European Food Safety Authority

ZOONOSES MONITORING

UNITED KINGDOM

The Report referred to in Article 9 of Directive 2003/99/EC

TRENDS AND SOURCES OF ZOONOSES AND ZOONOTIC AGENTS IN HUMANS, FOODSTUFFS, ANIMALS AND FEEDINGSTUFFS

including information on foodborne outbreaks, antimicrobial resistance in zoonotic agents and some pathogenic microbiological agents.

IN 2013

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: United Kingdom

Reporting Year: 2013

Laboratory name	Description	Contribution
Department for Environment, Food and Rural Affairs (Defra)	Competent Authority for Directive 2003/99/EC	Coordination of report production
Department of Agriculture and Rural Development, (DARD) Northern Ireland	Competent Authority in Northern Ireland for Directive 2003/99/EC	Coordination of information on zoonotic agents in animals, and feed
Public Health England	Public Health England (PHE) is an independent body that protects the health and well-being of everyone in England	Data on Zoonoses and zoonotic agents in humans, foodborne outbreaks, and antimicrobial resistance in humans and food isolates in England and Wales
Public Health Wales	Public Health Wales (PHW) - protects the population from infection by surveillance and independent advice, outbreak investigation and applied research	Data on zoonotic agents in humans in Wales
Animal Health and Veterinary Laboratories Agency (AHVLA)	AHVLA is an Executive Agency of Defra. It has a regional network of veterinary laboratories and provides animal disease surveillance, diagnostic services, research and implementation of animal and zoonotic disease control policy in Great Britain	Data on zoonotic agents in animals and feed, antimicrobial resistance data on isolates from animals in Great Britain and population data and monitoring of implementation of the zoonotic disease control programmes in Great Britain.
Department of Health	Government department. The aim of DH is to improve the health and well being of people in England	Overview
Scotland's Rural Colleges	Under contract provides surveillance information on range of animal diseases to the Scottish Government	Data on zoonotic agents in animals in Scotland
Scottish Government	Devolved Administration for Scotland	Overview

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Laboratory name	Description	Contribution
Food Standards Agency FSA	The Food Standards Agency is an independent government department set up by an act of parliament in 2000 to protect the public health and consumer interest in relation to food	Data on zoonotic agents in food in the UK
Health Protection Scotland	Health Protection Scotland (HPS) established by Scottish Executive to strengthen and coordinate health protection in Scotland.	Data on zoonotic agents and foodborne outbreaks in humans in Scotland
Public Health Agency, Northern Ireland	Surveillance of communicable disease. Advice and support to public health authorities and health professionals, training, and research in Northern Ireland	Data on zoonotic agents in humans in Northern Ireland and foodborne outbreaks.
Welsh Government	Devolved Administration for Wales	Overview

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/ EC*. The information has also been forwarded to the European Food Safety Authority (EFSA).

The report contains information on trends and sources of zoonoses and zoonotic agents in United Kingdom during the year 2013 .

The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given. The information given covers both zoonoses that are important for the public health in the whole European Community as well as zoonoses, which are relevant on the basis of the national epidemiological situation.

The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the Community Legislation, while for the other zoonoses national approaches are applied.

The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.

The information covered by this report is used in the annual Community Summary Report on zoonoses that is published each year by EFSA.

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* Directive 2003/ 99/ EC of the European Parliament and of the Council of 12 December 2003 on the monitoring of zoonoses and zoonotic agents, amending Decision 90/ 424/ EEC and repealing Council Directive 92/ 117/ EEC, OJ L 325, 17.11.2003, p. 31

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1. ANIMAL POPULATIONS

The relevance of the findings on zoonoses and zoonotic agents has to be related to the size and nature of the animal population in the country.

A. Information on susceptible animal population

Sources of information

Animal population information is sourced from the June Survey of Agriculture in each of England, Wales and Scotland. Northern Ireland data ia provided by the Department of Agriculture and Rural Development Northern Ireland, 2013 from Agriculture Survey for 2013 and APHIS records.

Note that figures in the table are a snapshot of the population at a specific time during the year.

Dates the figures relate to and the content of the figures

Population figures (other than number of flocks of chickens and turkeys subject to the Salmonella NCP) are derived on the 1st June or the 1st December.

Definitions used for different types of animals, herds, flocks and holdings as well as the types covered by the information

All poultry keepers with 50 or more birds (in total of any species) are required to register their premises with the Great Britain Poultry Register (even if the premises is only stocked with 50 or more birds for part of the year). At present, premises with fewer than 50 birds are not required to register, but keepers are encouraged to do so voluntarily and those registered, even if less than 50 birds are kept, are included in the poultry data.

Geographical distribution and size distribution of the herds, flocks and holdings

Table Susceptible animal populations

* Only if different than current reporting year

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	Category of animals	Data	Year*	Data	Year*	Data	Year*	Data	Year*
Cattle (bovine animals)	- in total					9881412			
Deer	farmed - in total					72305			
Gallus gallus (fowl)	breeding flocks for egg production line - in total	139							
	breeding flocks for meat production line - in total	1627							
	laying hens	4012							
	broilers	37721							
Goats	- in total					97574			
Pigs	- in total					4837186			
Sheep	- in total					32922175			
Solipeds, domestic	horses - in total					293505			
Turkeys	meat production flocks	3178							
	breeding flocks, unspecified - in total	226							

Table Susceptible animal populations

2. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

Zoonoses are diseases or infections, which are naturally transmissible directly or indirectly between animals and humans. Foodstuffs serve often as vehicles of zoonotic infections. Zoonotic agents cover viruses, bacteria, fungi, parasites or other biological entities that are likely to cause zoonoses.

2.1 SALMONELLOSIS

2.1.1 General evaluation of the national situation

A. General evaluation

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Comparison of the Salmonella serovars found in animals, feedingstuffs, food and man helps to suggest possible sources of infection in the food chain.

Additional information

Surveillance system:
The UK government undertakes national microbiological food surveillance. The priorities of these surveys are closely linked to a strategy to reduce the level of foodborne disease. Surveys are carried out regularly on a variety of foods and processes to gather data on the possible effects of processing changes on pathogens and to monitor high-risk foods linked to human cases/outbreaks and the emergence of new pathogens. In addition to national surveillance, Wales, Scotland and Northern Ireland also have separate microbiological food surveillance programmes within their own regions.

The UK government also collates returns from all UK food authorities on official food enforcement activities in line with Regulation (EC) No 882/2004 on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in this report.

2.1.2 Salmonellosis in humans

A. Salmonellosis in humans

Reporting system in place for the human cases

Ascertainment of cases is via mandatory notification of food poisoning and reporting of isolations by publicly funded human diagnostic microbiology laboratories.

Case definition

The main method used is bacteriological examination of faecal specimens. Positive blood cultures are also reported.

Most of the isolates are from faecal specimens, however isolates from extra-intestinal sites are also reported.

Diagnostic/analytical methods used

Microbiological culture and isolation

Notification system in place

See reporting system above.

History of the disease and/or infection in the country

An increase in the reports of human salmonellosis in the UK was seen in the mid 1980s and between 1989 and 1997, about 30,000 cases were reported each year. Since 1997 numbers reported have declined. Generally during this period over 60% of reports were Salmonella Enteritidis. The overall decline in Salmonellosis since the late 1990's has been mainly driven by a decline in the incidence of S. Enteritidis PT 4.

National evaluation of the recent situation, the trends and sources of infection

There has been a significant decreasing trend in laboratory confirmed reports of Salmonella infection in humans in the UK since the late 1990s.

Relevance as zoonotic disease

Salmonella Enteritidis and Salmonella Typhimurium still account for the majority of cases of human Salmonellosis in the UK.

2.1.3 Salmonella in foodstuffs

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample > meat	Unknown	Unknown	25g	133	0	0	0
Meat from turkey - meat products - cooked, ready-to -eat - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample > meat	Unknown	Single	25g	9	0	0	0

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Retail - Surveillance	0	0
Meat from turkey - meat products - cooked, ready-to -eat - Retail - Surveillance	0	0

Footnote:

FSA = Food Standards Agency

Table Salmonella in milk and dairy products

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample	Unknown	Single	25g	24	0	0	0
Cheeses made from goats' milk - fresh - made from raw or low heat-treated milk - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample	Unknown	Single	25g	43	0	0	0
Dairy products (excluding cheeses) - butter - made from raw or low heat-treated milk - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample	Unknown	Single	25g	5	0	0	0
Dairy products (excluding cheeses) - cream - made from raw or low heat-treated milk - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample	Unknown	Single	25g	4	0	0	0
Dairy products (excluding cheeses) - ice-cream - made from raw or low heat-treated milk - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample	Unknown	Single	25g	272	0	0	0
Dairy products (excluding cheeses) - milk powder and whey powder - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample	Unknown	Single	25g	10	0	0	0

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk - Retail - Surveillance	0	0

Table Salmonella in milk and dairy products

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Cheeses made from goats' milk - fresh - made from raw or low heat-treated milk - Retail - Surveillance	0	0
Dairy products (excluding cheeses) - butter - made from raw or low heat-treated milk - Retail - Surveillance	0	0
Dairy products (excluding cheeses) - cream - made from raw or low heat-treated milk - Retail - Surveillance	0	0
Dairy products (excluding cheeses) - ice-cream - made from raw or low heat-treated milk - Retail - Surveillance	0	0
Dairy products (excluding cheeses) - milk powder and whey powder - Retail - Surveillance	0	0

Table Salmonella in other food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Vegetables - pre-cut - ready-to-eat - Retail - Surveillance	FSA	Unspecified	Official sampling	food sample	Unknown	Single	25g	46	0	0	0

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Vegetables - pre-cut - ready-to-eat - Retail - Surveillance	0	0

Table Salmonella in red meat and products thereof

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Meat from pig - carcase - Slaughterhouse - Survey - national survey		Objective sampling	Official sampling	food sample > carcase swabs	Domestic	Slaughter batch		624	60		2

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. 1,4,[5],12:i:- - DT 104b	S. 1,4,[5],12:i:- - DT 120	S. 1,4,[5],12:i:- - DT 193	S. 1,4,[5],12:i:- - U 311	S. 4,12:i:-	S. 4,5,12:i:- - U 323	S. Bovismorbificans	S. Choleraesuis var. Kunzendorf	S. Derby
Meat from pig - carcase - Slaughterhouse - Survey - national survey			1	1	15	1	6	4	5	1	8

	S. Goldcoast	S. Panama	S. Reading	S. Rissen	S. Stanley	S. Typhimurium - DT 193	S. Typhimurium - DT 208	S. Typhimurium - U 288	S. Typhimurium - U 302	S. enterica subsp. enterica - rough
Meat from pig - carcase - Slaughterhouse - Survey - national survey	1	1	1	2	2	2	1	2	2	2

2.1.4 Salmonella in animals

A. Salmonella spp. in Gallus Gallus - breeding flocks

Monitoring system

Sampling strategy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Sampling is carried out as specified in EU legislation Regulation (EC) No. 2160/2003, Regulation (EC) No. 200/2010 and the UK Salmonella National Control Progamme (NCP) for breeding hens (Gallus gallus).

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

All consignments sampled on arrival

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

When birds are four weeks old and two weeks before moving to laying phase/laying unit

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Every two or three weeks during the production period.

In addition to the sampling above, Official Control Samples are collected from each adult breeding flock on two occasions which are sufficiently distant in time from each other during the production cycle (usually within 4 weeks of moving to the laying accommodation and again within the last 8 weeks of production).

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Sampling at the holding: hatcher tray liners or chick box liners and chicks dead on arrival/culls

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Sampling at the holding: Boot swabs or composite faeces samples (depending on production system)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Sampling at the holding: Boot swabs or composite faeces samples (depending on production system)

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

According to the requirements of the Salmonella NCP, mandatory sampling is required on the day of arrival - samples must be taken from each flock within 72 hours of age, comprising of at least the following from each hatchery supplying the chicks:
- Hatcher tray liners or chick box liners: one liner for each 500 chicks delivered, up to a maximum of 10 liners
- All chicks dead on arrival and culls at day old, up to a maximum of 60.

Operator voluntary monitoring can include hatchery debris, dust, fluff, meconium samples etc.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

According to the requirements of the Salmonella NCP, mandatory sampling is required at 4 weeks old and then 2 weeks before moving to the laying phase or laying unit as follows:
- A minimum of 2 pairs of boot swabs or

- A composite faeces sample made up of individual 1g faeces samples selected at random from sites to represent the whole building/space available to the birds. The size of the sample required is determined by the number of birds in the building/flock.

Other operator voluntary monitoring can include rodent droppings, dust samples, swabs taken from empty houses, transport vehicles etc.

Breeding flocks: Production period

According to the requirements of the Salmonella NCP, mandatory sampling is required every 2 to 3 weeks during the laying/production period as follows:
- A minimum of 5 pairs of boot swabs or
- A composite faeces sample made up of individual 1g faeces samples selected at random from sites to represent the whole building/space available to the birds. The size of the sample required is determined by the number of birds in the building/flock.

Other operator voluntary monitoring can include hatcher debris, fluff, additional boot swabs/faeces samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc. Additional voluntary operator samples are usually taken as part of hatchery hygiene monitoring programmes.

Case definition

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Culture and isolation of Salmonella (field strain) from samples taken from the animal, or directly associated with its environment.

Reports of Salmonella isolates under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/isolates obtained.

'Flock' is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace.

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Vaccination policy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There are no restrictions on the use of Salmonella vaccines which have a marketing authorisation. Vaccine is not used in the layer breeder sector but is sometimes used in the broiler breeder sector (parent level).

Other preventive measures than vaccination in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Codes of Good Practice for the Control of Salmonella in poultry flocks, for rodent control on poultry farms and for the production, handling and transport of feed have been published in collaboration with the industry.

Control program/mechanisms

The control program/strategies in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Regulation (EC) No. 2160/2003 lays down harmonised rules for the monitoring and control of Salmonella in breeding flocks of domestic fowl. The legislation sets out enhanced monitoring and controls for Salmonella which have been implemented in the UK Salmonella National Control Programme (NCP) for breeding chicken flocks. The requirements of the Programme are enforced through the Control of Salmonella in Poultry Order (England) 2007, the Control of Salmonella in Poultry (Scotland) Order 2008, the Control of Salmonella in Poultry (Wales) Order 2008 and the Control of Salmonella in Poultry Scheme Order (Northern Ireland) 2008 in order to to meet the target for reduction in Salmonella prevalence set out in EU legislation.

Regulation (EC) No. 200/2010 (which amends Regulation (EC) No. 1003/2005), sets a target for the breeding flock sector to ensure that no more than 1% of adult breeding flocks with more than 250 birds remain positive for the regulated Salmonella serovars annually. The EU target for breeding flocks is based on the 5 serovars considered of greatest public health significance at the time of drafting of the legislation (the 5 most frequent serovars in human cases): S. Enteritidis, S. Typhimurium, S. Virchow, S. Hadar and S. Infantis. Regulation (EU) No. 517/2011 amends Regulation (EC) No. 200/2010 to include the monophasic Salmonella Typhimurium variants S. 1,4,[5],12:i:- as regulated/target Salmonella ssp. within the requirements of the Salmonella National Control Programmes. Any breeding flock found to be infected with a regulated Salmonella serovar according to the protocol outlined above is placed under official control and the requirements of Regulation (EC) No. 2160/2003 are implemented.

