBI	Agri-Food and Biosciences Institute
AH	Animal Health (a former agency of Defra which existed until 1st April 2011 when it was merged with VLA to form AHVLA)
AHVLA	Animal Health and Veterinary Laboratories Agency (an agency of Defra created by the merger of Animal Health and VLA on 1st April 2011)
AI	Avian Influenza
BSE	Bovine Spongiform Encephalopathy
bTB	Bovine Tuberculosis
CCDC	Consultant in Communicable Disease Control
CFT	Complement Fixation Test
cfu/g	Colony forming units/gram
CJD	Creutzfeldt-Jakob Disease
DARD	Department of Agriculture and Rural Development (Northern Ireland)
Defra	Department for Environment, Food and Rural Affairs
DH	Department of Health
EAE	Enzootic Abortion of Ewes
EBLV	European Bat Lyssavirus
EC	European Commission
EFIG	Epidemiology of Foodborne Infections Group

EFSA	European Food Safety Authority
ELISA	Enzyme-Linked Immunosorbent Assay
EU	European Union
FSA	Food Standards Agency
GB	Great Britain (England, Wales, Scotland)
HAIRS	Human, Animal Infections and Risk Surveillance Group
HCW	Healthcare Worker
HPA	Health Protection Agency
HPAI	Highly Pathogenic Avian Influenza
HPS	Health Protection Scotland
HSE	Health and Safety Executive
ICT	Incident Control Team (multinational/ multiagency)
IID	Infectious Intestinal Disease
JWGC	Joint Working Group on <i>Campylobacter</i>
LGR	Local Government Regulation
LPAI	Low Pathogenic Avian Influenza
NCP	National Control Programme for <i>Salmonella</i> in Poultry
NEPNEI	National Expert Panel on New and Emerging Infections
NI	Northern Ireland
OBF	Officially Brucellosis Free
OIE	World Organisation for Animal Health
OMT	Outbreak Management Team

PCR	Polymerase Chain Reaction
PHA	Public Health Agency (Northern Ireland)
PHW	Public Health Wales
PM	Post mortem
PT	Phage Type
RADAR	Rapid Analysis and Detection of Animal-related Risks
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (HSE)
SAC	Scottish Agriculture College
SBV	Schmallenberg virus
SG	Scottish Government
TB	Tuberculosis
TSE	Transmissible Spongiform Encephalopathy
UK	United Kingdom (England, Wales, Scotland, Northern Ireland)
UKZADI	United Kingdom Zoonoses, Animal Diseases and Infections Group
vCJD	Variant Creutzfeldt-Jakob disease
VIDA	Veterinary Investigation Diagnosis Analysis Database
VLA	Veterinary Laboratories Agency (a former agency of Defra which existed until 1st April 2011 when it was merged with Animal Health to form AHVLA)
VTEC	Verocytotoxigenic <i>Escherichia coli</i>
WG	Welsh Government (WG was formerly WAG)
ZNCP	Zoonosis National Control Programme for <i>Salmonella</i> in Pigs

Appendix 10: Acknowledgements

This report was produced by a small group formed under the Chairmanship of Dilys Morgan, HPA. The group contained representatives of, or received assistance from, the following organisations:

Animal Health and Veterinary Laboratories Agency (AHVLA)

New Haw, Addlestone, Surrey KT15 3NB

www.defra.gov.uk/ahvla/

Department for Environment, Food and Rural Affairs (Defra)

Area 4A, Nobel House, 17 Smith Square, London SW1P 3JR

www.defra.gov.uk

Department of Agriculture and Rural Development (Northern Ireland) (DARD)

Dundonald House, Upper Newtownards Road, Belfast BT4 3SB

www.dardni.gov.uk

Department of Health

Skipton House, 80 London Road, Elephant and Castle, London SE1 6LW

www.dh.gov.uk

Department of Health, Social Services & Public Safety (Northern Ireland)

Castle Buildings, Stormont, Belfast BT4 3SJ

www.dhsspsni.gov.uk

Food Standards Agency (FSA)

Aviation House, 125 Kingsway, London WC2B 6NH

www.food.gov.uk

Health Protection Agency (HPA)

HPA Colindale, 61 Colindale Avenue, London NW9 5EQ

www.hpa.org.uk/

Health Protection Scotland (HPS)

Meridian Court, 5 Cadogan Street, Glasgow G2 6QE

www.hps.scot.nhs.uk

Leptospira Reference Unit

(HPA Collaborating Laboratory)

Department of Microbiology and Immunology, County Hospital, Hereford HR1 2ER

www.hpa.org.uk/webw/HPAweb&Page&HPAwebAutoListName/Page/1200660022261

Lyme Borreliosis Unit⁶⁴

Southampton HPA Laboratory, Level B South Laboratory Block, Southampton General Hospital, Southampton SO16 6YD

www.hpa.org.uk/webw/HPAweb&Page&HPAwebAutoListName/Page/1200660022877

National Lyme Disease Testing Service

Microbiology department, Raigmore Hospital, Inverness IV2 3UJ

Public Health Agency (Northern Ireland)

18 Ormeau Avenue, Belfast, BT2 8HS

www.publichealth.hscni.net/

Public Health Wales

Communicable Disease Surveillance Centre, Health Protection Division, The Temple of Peace and Health, Cathays Park, Cardiff CF10 3NW

www.wales.nhs.uk/sitesplus/888

Scottish Agricultural College

West Mains Road, Edinburgh EH9 3JG

www.sac.ac.uk

Scottish *E. coli* O157/VTEC Reference Laboratory (SERL)

Department of Clinical Microbiology, Western General Hospital, Crewe Road, Edinburgh EH4 2XU

⁶⁴ As of 1st June 2012, the HPA Lyme disease laboratory service and clinical support will be provided at the Rare & Imported Pathogens Laboratory, Porton.

www.hps.scot.nhs.uk/reflab/RefLabDetail.aspx?id=13

Scottish Government, Rural Directorate

Pentland House, 47 Robb's Loan, Edinburgh EH14 1TY

www.scotland.gov.uk

Scottish *Salmonella* Reference Laboratory

North Glasgow University Hospitals NHS Trust, 133 Balornock Road, Glasgow G21 3UW

www.ssrl.scot.nhs.uk/

Scottish *Toxoplasma* Reference Laboratory

Microbiology department, Raigmore Hospital, Inverness IV2 3UJ

***Toxoplasma* Reference Unit**

(HPA Collaborating Laboratory)

Public Health Wales, Microbiology Swansea, Singleton Hospital, Sketty, Swansea SA2 8QA

www.wales.nhs.uk/sites3/page.cfm?orgId=457&pid=25359

UK *Cryptosporidium* Reference Unit

(HPA Collaborating Laboratory)

Public Health Wales, Microbiology Swansea, Singleton Hospital, Sketty, Swansea SA2 8QA

www.wales.nhs.uk/sites3/page.cfm?orgId=457&pid=25284

Welsh Government (WG)

Cathays Park, Cardiff, CF10 3NQ

www.wales.gov.uk