Regulation (EC) No 200/2010 allows for an extension in the frequency of operator sampling at the holding from every two weeks to every three weeks, at the discretion of the Competent Authority. A reduction in the number of routine official samples required in each flock from three to two per year is also allowed. This revised testing protocol is applicable to Member States who have met the Salmonella reduction target as specified in the legislation for two consecutive years. As the UK breeding chicken sector achieved the reduction target for 2011 and 2012, this extended testing interval (at the discretion of the Competent Authority) and the reduced official sampling frequency have been applied in the UK in 2013. However, some UK breeding chicken companies have chosen to still sample at a two weekly frequency.

Measures in case of the positive findings or single cases

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Any breeding flock found to be infected with S. Typhimurium or S. Enteritidis is compulsorily slaughtered with compensation. When Salmonella Enteritidis or Salmonella Typhimurium (including monophasic strains) is suspected in a breeding flock, the holding is placed under official control. An investigation is carried out on all the flocks on the site. Following compulsory slaughter of the positive flock(s), the holding remains under official control until cleaning and disinfection has been carried out and shown to be satisfactory by microbiological culture of samples taken from the empty house. Eggs from the positive flock are removed from the hatchery and destroyed.

In the case of detection of S. Hadar, S. Infantis or S. Virchow, a control plan for eradication of infection is put in place, in collaboration with government experts on Salmonella control and the operator's private veterinary surgeon.

Public health authorities are advised of the isolation of Salmonella. Visits are made to the farm by government officials to carry out an epidemiological investigation and provide advice to the food business operator on the control of Salmonella if the Salmonella isolated is considered to be of public health significance.

Notification system in place

All isolations of Salmonella must be reported and a culture must be supplied to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991]. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

The main provisions of the Zoonoses Order are:
- A requirement to report to a veterinary officer of the Minister the results of tests which identify the presence of a Salmonella from an animal or bird, a carcase of an animal or bird, their surroundings or feedstuffs by the laboratory that carries out the test. A culture must be provided to the official laboratory.
- Samples (including live birds) may be taken for diagnosis.
- Movement restrictions and isolation requirements may be imposed.
- Provision for compulsory slaughter and compensation where Salmonella infection is confirmed in a breeding flock of Gallus gallus.
- Compulsory cleansing and disinfection of premises and vehicles.

The main provisions of the Control of Salmonella in Poultry Orders relevant to the breeding chicken control programme are:
- Owners of poultry breeding flocks of more than 250 birds must be registered unless officials have access to flock information from another source (e.g. the Great Britain Poultry Register and the Poultry Register in Northern Ireland). Information supplied should include the name and address of the holding, the number (and species) of breeding flocks on the holding, the number of poultry in each breeding flock, their status in the breeding pyramid (e.g. Parent, Grandparent etc) and whether layer breeders or meat (broiler) breeders.
- Flock owners are required to record the movements of birds, chicks or eggs onto and off the premises, including dates of movements, numbers of poultry, chicks or eggs moved, their ages, building/ flock identity and the addresses of source or destination premises. This information must be made available for inspection on request by a government authorised official. Owners must also inform officials with 2 weeks notice of the expected date of movements to the laying phase or laying unit and also the date on which the flock is expected to reach the end of the production cycle. This is done to facilitate the collection of official samples.
- The owner/operator is required to maintain records of the dates of sampling, type of samples collected, the identity of building, flock or holding sampled and the age of each flock sampled. Owners should also keep a record of the test result and name of laboratory used.

Results of the investigation

In the UK in 2013, a total of 1766 adult breeding flocks were subject to at least one Official Control Sample during the year (1,465 in Great Britain and 301 in Northern Ireland). Two adult breeding flocks were positive for Salmonella Typhimurium DT104 during the year. No flocks were detected positive for the other regulated serovars (S. Enteritidis, S. 4,[5],12:i:-, S. Hadar, S. Infantis or S. Virchow).

A further 13 adult flocks tested positive for the non-regulated serovars: seven flocks were positive for

Salmonella 13,23:i:-, two flocks were positive for S. Indiana, one flock was positive for S. Kedougou, one flock was positive for S. Senftenberg, one flock was positive for S. Dublin and one flock was positive for S. Mbandaka.

Taking the number of flocks tested as the denominator population, this gives a prevalence of 2/1,766 or 0.11% flocks testing positive for the regulated Salmonella serovars during 2013. In total, 0.85% of adult flocks were positive for all Salmonella spp. (15/1,766).

National evaluation of the recent situation, the trends and sources of infection

Overall, for both the layer breeder and broiler breeder sectors in the UK, the reduction target of 1% or less flocks remaining positive for Salmonella Enteritidis, S. Typhimurium (including monophasic strains), S. Hadar, S. Infantis, and S. Virchow has been achieved each year since the start of the programme (0.11% in 2013, 0.00% in 2012, 0.07% in 2011, 0.06% in 2010, 0.12% in 2009, 0.49% in 2008 and 0.06% in 2007).

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

A reducing contribution of Salmonella to the overall burden of food-borne zoonoses has been observed in the UK, especially for S. Enteritidis, where a significant decreasing trend in laboratory reports of infection in humans has been reported.

B. Salmonella spp. in Gallus Gallus - broiler flocks

Monitoring system

Sampling strategy

Broiler flocks

Sampling is carried out as specified in EU legislation Regulation (EC) No. 2160/2003 and Regulation (EU) No. 200/2012 and the UK Salmonella National Control Progamme (NCP) for chickens producing meat for human consumption (broilers).

Frequency of the sampling

Broiler flocks: Before slaughter at farm

According to the requirements of the Salmonella National Control Programme, mandatory sampling is required within 3 weeks of the birds being sent to slaughter. Routine Official Control Samples are collected once annually from 10% of holdings with more than 5000 birds.

Type of specimen taken

Broiler flocks: Before slaughter at farm

Socks/ boot swabs

Methods of sampling (description of sampling techniques)

Broiler flocks: Before slaughter at farm

The NCP sample must consist of a minimum of 2 pairs of boot swabs taken so as to be representative of the whole area in the house to which the birds have access. In flocks of less than 100 broilers, where it is not possible to take boot swabs, hand drag swabs may be used.

Other operator voluntary monitoring can include additional boot swabs, litter samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc.

Case definition

Broiler flocks: Before slaughter at farm

Culture and isolation of Salmonella (field strain) from samples taken from the animal, or directly associated with its environment.

Reports of Salmonella isolates under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/isolates obtained.

“Flock” is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace.

Diagnostic/analytical methods used

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002/Amd 1:2007

Vaccination policy

Broiler flocks

There are no restrictions on the use of Salmonella vaccines which have a Marketing Authorisation.

However, vaccination is not used in broiler flocks in the UK.

Other preventive measures than vaccination in place

Broiler flocks

Codes of Good Practice in the control of Salmonella on broiler farms and in the production, handling and transport of feed, as well as advice on rodent control have been published in collaboration with the poultry industry.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

Regulation (EC) No. 2160/2003 and Regulation (EU) No. 200/2012 lay down harmonised rules for the monitoring and control of Salmonella in broiler flocks, which have been implemented in the UK Salmonella National Control Programme (NCP). The NCP is enforced by the Control of Salmonella in Broiler Flocks Order (England) 2009, the Control of Salmonella in Poultry (Breeding, Laying and Broiler Flocks) (Scotland) Order 2009, the Control of Salmonella in Broiler Flocks (Wales) Order 2009 and the Control of Salmonella in Broiler Flocks Scheme Order (Northern Ireland) 2009. This national legislation enforces the requirements of the NCP required to meet the target for reduction in Salmonella prevalence set out in EU legislation. The NCP applies to all operators, except where the operator produces small quantities of product provided direct to the consumer or via local retailers which only supply the final consumer or where all production is for private domestic use only.

Regulation (EU) No. 200/2012 sets a target for the UK broiler sector to ensure that no more than 1% of broiler flocks are detected positive for Salmonella of greatest human health significance annually. The EU target is based on the 2 most common serovars in human cases which are S. Enteritidis and S. Typhimurium (including monophasic strains).

According to Commission Regulation (EC) No. 1177/2006, the administration of antimicrobials to any bird of the species Gallus gallus as a specific method to control Salmonella is prohibited. The same legislation also prohibits the administration of any live Salmonella vaccine to any bird of the species Gallus gallus where the manufacturer does not provide an appropriate method to distinguish bacteriologically wild-type strains of Salmonella from vaccine strains.

Measures in case of the positive findings or single cases

Broiler flocks: Before slaughter at farm

If S. Enteritidis or S. Typhimurium (including monophasic strains) is detected in an operator sample, official samples are collected by the Competent Authority from the next crop in the affected house as well as from all other flocks on the holding. If any of these samples are positive, a restriction notice is served on the holding under the Zoonoses Order, requiring supervised cleansing and disinfection and further sampling. If any of the post cleansing and disinfection samples return a positive result for S. Enteritidis or S. Typhimurium, subsequent flocks may only be moved off the site under license to the slaughterhouse and further official sampling of all flocks in the next crop is carried out.

It is the responsibility of the food business operator to notify the Official Veterinarian at the slaughterhouse of the Salmonella status of the flock prior to slaughter so that suitable precautions can be put in place to prevent the possibility of cross-contamination and to minimise the risk to public health. The Salmonella monitoring results for all eligible broiler flocks must be included as part of the Food Chain Information documentation, accompanying each batch to the slaughterhouse (Annex II of Regulation (EC) No. 853/2004)

Public health authorities are advised of the isolation of Salmonella in broiler flocks. Visits are made to the farm by Government officials to carry out an epidemiological investigation and provide advice to the food business operator on the control of Salmonella if the Salmonella isolated is considered to be of public health significance.

Notification system in place

All isolations of Salmonella must be reported to the Competent Authority and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain and the Zoonoses Order (Northern Ireland) 1991 in Northern Ireland.

Approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under the Salmonella NCP legislation to the Competent Authority.

The owner/operator is required to maintain records of the dates of sampling, type of samples collected, the identity of building, flock or holding sampled and the age of each flock sampled. Owners should also keep a record of the test result and name of laboratory used.

Results of the investigation

In total, 172 routine annual official sampling visits were carried out to broiler premises in the UK by the Competent Authority during the year to fulfill the requirements of the legislation (123 in Great Britain and 49 in Northern Ireland). In addition, risk based sampling visits were carried out to all premises where a flock was detected positive for a regulated serovar during the year.

There were approximately 37,721 flocks tested according to the requirements of the Salmonella NCP during 2013 - ~30,236 in Great Britain and 7485 in Northern Ireland. This estimate was derived from the monthly returns of operator testing at private and government testing laboratories for all broiler flocks tested 3 weeks before moving to slaughter.

In total 848 broiler flocks of Gallus gallus were positive for Salmonella spp. in 2013, a 26% increase compared to 2012 (674 flocks). Of these, 809 were flocks in Great Britain and 39 were flocks in Northern Ireland. Salmonella Mbandaka was the most commonly isolated serovar (214 positive flocks). No broiler flocks were positive for S. Enteritidis. 12 broiler flocks were positive for S. Typhimurium, compared with 3 flocks last year. One flock was positive for monophasic Salmonella 4,5,12:i:- (the same as 2012) and 4 flocks were positive for S. 4,12:i:- compared to none in 2012. Overall, 794 flocks were positive for other non-regulated Salmonella spp.

Using the number of flocks in production in the UK during 2013 as the denominator figure, this gives an estimated prevalence of 1737721 or 0.05%% for the target Salmonella serovars for the UK in 2013. These results indicate an increase in the prevalence compared to previous years: 0.01% in 2012 and 2011, 0.02% in 2010 and 0.04% in 2009. The prevalence of Salmonella spp. for the UK for 2013 was 2.25% (848/37721) which is also an increase in prevalence compared to previous years: 1.78% in 2012, 1.35% in 2011, 1.57% in 2010 and 1.31% in 2009.

Although the prevalence of regulated serovars increased in 2013, it still remains at a low level and thus well below the target of 1% specified in the EU legislation.

National evaluation of the recent situation, the trends and sources of infection

C. Salmonella spp. in Gallus Gallus - flocks of laying hens

Monitoring system

Sampling strategy

Laying hens flocks

Sampling is carried out as specified in EU legislation Regulation (EC) No. 2160/2003, Regulation (EU) No 517/2011 and the UK Salmonella National Control Programme (NCP) for laying hens (Gallus gallus).

Frequency of the sampling

Laying hens: Day-old chicks

All consignments sampled on arrival

Laying hens: Rearing period

2 weeks prior to moving to the laying unit/ start of lay

Laying hens: Production period

At least every 15 weeks during the production period. One routine Official Control Sample is collected annually from one laying flock on all premises with more than 1000 birds.

Eggs at packing centre (flock based approach)

Voluntary industry sampling as part of industry assurance scheme. Sampling by Government officials if suspicion of presence of Salmonella that could pose public health risk or if suspicion of link to human food -borne disease outbreak.

Type of specimen taken

Laying hens: Day-old chicks

Hatcher tray liners or chick box liners and chicks dead on arrival or cull chicks

Laying hens: Rearing period

Boot swabs or composite faeces sample

Laying hens: Production period

Boot swabs or composite faeces (plus dust sample at official test)

Eggs at packing centre (flock based approach)

Eggs for human consumption

Methods of sampling (description of sampling techniques)

Laying hens: Day-old chicks

According to the requirements of the NCP, mandatory sampling is required on the day of arrival, comprising of at least the following from each hatchery supplying the chicks:
- Hatcher tray liners or chick box liners: one liner for each 500 chicks delivered, up to a maximum of 10 liners for every batch of chicks delivered.
- All chicks dead on arrival and culls at day old, up to a maximum of 60 from each hatchery delivery.

Laying hens: Rearing period

According to the requirements of the NCP, mandatory sampling is required 2 weeks before moving to the laying phase or laying unit as follows:
- A minimum of two pairs of boot swabs (for floor reared birds) to be representative of the whole area in the house to which the birds have access or

- A large composite faeces sample (for cage reared) selected at random from sites to represent the house/space available to the birds.

Other operator voluntary monitoring can include rodent droppings, dust samples, swabs taken from empty houses, transport vehicles etc.

Laying hens: Production period

According to the requirements of the NCP, mandatory sampling is required at least every 15 weeks during the laying/production period of the flock starting at 22-26 weeks of age as follows:
- A minimum of two pairs of boot swabs to be representative of the whole area in the house to which the birds have access or
- Two x 150g composite faeces sample taken to represent the whole building/space available to the birds.

In addition to the sampling above, one routine Official Control Sample is collected annually from one laying flock on all premises with more than 1000 birds and consists of two pairs of boot swabs/two composite faeces samples and a dust sample or three pairs of boot swabs/three composite faeces samples .

Operator voluntary monitoring can include rodent faeces and other environmental samples, dust samples, swabs taken from empty houses, transport vehicles, egg samples taken at the packing centre etc.

Case definition

Laying hens: Production period

Culture and isolation of Salmonella (non vaccine strain) from samples taken from the animal, or directly associated with its environment.

Reports of Salmonella isolates under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/isolates obtained.

“Flock” is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace

Diagnostic/analytical methods used

Laying hens: Day-old chicks

Bacteriological method: ISO 6579:2002/Amd 1:2007

Laying hens: Rearing period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Laying hens: Production period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Vaccination policy

Laying hens flocks

There are no restrictions on the use of Salmonella vaccines which have a marketing authorisation. A large proportion of the commercial layer flocks in the UK are vaccinated with a Salmonella vaccine.

Other preventive measures than vaccination in place

Laying hens flocks

Codes of Good Practice in the control of Salmonella in laying flocks, in rodent control on poultry farms and in the production, handling and transport of feed have been published in collaberation with the industry.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

Regulation (EC) No. 2160/2003 and Regulation (EU) No. 517/2011 (amending Regulation (EC) No.1168/2006), lay down harmonised rules for the monitoring and control of Salmonella in laying flocks of domestic fowl, which have been implemented in the UK Salmonella National Control Programme (NCP). The NCP applies to all operators who produce eggs unless all the eggs are for private domestic use or are supplied in small quantities by the producer to the final consumer/local retail shops. The NCP is enforced by The Control of Salmonella in Poultry (England) Order 2007, The Control of Salmonella in Poultry Scheme Order (Northern Ireland) 2008, the Control of Salmonella in Poultry (Breeding, Laying and Broiler Flocks) (Scotland) Order 2009 and The Control of Salmonella in Poultry (Wales) Order 2008. The Control of Salmonella in Poultry Orders enforce the requirements of the NCP required to meet the definitive target for reduction in Salmonella prevalence of 2% set out in Regulation (EU) No. 517/2011 and set out a schedule of sampling which forms the basis for validating achievement of the target for reduction in regulated Salmonella spp. Results of the statutory sampling carried out in immature laying flocks and additional voluntary operator sampling does not count towards this target.

The EU target for laying flocks is based on the 2 most common serovars in human cases which are S. Enteritidis and S. Typhimurium (including the monophasic strains). Any laying flock found to be infected with the regulated Salmonella serovars according to the testing protocol outlined in the legislation is placed under official control and the requirements of the Regulation (EC) No. 2160/2003, as amended by Regulation (EC) No. 1237/2007 are implemented.

According to Commission Regulation (EC) 1177/2006, the administration of antimicrobials to any bird of the species Gallus gallus as a specific method to control Salmonella is prohibited. The same legislation also prohibits the administration of any live Salmonella vaccine to any bird of the species Gallus gallus where the manufacturer does not provide an appropriate method to distinguish bacteriologically wild-type strains of Salmonella from vaccine strains.

Measures in case of the positive findings or single cases

Laying hens flocks

If a flock is confirmed infected with S. Enteritidis or S. Typhimurium (including the monophasic strains), the flock is placed under restriction and all the eggs from the flock must be designated as Class B eggs (i.e. can no longer be marketed as Class A table eggs). The eggs cannot be used for human consumption unless they are heat treated to eliminate the risk of Salmonella contamination. All other flocks on the holding are sampled officially. Following depopulation of a S. Enteritidis/S. Typhimurium/S. 1,4,[5],12:i:- positive flock, another official sample is required in the follow-on flock at 22-26 weeks of age.

If the operator wishes to challenge sampling results, he/she can request additional optional confirmatory testing to be carried out according to the sampling protocol laid out in Regulation (EC) No. 1237/2007 (testing either 4000 eggs or the internal organs of 300 birds or 5 faecal & 2 dust samples per flock). Restrictions remain in place until results of this further testing are known.

Public health authorities are advised of the isolation of Salmonella in laying chicken flocks. Visits are made to the farm by Government officials to carry out an epidemiological investigation and provide advice to the food business operator on the control of Salmonella if the Salmonella isolated is considered to be of public health significance.

Notification system in place

All isolations of Salmonella must be reported to the Competent Authority and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain and the Zoonoses Order (Northern Ireland) 1991 in Northern Ireland.

The Salmonella NCP is enforced in the UK through the Control of Salmonella in Poultry Orders (England, Scotland, Wales and Northern Ireland). The main provisions of this legislation relevant to the laying chicken Salmonella National Control Programme are:
- Owners of chicken laying flocks of more than 350 birds must be registered unless officials have access to flock information from another source (e.g. the Great Britain Poultry Register or Northern Ireland Poultry Register). Information supplied should include the name and address of the holding, the number of laying hens on the holding.
- flock owners are required to record the movements of birds, chicks or eggs onto and off the premises, including dates of movements, numbers of poultry, chicks or eggs moved, their ages, building/ flock identity and the addresses of source or destination premises. This information must be made available for inspection on request by a government authorised official.
- The owner/operator is required to maintain records of the dates of sampling, type of samples collected, the identity of building, flock or holding sampled and the age of each flock sampled. Owners should also keep a record of the test result and name of laboratory used.

Approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

Results of the investigation

During 2013, two adult laying chicken flocks were confirmed positive for Salmonella Enteritidis and one flock was confirmed positive for monophasic Salmonella strain S. 4,5,12:i:- in Great Britain. There were no flocks positive for the regulated serovars in Northern Ireland. No flocks were detected positive for Salmonella Typhimurium or Salmonella monophasic strain 4,12:i:- in the UK during the year. A further 34 adult laying flocks tested positive for other Salmonella serovars during the year in the UK (all in Great Britain).

A total of 4,012 adult flocks of laying hens were included in the NCP in 2013 (3,687 in Great Britain and 325 in Northern Ireland). For the UK, the estimated prevalence of the target serovars S. Enteritidis &/or S. Typhimurium (including monophasic strains) in adult laying flocks under the NCP for 2013 was 0.07% (3/4,012) which is well below the definitive target of 2%. The estimated prevalence of Salmonella-positive adult laying flocks, according to the requirements of the NCP, for Salmonella spp. was 0.92% (37/4,012).

These results are the same as the prevalence for the target serovars in 2012 (0.07%) but indicate a significant reduction in prevalence for the target serovars compared to previous years (prevalence of 0.17% in 2011, 0.25% in 2010, 0.36% in 2009 and approximately 1% for the regulated serovars in 2008). For all Salmonella serovars, the 2013 results showed a slight increase compared to the 2012 prevalence of 0.84%, but in general there has also been a reducing trend since the start of the NCP in 2008 (0.74% for all Salmonella spp. in 2011, 1.10% in 2010, 1.7% in 2009 and approximately 1.2% in 2008).

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

A reducing contribution of Salmonella to the overall burden of food-borne zoonoses has been observed in the UK, especially for S. Enteritidis, where a significant decreasing trend in laboratory reports of infection in humans, particularly for phage type 4 which had been associated with UK laying flocks in earlier years, has been reported.

Additional information

D. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

Government funded scanning surveillance programmes are delivered by the Animal Health and Veterinary Laboratories Agency (AHVLA), Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. Over 90% of the Salmonella isolates derived from cattle annually are from samples taken for diagnostic purposes and submitted for testing under this programme.

Type of specimen taken

Animals at farm

Usually faeces or from organs at post mortem

Methods of sampling (description of sampling techniques)

Animals at farm

Voluntary samples usually sent by a private veterinarian for diagnostic purposes

Case definition

Animals at farm

Culture and isolation of Salmonella from samples taken from the animal. Reports of Salmonella isolates under the Zoonoses Order are classed as positive.

Diagnostic/analytical methods used

Animals at farm

Various

Vaccination policy

Vaccination against Salmonella Dublin and Salmonella Typhimurium may be used on a voluntary basis. There is no restriction on using any authorised Salmonella vaccine

Control program/mechanisms

The control program/strategies in place

There is no statutory national control programme for Salmonella in cattle. All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the Salmonella is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of Salmonella from cattle. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is a outbreak of salmonellosis in humans associated with the farm.

Measures in case of the positive findings or single cases

Advice is given on control of Salmonella and farm visits may be made by the veterinary and public health authorities.

Notification system in place

All isolations of Salmonella must be reported to the Competent Authority and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain and the Zoonoses Order (Northern Ireland) 1991 in Northern Ireland.

Units tested are not known because the laboratories do not report negative results unless as part of an official control programme or survey.

Results of the investigation

There is no routine Salmonella monitoring of cattle in the UK, therefore the majority of isolates come from cattle with clinical disease. The number of reports is dependent on the total cattle population and the number of diagnostic submissions to veterinary laboratories. As in previous years, the majority (> 90%) of Salmonella reports in cattle were from samples taken for clinical diagnostic purposes and came from cattle on farms.

Great Britain:
There were 604 isolations of Salmonella in cattle reported in 2013. Salmonella Dublin remained the most commonly isolated serovar (438 reported isolations). There were 30 reports of Salmonella Typhimuirum, 17 reports of 4,5,12:i:- and four reports of 4,12:i:-. There were no reports of Salmonella Enteritidis during the year.

Northern Ireland:
There were a total of 157 reports of isolation of Salmonella from cattle in Northern Ireland in 2013. The majority of these were S. Dublin (127). There were also ten S. Typhimurium and six monophasic Typhimuirum reports during the year.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Salmonella Dublin is the most common serovar associated with abortion in cattle. Salmonella Dublin is seldom isolated in samples from man.

Additional information

The majority of incidents reported are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. Therefore the sample submission rate and the number of Salmonella incidents recorded on an annual basis is subject to external influencing factors which can impact on observed trends (such as clinical presentation of disease, economic influences, awareness of a disease etc).

E. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Breeding herds

Government funded scanning surveillance programmes are delivered by the Animal Health and Veterinary Laboratories Agency (AHVLA), Scotland's Rural College (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. On average, approximately 90% of incidents are from the isolation of Salmonella in samples taken for diagnostic purposes (clinical samples) and submitted for testing under this programme.

Multiplying herds

As for breeding herds

Fattening herds

As for breeding herds.

Type of specimen taken

Breeding herds

Usually faeces or organs at post mortem. Voluntary samples usually sent by a private veterinarian for diagnostic purposes

Multiplying herds

Usually faeces or organs at post mortem. Voluntary samples usually sent by a private veterinarian for diagnostic purposes

Fattening herds at farm

Usually faeces or organs at post mortem. Voluntary samples usually sent by a private veterinarian for diagnostic purposes

Fattening herds at slaughterhouse (herd based approach)

Meat juice

Methods of sampling (description of sampling techniques)

Fattening herds at farm

Fattening herds at slaughterhouse (herd based approach)

Case definition

Breeding herds

Reports of Salmonella isolates under the Zoonoses Order are classed as positive.

Vaccination policy

Breeding herds

There are no restrictions on the use of Salmonella vaccines which have a Marketing Authorisation.

Multiplying herds

As for breeding herds

Fattening herds

As for breeding herds

Other preventive measures than vaccination in place

Breeding herds

Codes of good practice in the control of Salmonella on pig farms and in the production, handling and transport of feed, as well as advice on rodent control have been published in collaboration with the pig industry.

Multiplying herds

As above

Fattening herds

As above

Control program/mechanisms

The control program/strategies in place

Breeding herds

There is no statutory national control programme for Salmonella in pigs. All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the Salmonella is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of Salmonella from pigs. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is a outbreak of salmonellosis in humans associated with the farm.

Multiplying herds

As for breeding herds

Fattening herds

As for breeding herds

Measures in case of the positive findings or single cases

Public health authorities are advised of the isolation of Salmonella. Advice is given on control of Salmonella and farm visits may be made by the veterinary and public health authorities.

Notification system in place

All isolations of Salmonella must be reported to the Competent Authority and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain and the Zoonoses Order (Northern Ireland) 1991 in Northern Ireland.

Units tested are not known because the laboratories do not report negative results unless testing as part of a statutory official control programme or survey.

Results of the investigation

There is no statutory routine Salmonella monitoring of pigs in the UK, therefore the majority of isolates come from pigs with clinical disease. The number of reports is dependent on the total pig population and the number of diagnostic submissions to veterinary laboratories. Generally, the majority (> 90%) of Salmonella reports in pigs were from samples taken for clinical diagnostic purposes and came from pigs

on farms. However, a survey of pigs at slaughterhouse was also carried out in 2013 (reported separately)

Great Britain:
There were 127 incidents of Salmonella in 2013. Salmonella Typhimurium remained the most commonly found serovar, with 42 isolations reported during the year. No Salmonella Enteriditis was isolated from pig submissions during the year. Reports of Salmonella 4,[5],12:i:- have risen steadily since 2005 and it accounted for 55 reports in 2013 (31x 4,5,12:i:- and 24x 4,12:i:-)

Northern Ireland:
There were a total of 29 reports of isolation of Salmonella from pigs in Northern Ireland in 2013. The most commonly reported serovar was S. Typhimurium (25 isolations). There were no reports of S. Enteritidis or the monophasic strains 4,[5],12:i:-.

National evaluation of the recent situation, the trends and sources of infection

The majority of incidents reported are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. Therefore the sample submission rate and the number of Salmonella incidents recorded on an annual basis is subject to external influencing factors which can impact on observed trends (such as clinical presentation of disease, economic influences, awareness of a disease etc). In Great Britain, a total of 5,685 pig submissions were received by AHVLA in 2011, an increase on the 5,202 in 2010 and 5,334 in 2009. 1,596 diagnostic pig submissions (which generate the bulk of Salmonella incidents in pigs) were received in 2011, which is up slightly on 2010 (1,574).

There were a total of 234 reported incidents of Salmonella recorded in pigs in the UK in 2010. This was higher than during 2009. There was a decrease in reports of S. Typhimurium incidents (122 reports during 2010 compared to 150 in 2009). Over two thirds of the S. Typhimurium reports were either U288 or DT193. By contrast, reports of Salmonella 4,[5],12:i:- increased with 51 reports during the year. This reflects the pan-European rise in monophasic S. Typhimurium strains, especially in pigs. There were no reports of S. Enteritidis.

In 2009, there were 207 reports of Salmonella in pigs. The most commonly isolated serovar was Salmonella Typhimurium (150 reports - 72.5%). For the first time, in 2009, S. 4,5,12:i:- was the second most commonly isolated serovar (12 incidents reported accounting for 5.8%, compared to 8 recorded incidents in 2008) and S. Derby was only the third most common serovar (8 reported incidents accounting for 3.9%). No S. Enteritidis was reported in pigs in the UK in 2009. There was one report of S. Anatum. In 2008 there were 219 pig Salmonella incidents recorded, 226 in 2007, 201 in 2006, 194 in 2005 and 164 reports in 2004.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Salmonella Typhimurium is the second most common serovar isolated from humans in the UK. Salmonella Derby is not commonly isolated from human disease cases.

From 2007, reports of the monophasic Salmonella 4,[5],12:i:- serovar have increased substantially, mainly in pigs and cattle in the UK, but also in other animals (mice, sheep, cats, dogs, horses).

F. Salmonella spp. in turkey - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Sampling is carried out as specified in EU legislation Regulation (EC) No. 2160/2003, Regulation (EU) No. 1190/2012 and the UK Salmonella National Control Progamme (NCP) for breeding turkey flocks.

Meat production flocks

Sampling is carried out as specified in EU legislation Regulation (EC) No. 2160/2003, Regulation (EU) No. 1190/2012 and the UK Salmonella National Control Programme (NCP) for fattening turkey flocks producing meat for human consumption.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

All consignments sampled on arrival

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

At 4 weeks of age and 2 weeks prior to moving to the laying unit/ start of lay

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

At least every 3 weeks during the production period. Sampling can be carried out at the holding or at the hatchery. One routine Official Control Sample is collected annually from all flocks of adult breeding turkeys between 30 and 45 weeks of age.

Meat production flocks: Before slaughter at farm

According to the requirements of the Salmonella National Control Programme, mandatory sampling is required within 3 weeks of the birds being sent to slaughter. The results remain valid for up to 6 weeks after sampling. Routine Official Control Samples are collected once annually from 10% of holdings with more than 500 birds.

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Poult box liners and poults dead on arrival or culled poults.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Bootswabs and/or 900 square cm dust swabs.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Sampling at the holding: bootswabs and/or 900 square cm dust swabs.
Sampling at the hatchery: poult box liners or 900 square cm swabs or broken eggshells

Meat production flocks: Before slaughter at farm

Bootswabs and/or 900 square cm dust swabs.

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

According to the requirements of the NCP, mandatory sampling is required on the day of arrival, comprising of at least the following from each hatchery delivery:
- Ten poult box liners for every batch of poults delivered.
- All poults dead on arrival or culled on arrival from each hatchery delivery.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

According to the requirements of the NCP, mandatory sampling is required at four weeks of age and two weeks before moving to the laying phase or laying unit as follows:
- A minimum of five pairs of boot swabs to be representative of the whole area in the house to which the birds have access or
- One pair of bootswabs and one 900 square cm dust swab or
- Four hand-held 900 square cm dust swabs if less than 100 turkeys present.

Other operator voluntary monitoring can include rodent droppings, dust samples, swabs from transport vehicles etc.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

According to the requirements of the NCP, mandatory sampling is required at least every three weeks during the laying/production period of the flock and within three weeks before the birds are moved to the slaughterhouse. Sampling can be carried out at the holding or at the hatchery.
Holding sampling:
- A minimum of five pairs of boot swabs to be representative of the whole area in the house to which the birds have access or
- One pair of bootswabs and one 900cm dust swab or
- Four hand-held 900 square cm dust swabs if less than 100 turkeys present.

Hatchery sampling:
- Visibly soiled liners from five hatcher baskets covering one square metre area or
- 900 square cm swabs from five places in hatcher or hatcher baskets or
- 10 grams broken egg shells from each of 25 hatcher baskets.

Operator voluntary monitoring can include rodent faeces and other environmental samples, dust samples, swabs taken from empty houses, transport vehicles, meconium samples etc.

Meat production flocks: Before slaughter at farm

The NCP sample must consist of a minimum of two pairs of boot swabs or one pair of bootswabs and one 900 square cm dust swab taken so as to be representative of the whole area in the house to which the birds have access. In flocks of less than 100 turkeys, where it is not possible to take boot swabs, four hand-held 900 square cm dust swabs may be used.

Other operator voluntary monitoring can include additional boot swabs, litter samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc.

Case definition

Culture and isolation of Salmonella (non vaccine strain) from samples taken from the animal, or directly associated with its environment.

Reports of Salmonella isolates under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/isolates obtained.

“Flock” is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace.

Monitoring system

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Meat production flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002/Amd 1:2007

Vaccination policy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There are no restrictions on the use of Salmonella vaccines which have a Marketing Authorisation.

Meat production flocks

There are no restrictions on the use of Salmonella vaccines which have a Marketing Authorisation.

Other preventive measures than vaccination in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Codes of Good Practice in the control of Salmonella on turkey farms and in the production, handling and transport of feed, as well as advice on rodent control have been published in collaboration with the poultry industry.

Meat production flocks

As above

Control program/mechanisms

The control program/strategies in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Regulation (EC) No. 2160/2003 lays down harmonised rules for the monitoring and control of Salmonella in turkey flocks which have been implemented in the UK Salmonella National Control Programme (NCP). The Regulation is enforced in the UK through the Control of Salmonella in Turkey Flocks Order (England) 2009, the Control of Salmonella in Turkey Flocks (Scotland) Order 2009, the Control of Salmonella in Turkey Flocks (Wales) Order 2010 and the Control of Salmonella in Turkey Flocks Scheme Order (Northern Ireland) 2010. This national legislation enforces the requirements of the NCP required to meet the target for reduction in Salmonella prevalence set out in EU legislation.

Regulation (EU) No. 1190/2012 sets a target for the UK turkey sector to ensure that no more than 1% of breeding turkey flocks and no more than 1% of fattening turkey flocks are detected positive for Salmonella of human health significance annually. The EU target is based on the 2 most common serovars in human cases which are S.Enteritidis and S. Typhimurium (including monophasic strains).

According to the Control of Salmonella in Turkey Flocks Orders, no person may administer any antimicrobial to turkeys as a specific method to control Salmonella.

Meat production flocks

As above for breeding turkeys. The NCP applies to all operators, except where the operator produces small quantities of product provided direct to the consumer or via local retailers which only supply the final consumer or where all production is for private domestic use only.

Measures in case of the positive findings or single cases

Any breeding turkey flock found to be infected with S. Enteritidis or S. Typhimurium (including monophasic strains) is compulsorily slaughtered with compensation. When S. Enteritidis or S. Typhimurium is suspected in a breeding flock the holding is placed under official control. An investigation is carried out on all the flocks on the site. Following compulsory slaughter of positive flock(s), the holding remains under official control until cleaning and disinfection has been carried out and shown to be satisfactory by microbiological culture of samples taken from the empty house. Eggs from the positive flock must be

removed from the hatchery and destroyed.

In fattening turkey flocks, if S. Enteritidis or S. Typhimurium (including monophasic strains) is detected in an operator sample, official samples are collected by the Competent Authority from the next crop in the affected house as well as from all other flocks on the holding. If any of these samples are positive, a restriction notice is served on the holding under the Zoonoses Order, requiring supervised cleansing and disinfection and further sampling. If any of the post cleansing and disinfection samples return a positive result for S. Enteritidis or S. Typhimurium, subsequent flocks may only be moved off the site under license to the slaughterhouse and further official sampling of all flocks in the next crop is carried out.

It is the responsibility of the food business operator to notify the Official Veterinarian at the slaughterhouse of the Salmonella status of the flock prior to slaughter so that suitable precautions can be put in place to prevent the possibility of cross - contamination and to minimise the risk to public health. The Salmonella monitoring results for all eligible turkey flocks must be included as part of the Food Chain Information documentation, accompanying each batch to the slaughterhouse (Annex II of Regulation (EC) No. 853/2004).

Public health authorities are advised of the isolation of Salmonella. Visits will be made to the farm by Government officials to carry out an epidemiological investigation and provide advice to the food business operator on the control of Salmonella if the Salmonella isolated is considered to be of public health significance.

Notification system in place

All isolations of Salmonella must be reported to the Competent Authority and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain and the Zoonoses Order (Northern Ireland) 1991 in Northern Ireland.

Approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

Results of the investigation

Breeding turkey flocks:
Three UK adult turkey breeding flocks and two immature turkey breeding flocks in the UK were positive for Salmonella spp. One adult flock tested positive for S. Derby, two adult flocks tested positive for S. Kedougou and two immature flocks tested positive for S. Senftenberg. No (0) UK turkey breeding flocks were positive for S. Enteritidis, S. Typhimurium or monophasic strains.

A total of 226 adult breeding flocks were in production in the UK in 2013 and were included in the NCP. The estimated prevalence for regulated serovars was therefore 0% (0/226) which is well below the EU target of 1% of flocks positive for S. Enteritidis and S. Typhimurium. The estimated prevalence for all Salmonella serovars was 1.3% (3/226).

Fattening turkey flocks:
Two hundred and fifty-six (256) turkey fattening flocks were positive for Salmonella spp. Two flocks were positive for S. Typhimurium (ST) and one flock was positive for a monophasic strain of S. Typhimurium (ST); S. 4,5,12:i:-. No (0) flocks were positive for S. Enteritidis (SE).

A total of 3178 fattening flocks were in production in the UK in 2013 and were included in the NCP. The estimated prevalence for regulated serovars was therefore 0.09% (3/3178) which is well below the EU target of a maximum of 1% of flocks positive for S. Enteritidis and S. Typhimurium. The estimated

prevalence for all Salmonella serovars was 8.06% (256/3178).

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

The most common serovars reported in turkeys in the UK are not commonly reported in human disease laboratory confirmed cases.

G. Salmonella in Animals Pigs - Survey - national survey

Monitoring system

Sampling strategy

A study to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum β-lactamase (ESBL) E. coli in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter coli was carried out in 2013. This was the first UK-wide study of Toxoplasma, HEV, PRRSv and ESBL E. coli in pigs.

The study design was consistent, where possible, with the technical specifications for the EU baseline survey for Salmonella in slaughter pigs (Commission Decision 2006/668/EC), with a target sample size of 600 pigs. In anticipation of non-responses or inadequate samples, a further 10% of pigs were scheduled for sampling.

The study was carried out at the 14 largest abattoirs of the 169 approved premises in the UK who between them process 80% of pigs slaughtered in the UK. Sampling was weighted so that the number of carcases to sample in each of the selected abattoirs was proportional to the throughput of the abattoir. Overall, 654 pigs were scheduled for sampling during the study period.

Frequency of the sampling

Animals at slaughter (herd based approach)

Sampling was scheduled to take place between 14th January 2013 and 12th April 2013. The sampling schedule was randomized so that the day of sampling and the carcase to be sampled on a given day was based on a random selection. The sampling day within each month was randomly chosen from the days the selected slaughterhouse was usually open. The individual carcase to be sampled was randomly chosen from the total number of carcases that the selected slaughterhouse processed daily. The total number of carcases to be sampled was stratified by calendar month.

Type of specimen taken

Animals at slaughter (herd based approach)

Caecum and carcass swab

Methods of sampling (description of sampling techniques)

Animals at slaughter (herd based approach)

Samples were collected by trained staff of the Food Standards Agency (FSA) in Great Britain and by the Veterinary Public Health Unit of the Department of Agriculture and Rural Development (DARD) in Northern Ireland. The whole caecum was collected at the evisceration point and two carcase swabs at pre-chill. One carcase swab was taken on the left or right side of the carcase using one single sponge for all four sites described in Annex A of Standard ISO 17604 (hind limb, abdomen, mid-dorsal region, jowl). The second carcase swab was taken, using the same sites, but on the opposite side of the carcase. One carcass swab was tested for Salmonella and one for Yersinia.

All samples taken were from carcasses deemed fit for consumption by the Competent Authority. The exclusion criteria were as follows: any carcase that was totally condemned; animals with a live weight of less than 50kg; animals that had undergone emergency slaughter; and animals kept in the UK for less than 3 months prior to slaughter were excluded from the study.

Diagnostic/analytical methods used

Animals at slaughter (herd based approach)

The Salmonella isolation method was that described in Annex D of ISO 6579:2002 ‘Detection of Salmonella spp. in animal faeces and in samples of the primary production stage’.

A pre-enrichment culture was prepared in Buffered Peptone Water (BPW) and incubated for 16-20 hours. This was then sub-cultured into Selective Modified Semi-Solid Rappaport-Vassiliadis (MSRV) medium (with novobiocin at 0.001%) and incubated for up to 48 hours at 41.5degrees C. MSRV plates were examined at 24 hours for growth typical of Salmonella, suspect growths were sub cultured onto Brilliant Green agar (BGA) and Xylose lysine desoxycholate media (XLD). MSRV plates without growth were re incubated for a further 24 hours and the process repeated. BGA plates and XLD media were incubated for 18-24 hours at 37oC and examined for the presence of Salmonella like growth. Presumptive Salmonella colonies were confirmed using standard biochemical and serological procedures.

All strains isolated and confirmed as Salmonella spp. were serotyped according to the White-Kauffmann-Le Minor scheme. Isolates of Salmonella serovar Typhimurium and monophasic Typhimurium strains were also phage typed.

Any samples that arrived at the testing laboratory more than 96 hours after sample collection were excluded from testing/analysis.

Results of the investigation

A total of 619 caeca and 624 carcase swabs, from 626 pigs, were tested for Salmonella. After accounting for within-farm clustering, the prevalence of Salmonella in the caecal samples was 30.5% (95% CI 26.5-34.6) and the prevalence in the carcase swab samples was 9.6% (95% CI 7.3-11.9).

Salmonella carriage was determined by testing caecal contents whereas carcase contamination was measured by testing carcase swabs. Salmonella carriage as determined by caecal sampling varied by abattoir from 11.3% to 46.8%, whereas carcase contamination ranged from 0% to 21%. The prevalence ratio of caecal carriage: carcase contamination by abattoir was examined which ranged from 0.0 to 1.17 with an average of 0.31. For all but two abattoirs the prevalence of caecal carriage was higher than the carcase contamination. It should be noted however that some of the prevalence data are based on small sample sizes and the method of comparison is crude, however it highlights potential differences between abattoirs.

Salmonella positivity in the caecal contents was examined by age: prevalence varied from 25.9% in pigs aged less than 6 months up to 40.7% in pigs aged over 12 months. Salmonella positivity in the carcase swab samples was also found to increase slightly with age from 7.3% in pigs aged less than 6 months up to 10.9% in pigs aged over 12 months although again this variation was not statistically significant (p=0.79).The proportion of pigs that tested positive for Salmonella in the caecal content sample was not found to vary significantly between the different months of sampling (p=0.43).

The most commonly isolated serovars were monophasic Typhimurium variants S. 4,12:i:- (found in 17.5% caecal contents positive samples and 26.7% carcass swab positive samples) and S. 4,5,12:i:- (16.9% caecal contents positive samples and 20.0% carcass swab positive samples). The other most commonly isolated serovars were S. Typhimurium, S. Derby and S. Bovismorbificans. No pigs were found to be infected with S. Enteritidis, S. Hadar, S. Infantis or S. Virchow. For S. Typhimurium, S. 4,5,12:i:- and S. 4,12:i:-, DT193 was most commonly isolated. Phage type U288 was also relatively common among pigs infected with S. Typhimurium.

The abattoirs participating in the survey processed 80% of the UK pig slaughter throughput; this coverage combined with the randomized sampling approach provides a robust and representative estimates of prevalence. However, there are a number of issues to consider when interpreting the data presented in

this report. The sampling schedule (the day of sampling and the carcase to be sampled) was randomised, hence for some abattoirs more than one carcase was sampled on a given day which could have resulted in pigs being sampled from the same farm on the same day. However this only occurred in two instances and would suggest limited clustering of pigs. In addition, all of the prevalence and seroprevalence data presented were adjusted to take into account within-farm clustering.

Whereas the 2006/2007 survey was undertaken over a 12 month calendar period, sampling in this study was only undertaken between January and April. The 2006/2007 survey and another pig slaughterhouse survey undertaken in Great Britain in 2003 found no statistical evidence of seasonality in carriage of Salmonella. Hence it is unlikely that the prevalence would be significantly different if pigs had been sampled across a 12 month period.

Separate surveys were previously undertaken for breeding and finishing pigs whereas here a single study was undertaken for all pigs at slaughter. Although the majority of pigs included in this study were from finishing only farms, almost 10% of the sampled pigs were aged 12 months or older and thus may be assumed to be breeders. The prevalence of Salmonella carriage by age varied from 25.9% in pigs aged less than 6 months up to 40.7% in pigs aged over 12 months.

National evaluation of the recent situation, the trends and sources of infection

A series of prevalence surveys of poultry and pigs have been conducted within the European Union (EU) over the last decade with the aim of obtaining baseline and comparable data for all Member States concerning foodborne zoonoses of interest; two of these surveys, conducted in 2006/07 and 2008, respectively, focused on Salmonella in finisher pigs and breeding herds (Commission Decision2005/636/EC and 2006/668/EC, respectively). The results from finishing pigs showed that UK levels of Salmonella were above the EU average with a prevalence from lymph nodes of 21.8% and carcase contamination of 15.1% (versus 10.3% and 8.3%, respectively, across the EU).

Levels of current Salmonella carriage, as monitored by testing caecal contents were high at 30.5%; this is considerably higher than the 2007 average EU prevalence, based on lymph node testing (10.3%). Furthermore, Salmonella carriage, determined by caecal testing, is significantly higher than the 2007 caecal results where 21.9% of pigs were found to be positive (95% CI 18.7–25.3). The results therefore indicate that the carriage of Salmonella by 1 in 5 pigs remains and therefore efforts will continue to be required to prevent contamination of carcases particularly in light of future EU plans for a reduction in Salmonella contamination of pig meat.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Salmonella is the second most commonly reported cause of food poisoning, behind Campylobacter, in the UK. There has been a reduction in the number of reported human cases of Salmonella over the past five years, which is in part due to the successful implementation of Salmonella national control plans in the poultry sector. However, given the reduction in risk from poultry meat and eggs, the role of pork and pork products and the relative number of human cases of salmonellosis attributed to such products may rise, even though the actual numbers may change little.

The contamination of pig carcases during the slaughter process was monitored in this study. Pigs may be infected with Salmonella on the farm of origin or following infection when being transported or in the lairage. Pigs for slaughter may then have their skin contaminated in the lairage or at any point through the processing line as a result of the leakage or spreading of faeces or intestinal contents during processing. The proportion of Salmonella contaminated carcases was lower than the Salmonella prevalence in caecal contents. The levels of Salmonella carcase contamination varies between abattoirs which suggests that the processing, in particular, decontamination by scalding and singeing, as well as general hygiene is

variably applied. The contamination rate of carcases in UK pigs was significantly higher in 2007 compared with this study (15.1% versus 9.6%).

Additional information

The control of Salmonella in pig herds is complex and will need a multi-factorial approach to reduce contamination throughout the food chain. Results from this study indicate a rise in Salmonella carriage, compared with the 2007 baseline survey, but a potential reduction in carcase contamination. Thus, whilst there is a reduction in risk to public health because of the reduction in contamination along the processing line, the supply of potentially infected pigs continues. Consequently, there is a continued reliance on procedures aimed at reducing the risk of cross-contamination, whilst the need remains to reduce the likelihood of introduction of Salmonella into the processing line in the first place through the carriage of Salmonella in pigs being supplied to the abattoir.

Information on the 2013 slaughterhouse survey of pigs taken from 'Powell et al. (2014) Study of Salmonella, Toxoplasma, Hepatitis E virus, Yersinia, Porcine Reproductive and Respiratory Syndrome virus, antimicrobial resistance in Campylobacter and extended spectrum beta lactamase E. coli in UK pigs at slaughter: OZ0150 final report' (available on Defra website). The project was funded by Defra, the Food Standards Agency, the British Pig Executive, the Veterinary Medicines Directorate, Public Health England and Public Health Wales. We thank Industry for supporting this work and the abattoirs for participating in this study.

H. Salmonella in Animals Ducks - unspecified

Monitoring system

Sampling strategy

Monitoring for Salmonella in duck breeding, fattening and commercial egg laying flocks is carried out on a voluntary basis by the food business operator.

Frequency of the sampling

Animals at farm

No statutory sampling carried out. Voluntary operator sampling according to food business operator's own protocol

Type of specimen taken

Animals at farm

Faeces samples, bootswabs, hatchery debris, cull birds, hatcher tray liners, organs at post mortem etc

Methods of sampling (description of sampling techniques)

Animals at farm

Voluntary samples usually sent by the operator to a private testing laboratory/ government testing laboratory to monitor Salmonella status of the flock or post mortem samples sent by private veterinarian for diagnostic purposes

Case definition

Animals at farm

Culture and isolation of Salmonella from samples taken from the animal/flock or associated with its environment. Reports of Salmonella isolates under the Zoonoses Order are classed as positive.

Vaccination policy

There are no restrictions on the use of Salmonella vaccines which have a Marketing Authorisation.

Control program/mechanisms

The control program/strategies in place

Operators are encouraged to monitor in the same way as done for Gallus gallus under Regulation (EC) No. 2160/2003, but there is no statutory national Salmonella control programme in the duck industry sector in the UK. All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the Salmonella is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of Salmonella from ducks. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is a outbreak of salmonellosis in humans associated with the farm.

An Industry Assurance Scheme, similar to those already in place for the broiler, turkey and layer chicken sectors has been developed by representatives of the UK duck industry and was published in 2011. The Duck Assurance Scheme is owned and administered by the British Poultry Council and is managed by an independently chaired Technical Advisory Committee. It covers all areas relating to quality and welfare in duck production: breeding, hatching, rearing, catching, transport, slaughter, free-range and table eggs, and includes guidance on control of Salmonella by means of biosecurity, farm hygiene and vaccination.

Measures in case of the positive findings or single cases

Advice is given on control of Salmonella and farm visits may be made by the veterinary and public health

authorities. Restrictions may be placed on the premises under the Zoonoses Order.

Notification system in place

All isolations of Salmonella must be reported to the Competent Authority and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain and the Zoonoses Order (Northern Ireland) 1991 in Northern Ireland.

Units tested are not known because the laboratories do not report negative results unless sampling was part of an official control programme or survey.

Results of the investigation

Voluntary monitoring for Salmonella is carried out by a significant proportion of the duck industry, but because this is done on a voluntary basis, the number of submissions for Salmonella testing from UK duck flocks can vary from year to year.

There were a total of 333 reports of Salmonella isolated from ducks in the UK in 2013. Salmonella Indiana was the most commonly isolated serovar (130). There were 15 isolations of Salmonella Typhimurium (DT41 x 14 and DT40 x 1).

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Salmonella Indiana is reported rarely in humans. S. Typhimurium DT8 has been associated with farmed ducks in the UK for many years, accounting for around 50% of all S. Typhimurium incidents in ducks but no DT8 was isolated in 2013.

In 2010, an outbreak of Salmonella Typhimurium DT 8 in humans occurred in England and Northern Ireland, with 81 recorded cases and 5 patients hospitalised. Descriptive epidemiological investigation found a strong association with infection and consumption of duck eggs. This was the first known outbreak of salmonellosis linked to duck eggs in the UK since 1949 and highlighted the impact of a changing food source and market on the re-emergence of salmonellosis linked to duck eggs. (Noble, D.J, Lane, C., Little, C.L., Davies, R., de Pinna, E., Larkin, L., Morgan, D. (2011). Revival of an old problem: An increase of Salmonella enterica serovar Typhimurium Definitive Phage Type 8 Infections in 2010 in England and Northern Ireland linked to duck eggs. Epidemiology and Infection)

I. Salmonella in Animals Geese - unspecified

Monitoring system

Sampling strategy

Monitoring for Salmonella in geese is carried out on a voluntary basis by the food business operator. Reports of Salmonella in geese usually arise from samples sent by a private veterinarian for diagnostic purposes. There is no official National Control Programme for the control of Salmonella in the geese industry sectors. Government funded scanning surveillance programmes are delivered by the Animal Health and Veterinary Laboratories Agency, Scotland's Rural College (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.

Type of specimen taken

Animals at farm

Usually faeces or from organs at post mortem

Methods of sampling (description of sampling techniques)

Animals at farm

Voluntary samples usually sent by a private veterinarian for diagnostic purposes

Case definition

Animals at farm

Culture and isolation of Salmonella from samples taken from the animal/flock or associated with its environment. Reports of Salmonella isolates under the Zoonoses Order are classed as positive.

Diagnostic/analytical methods used

Animals at farm

Various

Vaccination policy

There are no restrictions on the use of Salmonella vaccines which have a Marketing Authorisation.

Control program/mechanisms

The control program/strategies in place

Operators are encouraged to monitor in the same way as for Gallus gallus under Regulation (EC) No. 2160/2003, but there is no statutory Salmonella National Control Programme in the goose industry sector in the UK. All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the Salmonella is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of Salmonella from geese. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is a outbreak of salmonellosis in humans associated with the farm.

Measures in case of the positive findings or single cases

Advice is given on control of Salmonella and farm visits may be made by the veterinary and public health authorities. Restrictions may be placed on the premises under the Zoonoses Order.

Notification system in place

All isolations of Salmonella must be reported to the Competent Authority and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain and the Zoonoses Order (Northern Ireland) 1991 in Northern Ireland.

Units tested are not known because the laboratories do not report negative results unless sampling is carried out as part of an official control programme or survey.

Results of the investigation

Submission of samples from geese is most likely to be for diagnostic purposes. There was one report of Salmonella in geese in 2013 - Salmonella Ajiobo isolated from a clinical diagnostic sample.

National evaluation of the recent situation, the trends and sources of infection

There have been very few reports of Salmonella from geese in recent years.

Table Salmonella in breeding flocks of Gallus gallus

	No of flocks under control programme	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Target Verification	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Farm - Control and eradication programmes [1)]	1627	NRL	Census	Official and industry sampling		Domestic	yes	Flock	1627	15	0
Gallus gallus (fowl) - breeding flocks for egg production line - adult - Farm - Control and eradication programmes [2)]	139	NRL	Census	Official and industry sampling		Domestic	yes	Flock	139	0	0
Gallus gallus (fowl) - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3)]		NRL	Census	Industry sampling		Domestic	no	Flock	unknown	1	0

	S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. 13,23:i:-	S. Dublin	S. Indiana	S. Kedougou	S. Mbandaka
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Farm - Control and eradication programmes [1)]	0	0	0	0	0	0	7	1	2	1	1
Gallus gallus (fowl) - breeding flocks for egg production line - adult - Farm - Control and eradication programmes [2)]	0	0	0	0	0	0	0	0	0	0	0
Gallus gallus (fowl) - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3)]	0	0	0	0	0	0	0	0	0	1	0

Table Salmonella in breeding flocks of Gallus gallus

	S. Senftenberg	S. Typhimurium - DT 104
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Farm - Control and eradication programmes [1)]	1	2
Gallus gallus (fowl) - breeding flocks for egg production line - adult - Farm - Control and eradication programmes [2)]	0	0
Gallus gallus (fowl) - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3)]	0	0

Comments:

[1)] Sample type as per requirements of Regulation (EC) No. 200/2010 - animal sample (faeces) or environmental sample (bootswabs) depending on production system. Great-grandparent, grandparent and parent breeding flocks

[2)] Sample type as per requirements of Regulation (EC) No. 200/2010 - animal sample (faeces) or environmental sample (bootswabs) depending on production system. Great-grandparent, grandparent and parent breeding flocks

[3)] Great-grandparent, grandparent and parent flocks - egg and meat production lines. Animal sample (faeces, dead chicks) or environmental sample (bootswabs, hatcher tray liners)

Footnote:

The table records the results of the testing of breeding flocks across the broiler and layer breeder lines in fulfilment of the requirements of the Salmonella National Control Programme and monitoring of the achievement of the designated EU target for reduction of Salmonella in breeding chicken flocks according to the requirements of Regulation (EC) No. 200/2010. 'Flock' is defined as poultry of the same health status on a single holding, kept in the same enclosure and constituting a single epidemiological unit. The number of flocks in the broiler- and layer- breeder line categories that were registered and subject to at least one official test during 2013 is used as the denominator population. The data in the table for each sector includes all testing carried out and the results of this testing in great-grandparent, grandparent and parent breeding chicken flocks. A flock is counted as positive once only during the period 1st January - 31st December 2013, regardless of the number of tests carried out/ Salmonella isolates obtained.

For in-rear flocks, the number of existing flocks and the total number of flocks tested is not collated centrally, but there is a statutory requirement under national legislation, to report all isolations of Salmonella.

NRL= Salmonella National Reference Laboratory

Table Salmonella in other birds

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	S. 1,4,[5],12:i:-
Birds - wild - game birds, farmed - Farm - Clinical investigations		Suspect sampling	Not applicable		Domestic	Animal	30	30			
Pigeons - wild - Farm - Clinical investigations		Suspect sampling	Not applicable		Domestic	Animal	9	9		1	

	Salmonella spp., unspecified	Not typeable	S. 4,12:i:-	S. Gallinarum biovar Pullorum	S. Kedougou	S. Mbandaka	S. Orion	S. Orion var. 15	S. Rissen	S. Senftenberg	S. Typhimurium - DT 1
Birds - wild - game birds, farmed - Farm - Clinical investigations		1		2		1	3	5	3	1	1
Pigeons - wild - Farm - Clinical investigations			1		1						

	S. Typhimurium - DT 193	S. Typhimurium - DT 2	S. Typhimurium - DT 208	S. Typhimurium - DT 40	S. Typhimurium - DT 41	S. Typhimurium - DT 8	S. Typhimurium, monophasic - DT 99
Birds - wild - game birds, farmed - Farm - Clinical investigations	1		1	4	2	5	
Pigeons - wild - Farm - Clinical investigations	1	4					1

Table Salmonella in other animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	S. 1,4,[5],12:i:-
Cattle (bovine animals) - unspecified - Farm - Clinical investigations		Suspect sampling	Not applicable		Domestic	Animal	761	761	1	2	6
Pigs - unspecified - Farm - Clinical investigations		Suspect sampling	Not applicable		Domestic	Animal	156	156		31	
Pigs - unspecified - Slaughterhouse - Survey - national survey		Objective sampling	Official sampling	animal sample > caecum	Domestic	Animal	619	189		4	
Sheep - mixed herds - Farm - Clinical investigations		Suspect sampling	Not applicable		Domestic	Animal	144	144		1	
Solipeds, domestic - horses - Farm - Clinical investigations		Suspect sampling	Not applicable	animal sample	Domestic	Animal	44	44			

	Salmonella spp., unspecified	Not typeable	S. 1,4,[5],12:i:- - DT 104b	S. 1,4,[5],12:i:- - DT 120	S. 1,4,[5],12:i:- - DT 193	S. 1,4,[5],12:i:- - DT 8	S. 1,4,[5],12:i:- - U 302	S. 1,4,[5],12:i:- - U 310	S. 1,4,[5],12:i:- - U 311	S. 4,12:i:-	S. 4,5,12:-:1,2
Cattle (bovine animals) - unspecified - Farm - Clinical investigations		5	1	1	16	1				1	1
Pigs - unspecified - Farm - Clinical investigations		2	2	4	40				1	4	
Pigs - unspecified - Slaughterhouse - Survey - national survey			1	10	45		1			3	
Sheep - mixed herds - Farm - Clinical investigations		4						1			
Solipeds, domestic - horses - Farm - Clinical investigations					10				7	1	

Table Salmonella in other animals

	S. 4,5,12:i:-	S. 4,5,12:i:- - U 323	S. 9,12:-:-	S. Agama	S. Agona	S. Anatum	S. Anatum var. 15	S. Bovismorbificans	S. Butantan	S. Cerro	S. Coeln
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	1		4	13	1	7	2	6	1	2	2
Pigs - unspecified - Farm - Clinical investigations	3	1			1	1		2			
Pigs - unspecified - Slaughterhouse - Survey - national survey	2	3			2			20			
Sheep - mixed herds - Farm - Clinical investigations	1			15		1		1			
Solipeds, domestic - horses - Farm - Clinical investigations		2				7			2		

	S. Derby	S. Dublin	S. Durham	S. Ealing	S. Enteritidis - PT 11	S. Enteritidis - PT 12	S. Enteritidis - PT 14b	S. Enteritidis - PT 20	S. Enteritidis - PT 8	S. Give	S. Gloucester
Cattle (bovine animals) - unspecified - Farm - Clinical investigations		565				1	1				
Pigs - unspecified - Farm - Clinical investigations	10			1						2	1
Pigs - unspecified - Slaughterhouse - Survey - national survey	27										
Sheep - mixed herds - Farm - Clinical investigations		23	1								
Solipeds, domestic - horses - Farm - Clinical investigations					1			1	1		

Table Salmonella in other animals

	S. Goldcoast	S. Hindmarsh	S. Hull	S. IIIb 61:-:1,5,7	S. IIIb 61:k:1,5,(7)	S. IIIb 61:k:1,5,7	S. Indiana	S. Kedougou	S. Kottbus	S. London	S. Mbandaka
Cattle (bovine animals) - unspecified - Farm - Clinical investigations			2	2		1			2		46
Pigs - unspecified - Farm - Clinical investigations								5		2	
Pigs - unspecified - Slaughterhouse - Survey - national survey	3	1						6		5	1
Sheep - mixed herds - Farm - Clinical investigations				26	5	26	1				
Solipeds, domestic - horses - Farm - Clinical investigations											1

	S. Montevideo	S. Muenster	S. Newport	S. Ohio	S. Oslo	S. Panama	S. Reading	S. Rissen	S. Schwarzengrund	S. Senftenberg	S. Stanley
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	20	1	3		1				1	1	2
Pigs - unspecified - Farm - Clinical investigations						1	5	1			
Pigs - unspecified - Slaughterhouse - Survey - national survey				1		6	8	3			5
Sheep - mixed herds - Farm - Clinical investigations	36		1								
Solipeds, domestic - horses - Farm - Clinical investigations			1								

Table Salmonella in other animals

	S. Stourbridge	S. Typhimurium - DT 104	S. Typhimurium - DT 104b	S. Typhimurium - DT 12	S. Typhimurium - DT 120	S. Typhimurium - DT 193	S. Typhimurium - DT 208	S. Typhimurium - DT 32	S. Typhimurium - DT 66a	S. Typhimurium - Other	S. Typhimurium - U 288
Cattle (bovine animals) - unspecified - Farm - Clinical investigations		10			6	2				18	
Pigs - unspecified - Farm - Clinical investigations		1			1	8		1			17
Pigs - unspecified - Slaughterhouse - Survey - national survey		2	2		4	11	2	2			6
Sheep - mixed herds - Farm - Clinical investigations											
Solipeds, domestic - horses - Farm - Clinical investigations	1	2	1	1		1			1	1	

	S. Typhimurium - U 302	S. Typhimurium - U 323	S. enterica subsp. enterica - rough
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	2		
Pigs - unspecified - Farm - Clinical investigations	8		
Pigs - unspecified - Slaughterhouse - Survey - national survey	3		
Sheep - mixed herds - Farm - Clinical investigations			1
Solipeds, domestic - horses - Farm - Clinical investigations	1	1	

Table Salmonella in other animals

Table Salmonella in other poultry

	No of flocks under control programme	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Target Verification	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	4012		Census	Official and industry sampling		Domestic	yes	herd/flock	4012	37	
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes	37721		Census	Official and industry sampling	environmental sample > boot swabs	Domestic	yes	herd/flock	37721	848	
Ducks - unspecified - Farm - Monitoring [1)]			Unspecified	Not applicable		Domestic	no	herd/flock	333	333	
Gallus gallus (fowl) - laying hens - during rearing period - Farm - Control and eradication programmes [2)]			Census	Industry sampling		Domestic	no	herd/flock	7	7	
Geese - unspecified - Farm - Clinical investigations			Suspect sampling	Not applicable		Domestic	no	herd/flock	1	1	
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes	226		Census	Official and industry sampling		Domestic	yes	herd/flock	226	3	
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3)]			Census	Industry sampling		Domestic	no	herd/flock	2	2	
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes	3178		Census	Official and industry sampling		Domestic	yes	herd/flock	2954	256	

	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Not typeable	S. 1,4,[5],12:i:- - DT 193	S. 13,23:-:-	S. 13,23:i:-	S. 3,10: y:-	S. 4,5,12:i:-	S. 6,7:-:-	S. 6,7:-:e,n,z15
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes					1		1				

Table Salmonella in other poultry

	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Not typeable	S. 1,4,[5],12:i:- - DT 193	S. 13,23:-:-	S. 13,23:i:-	S. 3,10: y:-	S. 4,5,12:i:-	S. 6,7:-:-	S. 6,7:-:e,n,z15
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes					5	2	118	1		2	1
Ducks - unspecified - Farm - Monitoring [1)]				9							
Gallus gallus (fowl) - laying hens - during rearing period - Farm - Control and eradication programmes [2)]											
Geese - unspecified - Farm - Clinical investigations											
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes											
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3)]											
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes	2						2		1		

	S. 6,7:z10:-	S. 6,8:e,h:-	S. Agama	S. Agona	S. Ajiobo	S. Anatum	S. Apapa	S. Berta	S. Bovismorbificans	S. Bredeney	S. Derby
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes			2			1					
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes	10			2		1	1	2	1		2
Ducks - unspecified - Farm - Monitoring [1)]									15	10	

Table Salmonella in other poultry

	S. 6,7:z10:-	S. 6,8:e,h:-	S. Agama	S. Agona	S. Ajiobo	S. Anatum	S. Apapa	S. Berta	S. Bovismorbificans	S. Bredeney	S. Derby
Gallus gallus (fowl) - laying hens - during rearing period - Farm - Control and eradication programmes [2]											
Geese - unspecified - Farm - Clinical investigations					1						
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes											1
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3]											
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes	1	1	1	2							153

	S. Dublin	S. Durham	S. Enteritidis - PT 4	S. Enteritidis - PT 8	S. Give	S. Give var. 15	S. Hadar	S. Havana	S. Idikan	S. Indiana	S. Infantis
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	4		1	1	1		4				
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes								3	4	12	2
Ducks - unspecified - Farm - Monitoring [1]					35	20	13			130	
Gallus gallus (fowl) - laying hens - during rearing period - Farm - Control and eradication programmes [2]											

Table Salmonella in other poultry

	S. Dublin	S. Durham	S. Enteritidis - PT 4	S. Enteritidis - PT 8	S. Give	S. Give var. 15	S. Hadar	S. Havana	S. Idikan	S. Indiana	S. Infantis
Geese - unspecified - Farm - Clinical investigations											
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes											
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3)]											
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes	1	1								9	

	S. Kedougou	S. Kottbus	S. Livingstone	S. London	S. Mbandaka	S. Monschaui	S. Montevideo	S. Muenster	S. Newport	S. Nottingham	S. Ohio
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes			4	1	3		1		2	1	
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes	147	6	10		214		134	4	2		58
Ducks - unspecified - Farm - Monitoring [1)]		2			16	12					
Gallus gallus (fowl) - laying hens - during rearing period - Farm - Control and eradication programmes [2)]											
Geese - unspecified - Farm - Clinical investigations											
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes	2										

Table Salmonella in other poultry

	S. Kedougou	S. Kottbus	S. Livingstone	S. London	S. Mbandaka	S. Monschaui	S. Montevideo	S. Muenster	S. Newport	S. Nottingham	S. Ohio
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3]											
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes	24	22			5		3		23		

	S. Orion	S. Orion var. 15	S. Orion var. 15,34	S. Panama	S. Reading	S. Schwarzengrund	S. Senftenberg	S. Stanley	S. Stourbridge	S. Tennessee	S. Typhimurium - DT 104
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	1			2	2		1	1	1		
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes	39	6	1			6	24			2	7
Ducks - unspecified - Farm - Monitoring [1]	36	18					1				
Gallus gallus (fowl) - laying hens - during rearing period - Farm - Control and eradication programmes [2]							7				
Geese - unspecified - Farm - Clinical investigations											
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes											
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3]							2				

Table Salmonella in other poultry

	S. Orion	S. Orion var. 15	S. Orion var. 15,34	S. Panama	S. Reading	S. Schwarzengrund	S. Senftenberg	S. Stanley	S. Stourbridge	S. Tennessee	S. Typhimurium - DT 104
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes	3	1					1				

	S. Typhimurium - DT 120	S. Typhimurium - DT 40	S. Typhimurium - DT 41	S. Typhimurium - Other	S. Typhimurium - U 323	S. Virchow	S. Vitkin	S. enterica subsp. enterica - rough
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes							1	
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes	2			1	2	1		13
Ducks - unspecified - Farm - Monitoring [1)]		1	14					1
Gallus gallus (fowl) - laying hens - during rearing period - Farm - Control and eradication programmes [2)]								
Geese - unspecified - Farm - Clinical investigations								
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes								
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes [3)]								
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes								

Comments:

Table Salmonella in other poultry

Comments:

[1] total units tested not known

[2] total units tested not known

[3] total units tested not known

2.1.5 Salmonella in feedingstuffs

A. Salmonella spp. in feed - all feedingstuffs

History of the disease and/or infection in the country

Great Britain:
In Great Britain, the isolation of Salmonella spp. from animal feedingstuffs are reportable under the Zoonoses Order 1989. Home produced feed materials of animal origin are subjected to official testing under the Animal Byproducts Regulations 2011. (Imported animal protein destined for feed production in Great Britain is tested under the Importation of Processed Animal Protein Order 1981 according to a risk assessment of the import. The results of imported feed testing are not reported in this report).

In Great Britain since 1992, laboratories have provided enhanced information on the results of monitoring for Salmonella in animal feedingstuffs. The Department in conjunction with the feedingstuffs industry have introduced Codes of Practice for the control of Salmonella. In addition to the Defra Codes of Practice for the Control of Salmonella in Feedingstuffs, the Industry has also introduced codes of practice for the control of Salmonella. Samples taken under the codes of practice form part of the HACCP process. The results of testing carried out on feed materials by feed business operators under HACCP/own checks are included in the tables on Salmonella in other feed matter, compound feed materials and in the total Salmonella isolations in all feed types included in the Salmonella serovars table.

Northern Ireland:
All isolations of Salmonella in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feedingstuff must be reported to a veterinary inspector of the Department of Agriculture for Northern Ireland, [The Zoonoses Order (Northern Ireland) 1991]. All imported processed animal protein is sampled under the Diseases of Animals (Northern Ireland) Order 1981 and the Diseases of Animals (Importation of Processed Animal Protein) Order (Northern Ireland) 1989.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Although Salmonellas are found in feed materials, the processes involved in animal feed production should normally eliminate them. Animal feed may become contaminated on farm if poorly stored and not kept vermin free. There is the potential if Salmonella serovars contaminate feed during the manufacturing process for the serovar to infect large number of animals. It is most important that the principles of HACCP are applied to manage this risk.

Table Salmonella in compound feedingstuffs

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Compound feedingstuffs for pigs - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	2		
Compound feedingstuffs for poultry (non specified) - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Compound feedingstuffs, not specified - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	2		

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. 4,12:b:-	S. 4,12:i:-	S. 47:z4z23:-	S. Agama	S. Agona	S. Anatum	S. Carno	S. Coeln	S. Durham
Compound feedingstuffs for pigs - Feed mill - Surveillance											
Compound feedingstuffs for poultry (non specified) - Feed mill - Surveillance											
Compound feedingstuffs, not specified - Feed mill - Surveillance											

	S. Idikan	S. Infantis	S. Kedougou	S. Kentucky	S. Livingstone	S. Mbandaka	S. Montevideo	S. Newport	S. Ohio	S. Orion var. 15	S. Rissen
Compound feedingstuffs for pigs - Feed mill - Surveillance											

Table Salmonella in compound feedingstuffs

	S. Idikan	S. Infantis	S. Kedougou	S. Kentucky	S. Livingstone	S. Mbandaka	S. Montevideo	S. Newport	S. Ohio	S. Orion var. 15	S. Rissen
Compound feedingstuffs for poultry (non specified) - Feed mill - Surveillance											
Compound feedingstuffs, not specified - Feed mill - Surveillance											

	S. Senftenberg	S. Senftenberg var. Simsbury	S. Stanleyville	S. Tennessee	S. Typhimurium - DT 193	S. Umbilo
Compound feedingstuffs for pigs - Feed mill - Surveillance						
Compound feedingstuffs for poultry (non specified) - Feed mill - Surveillance						
Compound feedingstuffs, not specified - Feed mill - Surveillance						

Table Salmonella in other feed matter

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Feed material of cereal grain origin - barley derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of cereal grain origin - wheat derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of cereal grain origin - other cereal grain derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of cereal grain origin - maize derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of oil seed or fruit origin - palm kernel derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	2		
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	2		
Other feed material - legume seeds and similar products - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of cereal grain origin - rice derived - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Feed material of oil seed or fruit origin - other - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		

Table Salmonella in other feed matter

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Other feed material - minerals - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	1		
Other feed material - miscellaneous - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	6		
Other feed material - miscellaneous - Processing plant - Surveillance		Objective sampling	Official and industry sampling		Domestic	Batch	25 Gram	1000	1		
Other feed material - vegetable - Feed mill - Surveillance		Objective sampling	HACCP and own checks		Domestic	Batch	25 Gram	1000	2		
Premixtures - Processing plant - Surveillance		Objective sampling	Official and industry sampling		Domestic	Batch	25 Gram	1000	1		

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. 1,3,19:-:-	S. 1,3,19:i:-	S. 13,23:-:-	S. 13,23:i:-	S. 4,12:-:-	S. Aarhus	S. Adelaide	S. Agama
Feed material of cereal grain origin - barley derived - Feed mill - Surveillance											
Feed material of cereal grain origin - wheat derived - Feed mill - Surveillance											
Feed material of cereal grain origin - other cereal grain derived - Feed mill - Surveillance											
Feed material of cereal grain origin - maize derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Surveillance											

Table Salmonella in other feed matter

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. 1,3,19:-:-	S. 1,3,19:i:-	S. 13,23:-:-	S. 13,23:i:-	S. 4,12:-:-	S. Aarhus	S. Adelaide	S. Agama
Feed material of oil seed or fruit origin - palm kernel derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Surveillance											
Other feed material - legume seeds and similar products - Feed mill - Surveillance											
Feed material of cereal grain origin - rice derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - other - Feed mill - Surveillance											
Other feed material - minerals - Feed mill - Surveillance											
Other feed material - miscellaneous - Feed mill - Surveillance											
Other feed material - miscellaneous - Processing plant - Surveillance											
Other feed material - vegetable - Feed mill - Surveillance											
Premixtures - Processing plant - Surveillance											

Table Salmonella in other feed matter

	S. Agona	S. Anatum	S. Ealing	S. Fresno	S. Give	S. Havana	S. Idikan	S. Infantis	S. Kedougou	S. Lexington	S. Livingstone
Feed material of cereal grain origin - barley derived - Feed mill - Surveillance											
Feed material of cereal grain origin - wheat derived - Feed mill - Surveillance											
Feed material of cereal grain origin - other cereal grain derived - Feed mill - Surveillance											
Feed material of cereal grain origin - maize derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - palm kernel derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Surveillance											
Other feed material - legume seeds and similar products - Feed mill - Surveillance											
Feed material of cereal grain origin - rice derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - other - Feed mill - Surveillance											

Table Salmonella in other feed matter

	S. Agona	S. Anatum	S. Ealing	S. Fresno	S. Give	S. Havana	S. Idikan	S. Infantis	S. Kedougou	S. Lexington	S. Livingstone
Other feed material - minerals - Feed mill - Surveillance											
Other feed material - miscellaneous - Feed mill - Surveillance											
Other feed material - miscellaneous - Processing plant - Surveillance											
Other feed material - vegetable - Feed mill - Surveillance											
Premixtures - Processing plant - Surveillance											

	S. London	S. Mbandaka	S. Meleagridis	S. Molade	S. Montevideo	S. Newport	S. Ohio	S. Oranienburg	S. Orion	S. Orion var. 15	S. Orion var. 15,34
Feed material of cereal grain origin - barley derived - Feed mill - Surveillance											
Feed material of cereal grain origin - wheat derived - Feed mill - Surveillance											
Feed material of cereal grain origin - other cereal grain derived - Feed mill - Surveillance											
Feed material of cereal grain origin - maize derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Surveillance											

Table Salmonella in other feed matter

	S. London	S. Mbandaka	S. Meleagridis	S. Molade	S. Montevideo	S. Newport	S. Ohio	S. Oranienburg	S. Orion	S. Orion var. 15	S. Orion var. 15,34
Feed material of oil seed or fruit origin - palm kernel derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Surveillance											
Other feed material - legume seeds and similar products - Feed mill - Surveillance											
Feed material of cereal grain origin - rice derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - other - Feed mill - Surveillance											
Other feed material - minerals - Feed mill - Surveillance											
Other feed material - miscellaneous - Feed mill - Surveillance											
Other feed material - miscellaneous - Processing plant - Surveillance											
Other feed material - vegetable - Feed mill - Surveillance											
Premixtures - Processing plant - Surveillance											

Table Salmonella in other feed matter

	S. Poona	S. Rissen	S. Senftenberg	S. Senftenberg var. Simsbury	S. Soerenga	S. Tennessee	S. Typhimurium - DT 2	S. Typhimurium - DT 41	S. Weybridge	S. Yoruba	S. enterica subsp. enterica - rough
Feed material of cereal grain origin - barley derived - Feed mill - Surveillance											
Feed material of cereal grain origin - wheat derived - Feed mill - Surveillance											
Feed material of cereal grain origin - other cereal grain derived - Feed mill - Surveillance											
Feed material of cereal grain origin - maize derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - palm kernel derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Surveillance											
Other feed material - legume seeds and similar products - Feed mill - Surveillance											
Feed material of cereal grain origin - rice derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - other - Feed mill - Surveillance											

Table Salmonella in other feed matter

	S. Poona	S. Rissen	S. Senftenberg	S. Senftenberg var. Simsbury	S. Soerenga	S. Tennessee	S. Typhimurium - DT 2	S. Typhimurium - DT 41	S. Weybridge	S. Yoruba	S. enterica subsp. enterica - rough
Other feed material - minerals - Feed mill - Surveillance											
Other feed material - miscellaneous - Feed mill - Surveillance											
Other feed material - miscellaneous - Processing plant - Surveillance											
Other feed material - vegetable - Feed mill - Surveillance											
Premixtures - Processing plant - Surveillance											

2.1.6 Antimicrobial resistance in Salmonella isolates

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Frequency of the sampling

In England, Wales and Scotland (Great Britain) all isolations of Salmonella must be reported under the Zoonoses Order 1989. In Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991]. The isolates from cattle tested during 2013 for antimicrobial resistance were mainly selected from isolates tested under the Zoonoses Order from Great Britain and these were derived mainly from clinical diagnostic samples.

Type of specimen taken

In cattle, over 90% of the isolates were derived from private samples taken for diagnostic purposes on farm.

Methods of sampling (description of sampling techniques)

Mainly voluntary private sampling.

Procedures for the selection of isolates for antimicrobial testing

One isolate of each serovar from each incident reported.

Methods used for collecting data

Isolates from England, Wales, Scotland and Northern Ireland are tested at the respective National Reference Laboratories (NRLs).

Laboratory methodology used for identification of the microbial isolates

Modified ISO 6579:2002 in the National Reference Laboratory. Other methods may be used in private laboratories.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

All Salmonella isolates from cattle from England and Wales were tested to determine their antimicrobial susceptibility at either AHVLA Weybridge or AHVLA Lasswade. Isolates in Northern Ireland were tested by AFBI.

The British Society for Antimicrobial Chemotherapy (BSAC) standardised disc diffusion method was used to test Salmonella isolates from cattle obtained under the Zoonoses Order from England and Wales, mainly using BSAC breakpoints, though where these were unavailable (for example for some veterinary antimicrobials) then AHVLA breakpoints were used. The breakpoints used are listed in the UK Veterinary Antibiotic Resistance and Sales Surveillance Report 2012 (available at http://www.vmd.defra.gov.uk/pdf/VARSS.pdf). In Northern Ireland CLSI is used.

Antimicrobials included were: Tetracycline, Chloramphenicol, Ampicillin, Ceftazidime, Cefotaxime, Ciprofloxacin, Nalidixic acid, Trimethoprim / Sulfonamide, Sulfonamide, Streptomycin, Gentamicin (Kanamycin in Northern Ireland).

Cut-off values used in testing

Testing was performed for isolates from England and Wales using the BSAC standardised disc diffusion method with disc concentrations as recommended by BSAC (apart from sulphonamides where a 300µg

disc was used and nalidixic acid where there is no BSAC recommendation). For ceftazidime, cefotaxime, ciprofloxacin, gentamicin, chloramphenicol and trimethoprim/ sulphonamides BSAC breakpoints were used (zone of inhibition for resistant isolates < or equal to 29, 29, 19, 19, 20 and 15mm respectively). For other antimicrobials the AHVLA veterinary breakpoint was used (tetracyclines, ampicillin, nalidixic acid, sulphonamides, resistant < or equal to 13mm).

Control program/mechanisms

The control program/strategies in place

Control is based on effective surveillance for antimicrobial resistance in Salmonella isolates and reporting of findings to the Competent Authority. Follow up action taken in the event of detection of resistance depends on the type of resistance, the relevance to public and animal health and the serotype, phage type and characteristics of the organism involved. In Great Britain, visits are conducted by Animal Health and Veterinary Laboratories Agency staff and on farms where follow-up sampling and epidemiological investigation are carried out, control measures deemed appropriate may be put in place and relevant advice given to the farmer.

Notification system in place

All Salmonellas isolated in a veterinary or other laboratory from food-producing animals must be reported to the competent authority under the requirements of the Zoonoses Order. Isolates are sent to the NRL and serotyping and antimicrobial sensitivity testing is carried out at the NRL.

Results of the investigation

In England and Wales in 2013, 518 Salmonella isolates were tested for antimicrobial susceptibility from cattle and 91% were fully sensitive. Two S. Enteritidis isolates were recovered from cattle in England and Wales and these isolates were fully susceptible to the antimicrobials tested. For S. Typhimurium from cattle from England and Wales, 24 isolates were available for testing and 10 isolates (42%) were fully sensitive. These fully susceptible S. Typhimurium isolates in cattle belonged the definitive phage type DT 120 (7 isolates) and the undefined phage type U323 (1 isolate); the remaining susceptible isolates were not typable using the phage typing scheme. 25% of S. Typhimurium isolates were resistant to more than 4 antimicrobials. There were 9 S. Typhimurium DT104 isolates tested from cattle and 3 had the typical ACSSuT pattern of penta-resistance generally associated with DT104 (with or without additional resistances). Considering all S. Typhimurium isolates from cattle, resistance to nalidixic acid was detected in 17% of isolates, whereas considering all Salmonella serovars from cattle, resistance to nalidixic acid occurred in only 1.4%. However, ciprofloxacin resistance using the BSAC clinical resistance breakpoint (> 1mg/L) was not detected in Salmonella isolates from cattle. Resistance to cefotaxime or ceftazidime was not detected in Salmonella isolates from cattle. Monophasic Salmonella, with the antigenic structure 4,12:i:- or 4,5,12:i:- were detected in cattle and isolates were typically resistant to ampicillin, streptomycin, sulphonamides and tetracyclines, the resistance pattern commonly associated with these serovars.

National evaluation of the recent situation, the trends and sources of infection

The generally high level of resistance of Salmonella Typhimurium isolates reflects the contribution to the total from definitive phage type DT104, which is commonly resistant to antimicrobials. However, in 2013 an increase in the proportion of fully-susceptible S. Typhimurium isolates was noted; the main contributing definitive phage type was DT120 which did not demonstrate resistance to the panel of antimicrobials tested. Considering all Salmonella serovars, the relatively high number of susceptible isolates reflects the large numbers of Salmonella Dublin tested which rarely show antimicrobial resistance. Monophasic Salmonella isolates, often with the ASSuT pattern of resistance are increasing in prominence in cattle in the UK; similar isolates have been noted in several European countries.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is a possibility that antimicrobial resistance in organisms in animals could be transferred to organisms in humans. It should be noted however that the isolates reported here were mainly clinical isolates.

B. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Frequency of the sampling

A study to estimate the prevalence of Salmonella, amoungst other pathogens in UK pigs at slaughter was carried out in 2013. The study design was consistent with the technical specifications for the EU baseline survey for Salmonella in slaughter pigs (Commission Decision 2006/668/EC). Isolates were tested in accordance with EFSA's recommendations from this national survey of pigs.

Type of specimen taken

Caecum

Methods of sampling (description of sampling techniques)

National survey of pigs as previously described

Procedures for the selection of isolates for antimicrobial testing

One isolate per serovar from each herd was reported, in accordance with EFSA's recommendations.

Laboratory methodology used for identification of the microbial isolates

Modified ISO 6579:2002 in the National Reference Laboratory.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Salmonella isolates were tested against panels of antimicrobials in accordance with EFSA's recommendations.

Cut-off values used in testing

Testing was performed in accordance with EFSA's recommendations and using epidemiological cut-off values.

Results of the investigation

In the UK in 2013, 147 Salmonella isolates were tested for their antimicrobial susceptibility from pigs. Susceptibility to the panel of antimicrobials tested was shown by 27% (40/147) of Salmonella isolates. The isolates were selected in accordance with EFSA's recommendations for monitoring (one isolate per serovar per epidemiological unit per year).

Considering S. Typhimurium in pigs, 31 isolates were available from the surveillance programme in 2013 and only three isolates were fully sensitive to the panel, with a further single isolate resistant only to tetracyclines. Ampicillin, streptomycin, sulphonamide and tetracycline resistance was common occurring in 81-87% of S. Typhimurium isolates, with chloramphenicol resistance less common, occurring in 52% of isolates. The proportion (21%) of S. Typhimurium isolates contributing to the total number of Salmonella isolates tested influences the fully susceptible figure for all serovars because this serotype commonly shows antimicrobial resistance. Resistance to fluoroquinolones or third generation cephalosporins was not detected in these S. Typhimurium isolates.

In 2013, the next most prevalent serovars in pigs after S. Typhimurium were the monophasic Salmonella 4,12:i:- and 4,5,12:i:- which contributed 25 isolates each to the total and commonly showed resistance to ampicillin, streptomycin, sulphonamides and tetracyclines. Monophasic Salmonellas with the antigenic structure 4,5,12:i:- and an ASSuT pattern of resistance appear to be increasing in prevalence and importance in several parts of Europe and have been particularly associated with pigs. Resistance to gentamicin, chloramphenicol and trimethoprim was observed in approximately 20-35% of both of these monophasic Salmonella serovars. Single isolates of 4,12:i:- and 4,5,12:i:- were resistant (microbiological

breakpoint) to fluoroquinolones; the only other serovar displaying ciprofloxaxin resistance was S. Agona, where resistance was detected in a single isolate.

Considering other servars, there were no isolates of S. Enteritidis recovered from pigs. Four isolates of Salmonella Stanley were recovered from pigs and these were resistant to ampicillin, streptomycin, sulphonamides and tetracyclines, though not to nalidixic acid or ciprofloxacin. Salmonella Bovismorbificans, of which 17 isolates were available, were generally either fully susceptible to the panel or showed resistance to ampicillin, chloramphenicol, streptomycin, sulphonamides, tetracyclines, trimethoprim and gentamicin. Salmonella Reading was generally susceptible to the panel of antimicrobials tested, with only a single isolate of six tested showing resistance to tetracyclines; the situation was similar in the serovar Salmonella London, where one of three isolates showed resistance to tetracyclines only. Salmonella Derby isolates (N=18) were relatively susceptible, though 33-45% were resistant to tetracyclines, sulphonamides and trimethoprim. Similarly S. Rissen isolates (N=3) were resistant to tetracyclines only. Salmonella Panama (n=5) did not show resistance to the panel of antimicrobials tested; S. Goldcoast (N=3) was also relatively susceptible, with only a single isolate resistant to tetracyclines; however, this serovar has shown multiple resistance in the recent past in the UK.

National evaluation of the recent situation, the trends and sources of infection

It is evident that in general terms, Salmonella isolates from pigs tend to be more resistant than those from cattle or sheep. Considering those antimicrobials of particular public health importance, a low prevalence of resistance (2%) to ciprofloxacin was detected in Salmonella isolates from pigs, with resistance demonstrated in single isolates of serovars 4,12:i:- , 4,5,12:i:- and Agona. The level of resistance in these isolates was < 0.25 mg/L. Resistance to the third generation cephalosporin cefotaxime was not detected in Salmonella isolates from pigs.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is a possibility that antimicrobial resistance in organisms in animals could be transferred to organisms in humans.

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

In England, Wales and Scotland (Great Britain) all isolations of Salmonella must be reported under the Zoonoses Order 1989. In Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991]. The isolates tested for antimicrobial resistance in laying hens and broilers (Gallus gallus) and in turkeys were selected from isolates derived from testing carried out under the Salmonella National Control Programmes in accordance with the EFSA recommendations, SANCO/431/2007 and Decision 2007/407/EC.

Type of specimen taken

As per requirements of the Salmonella National Control Programmes.

Methods of sampling (description of sampling techniques)

In accordance with the Salmonella National Control Programmes.

Procedures for the selection of isolates for antimicrobial testing

One isolate of each serovar from each positive flock.

Methods used for collecting data

Isolates from England, Wales, Scotland and Northern Ireland are tested at the respective National Reference Laboratories (NRLs).

Laboratory methodology used for identification of the microbial isolates

Bacteriological method: ISO 6579:2002/Amd 1:2007.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Isolates from England and Wales were tested at the AHVLA National Reference Laboratory for Antimicrobial Resistance in Veterinary Bacteria. Isolates from Northern Ireland are tested by AFBI.

Antimicrobials included were: tetracyclines, chloramphenicol, ampicillin, cefotaxime, ciprofloxacin, nalidixic acid, trimethoprim, sulphonamide, streptomycin, gentamicin.

Cut-off values used in testing

Salmonella isolates recovered from laying hens, broilers and turkeys under the National Control Programme were tested by the broth microdilution (MIC) method, using EUCAST epidemiological cut-off values to discriminate between microbiologically resistant and susceptible isolates recommended by EFSA and described in Decision 2007/407/EC. 'Resistant' is used to describe microbiological resistance for brevity in this section.

Control program/mechanisms

The control program/strategies in place

Control is based on effective surveillance for antimicrobial resistance in Salmonella isolates and reporting of findings to the Competent Authority. Follow up action taken in the event of detection of resistance depends on the type of resistance, the relevance to public and animal health and the serotype, phage type and characteristics of the organism involved. In Great Britain, visits are conducted by Animal Health and Veterinary Laboratories Agency staff to farms where follow-up sampling and epidemiological investigation may be carried out; control measures as appropriate may be put in place and advice provided to the farmer.

Results of the investigation

Considering monitoring performed under the National Control Programmes for broilers, laying hens and turkeys in the UK in 2013, 170 Salmonella isolates were tested from broilers, 56 from layers and 170 from turkeys.

Broilers:
In broilers, 108/170 (64%) of the Salmonella isolates were fully sensitive. There were no isolates of S. Enteritidis recovered from broilers and eligible for inclusion under the EFSA protocol and only two isolates of S. Typhimurium, which were resistant to ampicillin, sulphonamides and tetracyclines, with one of the isolates also resistant to chloramphenicol.

Three isolates of monophasic Salmonella 4,12:i:- (2) and 4,5,12:i:- (1) were tested from broilers and showed ampicillin, sulphonamide and tetracycline (ASuT) resistance. [Streptomycin was not tested as it is no longer included in the EFSA panel of antimicrobials to be tested].

Considering all Salmonella serovars from broilers, the most prevalent serovar was S. Mbandaka (37 isolates) which slightly superseded S. Montevideo (34 isolates). Most S. Mbandaka isolates (29/37; 78%) were susceptible to the antimicrobials tested; the commonest resistance pattern was resistance to ampicillin, sulphonamides, tetracyclines and trimethoprim which was shown by 8% (3/37) of isolates. The Salmonella Montevideo isolates from broilers were mostly (91%) susceptible to the panel of antimicrobials tested, with only two isolates resistant to ampicillin and one to chloramphenicol. S. Kedougou was the third most prevalent serovar detected (29 isolates); 41% of isolates (12 isolates) were fully susceptible to the antimicrobial panel, whilst 55% (16 isolates) were resistant to sulphonamides and trimethoprim, with most of these (14 isolates) also resistant to tetracyclines.

Seven Salmonella isolates (4% of the total) were resistant to ciprofloxacin and these comprised mainly Salmonella Indiana (3) and Senftenberg (2), together with single isolates of Infantis and a rough strain. All of these isolates were also resistant to nalidixic acid. No isolates of Salmonella from broilers were resistant to cefotaxime.

Layers:
In layers, 84% (47/56) of the Salmonella isolates tested were fully sensitive. Considering S. Enteritidis three isolates were tested and each of these was fully sensitive. There were two isolates of S. Typhimurium from layers and both were resistant to ampicillin, streptomycin, sulphonamides and tetracyclines.

Salmonella Senftenberg isolates from layers (9 isolates) were susceptible and a single isolate of S. Stanley was resistant to ampicillin, streptomycin, sulphonamides and tetracyclines, though not to nalidixic acid or ciprofloxacin.

Five isolates of monophasic Salmonella (4,5,12:i) were examined from layers; four of these showed the typical ASSuT pattern of resistance often seen in such isolates of this serovar, whilst one was fully susceptible.

There were no Salmonella isolates recovered from layers in 2013 which were resistant to ciprofloxacin, nalidixic acid or cefotaxime.

Turkeys:

In turkeys, 14% of Salmonella isolates (23/170) were fully sensitive. There were no S. Enteritidis or S. Typhimurium isolates recovered from turkeys. A single isolate of the monophasic Salmonella 4,5,12:i:- was fully susceptible to the antimicrobials tested.

Resistance to the third generation cephalosporin cefotaxime was not detected in Salmonella isolates from turkeys. Resistance to ciprofloxacin was detected in 24 isolates (14%), belonging to serotypes Newport (19), Senftenberg (3), Indiana (1) and a rough strain (1). All of these ciprofloxacin-resistant isolates were also resistant to nalidixic acid.

Considering all S. Newport isolates, 86% (19/22) were resistant to ciprofloxacin, nalidixic acid, ampicillin and streptomycin with a low number of isolates also resistant to sulphonamides, tetracyclines and / or trimethoprim. There were 89 isolates of Salmonella Derby from turkeys and 81 (91%) were resistant to streptomycin, sulphonamides and tetracyclines with six additionally resistant to ampicillin and one additionally resistant to trimethoprim. There were 23 isolates of Salmonella Kedougou examined, all of which were resistant to sulphonamides and most of which 21/23 were also resistant to tetracyclines.

There were no isolates of S. Stanley from turkeys included in the selected panel of Salmonella isolates in 2013.

National evaluation of the recent situation, the trends and sources of infection

During 2013, no resistance to cefotaxime was detected in Salmonella isolates from broilers, layers or turkeys. Resistance to ciprofloxacin was detected in 2013 in Salmonella isolates from broilers (4% resistance) and turkeys (14% resistance), though not from layers. This represents a change from the situation in 2008, when ciprofloxacin resistance was not detected in Salmonella isolates; however fluctuations in the occurrence of resistance are noted in different years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is a possibility that antimicrobial resistance in organisms in animals could be transferred to organisms in humans.

D. Antimicrobial resistance in Salmonella in foodstuff derived from cattle

Results of the investigation

No results to report in 2013.

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Results of the investigation

No results to report in 2013.

F. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Results of the investigation

No results to report in 2013.

2.2 CAMPYLOBACTERIOSIS

2.2.1 General evaluation of the national situation

A. Thermophilic Campylobacter general evaluation

History of the disease and/or infection in the country

Campylobacter is the most commonly isolated bacterial gastrointestinal pathogen in the UK. In 2000 there were 65,165 reports of cases in the UK (including cases acquired in the UK and abroad) which steadily decreased to 49,508 in 2004. Since 2004 the UK has recorded an almost year on year increase in Campylobacter cases, with 65,114 laboratory confirmed cases reported in 2009, 70,298 in 2010 and 72,150 in 2011. There were 72,592 laboratory confirmed cases reported in 2012 - an increase of 0.5% on 2011, although while reports increased by 3.1% in Northern Ireland and 0.5% in England and Wales, they fell by 0.3% in Scotland.

However, the number of cases identified through laboratory reports is known to be an underestimate of the actual number of cases that occur in the community. Within the UK, epidemiological studies have indicated that the ratio of unreported human infection in the community to reports to national surveillance is approximately 9.3 to 1. This suggests that, in 2012, there could have been as many as 747,000 Campylobacter cases in the UK. (Tam CC, et al. Longitudinal study of infectious intestinal disease in the UK (IID2 study): incidence in the community and presenting to general practice. Gut 2011 [http://gut.bmj.com/content/early/2011/06/26/gut.2011.238386.short?q=w_gut_ahead_tab]).

A proportion of Campylobacter isolates are speciated and indicate that Campylobacter jejuni accounts for the majority, followed by Campylobacter coli.

Campylobacter are commonly found in the intestinal tract of animals where they are regarded as commensal bacteria. Clinical disease is rare, and most frequently associated with abortion in ruminants. Consequently, most isolations of Campylobacter in animals are from ruminant abortion investigation cases (Campylobacter fetopathy), with Campylobacter fetus being the most common isolate. Ruminant abortion material is not considered a major source for human infection.

National evaluation of the recent situation, the trends and sources of infection

Food:
No food surveys were carried out in 2013.

Animals:
During 2013, there were 499 reports of Campylobacter spp isolated in animals in Great Britain and Northern Ireland, with diagnoses achieved via the submission of clinical material by private veterinarians for diagnostic investigation at the Animal Health Veterinary Laboratories Agency, Scotland's Rural Colleges and the Agri-food and Biosciences Institute. Of the total, 438 reports were from Great Britain and 61 from Northern Ireland. The total units tested are not known because the laboratories do not report negative results, unless part of an official control programme or survey.

Analysis of all incidents of fetopathy in sheep and goats in Great Britain during the year indicated Campylobacter spp. (both thermophillic and non-thermophillic) accounted for 23.5% (of a total 907 investigated incidents) of all diagnoses of fetopathy. This is a significantly higher proportion than seen in 2012 where Campylobacter spp. (both thermophillic and non-thermophillic) accounted for 6.3% (of a total

1340 investigated incidents) of all diagnoses of fetopathy. In previous years, Campylobacter accounted for 14.4% (2011) and 21.3% (2010) of all diagnoses of fetopathy.

Broilers at slaughterhouse: in 2013, as part of a structured official monitoring programme based on Decision 2007/516/EC, 473 neck skin samples were tested with 78 positive for C. Coli and 298 positive for C. jejuni. Of the 125 caecal contents samples tested, 34 were positive for C. Coli and 66 for C. jejuni. The enumeration results indicated that there was no statistically significant difference in the percentage of birds with more than 1000cfu/g contamination compared to the UK 2008 EU baseline survey results

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Human campylobacteriosis due to thermophilic Campylobacter is a major cause of food poisoning, although non-thermophylic strains (such as C. fetus) can also (rarely) cause severe zoonotic illness. The route of transmission to humans in many sporadically occurring cases remains obscure. Campylobacter are commonly found in clinically healthy animals. Poultry have long been considered as a potential source of infection. Recent studies using Multi-locus Sequence Typing (MLST) have supported this view, identifying poultry meat as an important source of Campylobacter infections in humans. (http://cid.oxfordjournals.org/content/48/8/1072.full.pdf+html – Sheppard et al., 2009; http://www.plosgenetics.org/article/fetchArticle.action?articleURI=info:doi/10.1371/journal.pgen.1000203)

Recent actions taken to control the zoonoses

The Food Standards Agency's Strategy for 2010-2015 includes a key outcome that "food produced or sold in the UK is safe to eat" and sets out the aim of reducing UK food-borne disease using a targeted approach and tackling Campylobacter in chicken as a priority. To address this, a Campylobacter Risk Management Programme has been developed, encompassing a range of projects targeted at different points across the food chain, from farm to fork. The Programme aims to achieve a specified target: a reduction in the percentage of UK-produced chickens that have the highest level of contamination (i.e. those with more than 1000cfu per gram) from a baseline of 27% to a target of 10% by April 2015. A joint cross-government and industry stakeholder working group has been set up to coordinate work towards achieving this target. The reduction is planned to be achieved through stakeholder engagement and partnership working to set in place interventions that are effective at controlling Campylobacter at primary production, slaughterhouse/processing, retail and at the consumer level.

This work is being supported by a joint Campylobacter research strategy to extend and strengthen the evidence-base that supports the Programme (http://www.food.gov.uk/multimedia/pdfs/campylobacterstrategy.pdf).

Additional information

Surveillance system:
The UK government undertakes national microbiological food surveillance. The priorities of these surveys are closely linked to a strategy to reduce the level of foodborne disease. Surveys are carried out regularly on a variety of foods and processes to gather data on the possible effects of processing changes on pathogens and to monitor high-risk foods linked to human cases/outbreaks and the emergence of new pathogens. In addition to national surveillance, Wales, Scotland and Northern Ireland also have separate microbiological food surveillance programmes within their own regions.

The UK government also collates returns from all UK food authorities on official food enforcement

activities in line with Regulation (EC) No 882/20041 on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in this report.

2.2.2 Campylobacteriosis in humans

A. Thermophilic Campylobacter in humans

Reporting system in place for the human cases

Ascertainment of cases is via mandatory notification of food poisoning and reporting of isolation by publicly funded human diagnostic microbiology laboratories [Public Health England, Centre for Infections, (Colindale), Health Protection Scotland, Health Protection Agency, Communicable Disease Surveillance Centre (Northern Ireland)].

Case definition

Laboratory confirmed isolate, usually from a faeces sample.

Diagnostic/analytical methods used

Microbiological culture. Only a proportion of isolates are speciated.

History of the disease and/or infection in the country

During the last 25 years, reported cases of human illness caused by Campylobacter spp. rose to a peak in the late 1990s, followed by a general downward trend until around 2004. Since then, there has been a year on year increase in laboratory confirmed reports of campylobacteriosis in the UK. Campylobacter is the most commmonly isolated bacterial gastrointestinal pathogen in the UK. A proportion of Campylobacter isolates are speciated and indicate that Campylobacter jejuni accounts for the majority, followed by Campylobacter coli.

Relevance as zoonotic disease

Campylobacter remains the most commmonly isolated bacterial gastrointestinal pathogen in the UK. Although the route of infection in human cases is often not clear, the organism is common in livestock where it is seldom associated with disease.

2.2.3 Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Results of the investigation

No food surveys were carried out in 2013

2.2.4 Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

A quantitative Campylobacter monitoring programme of broiler slaughter batches and broiler carcasses, based on EU technical specifications in Decision 2007/516/EC. The monitoring will cover a 3 year timescale from March 2012 to April 2015 with the aim of monitoring the level of Campylobacter carcass contamination, determine if there is a significant change in the number of carcasses with the highest levels of Campylobacter contamination and provide baseline data to feed into risk assessment models

Frequency of the sampling

At slaughter

- Carcase: total samples were spread evenly across the year with 1/12th of the total samples taken each month.
- Caeca: total samples were spread evenly across the year with 1/12th of the total samples taken each month.

Type of specimen taken

At slaughter

- Carcase: neck skin sample taken from carcase after chilling and before further processing.
- Caeca: intact caecae taken at time of evisceration (caecal content).

Methods of sampling (description of sampling techniques)

At slaughter

- Carcase: The study unit was a ‘slaughter batch’ defined as ‘a delivery of chickens, which have been raised in the same flock, to a slaughterhouse on one single day’. The target population was large abattoirs that produce, in total, more than 85% of the annual UK broiler slaughter throughput. The sampling was randomised (by abattoir, day of sampling and batch) and weighted according to abattoir throughput.

- Caeca: The study unit was a ‘slaughter batch’ defined as ‘a delivery of chickens, which have been raised in the same flock, to a slaughterhouse on one single day’. The target population was large abattoirs that produce, in total, more than 85% of the annual UK broiler slaughter throughput. The sampling was randomised (by abattoir, day of sampling and batch) and weighted according to abattoir throughput.

Case definition

At slaughter

- Carcase: ‘Positive slaughter batch’ – a batch where at least one of ten colonies from a sample was confirmed as thermotolerant Campylobacter spp.

- Caeca: ‘Positive slaughter batch’ - a batch where at least one of ten colonies from a sample was confirmed as thermotolerant Campylobacter spp.

Diagnostic/analytical methods used

At slaughter

- Carcase: samples were tested for detection and quantification of thermotolerant Campylobacter spp. following ISO10272:2006 part 2. Confirmation and speciation of Campylobacter were undertaken as described in ISO 10272:2006, using biochemical methods. Samples were tested before 80 hours from collection.

- Caeca: samples were tested for detection and quantification of Campylobacter following ISO10272:2006 part 2. Confirmation and speciation of Campylobacter were undertaken as described in ISO 10272:2006, using biochemical methods. Samples were tested before 80 hours from collection.

Vaccination policy

None

Control program/mechanisms

The control program/strategies in place

A Campylobacter Risk Management Programme has been developed to reduce levels of Campylobacter in chicken. The programme encompasses a range of projects targeted at different points across the food chain, from farm to fork. The Food Standards Agency (FSA) is working in partnership with the industry and Defra as part of a Joint Working Group on Campylobacter. The working group has developed a Joint Action Plan, which will help identify and implement interventions that will reduce Campylobacter. To contribute to this work the Agency is also funding new research in collaboration with the Biotechnology and Biological Sciences Research Council (BBSRC), Defra, the Northern Ireland Department for Agriculture and Rural Development and the Scottish Government, the research forms part of a joint strategy entitled: UK Research and Innovation Strategy for Campylobacter (UK RISC) in the food chain (http://multimedia.food.gov.uk/multimedia/pdfs/campylobacterstrategy.pdf).

Recent actions taken to control the zoonoses

To measure progress on the effectiveness of the Risk Management Programme, a joint government and industry target to ‘reduce Campylobacter in UK produced chickens by 2015’ has been set. The Food Standards Agency, Defra, the UK poultry industry, and major retailers have agreed a new target that will measure efforts to reduce the levels of Campylobacter in chickens. The target is for the industry to reduce the numbers of the most contaminated carcases (>1,000 cfu/g) in UK poultry houses from 27% to 10% by 2015. http://www.food.gov.uk/science/microbiology/campylobacterevidenceprogramme/

Results of the investigation

In 2013, 473 neck skin samples were tested with 78 positive for C. Coli and 298 positive for C. jejuni. Of the 125 caecal contents samples tested 34 were positive for C. Coli and 66 for C. jejuni. The enumberation results indicated that there was no statistically significant difference in the percentage of birds with more than 1000cfu/g contamination compared to the UK 2008 EU baseline survey results

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

It is estimated that achievement of the reduction target above could mean a reduction in Campylobacter food poisoning of up to 30% – about 111,000 cases per year.

Table Campylobacter in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari
Cats - pet animals - Veterinary clinics - Clinical investigations	SRUC	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	7	1	0	0
Cattle (bovine animals) - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	38	0	4	1
Dogs - pet animals - Veterinary clinics - Clinical investigations	SRUC	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	95	1	27	1
Gallus gallus (fowl) - broilers - Slaughterhouse - Survey - national survey	AHVLA	Objective sampling	Official sampling	animal sample > caecum	Domestic	Slaughter batch	125	100	34	66	0
Gallus gallus (fowl) - broilers - Slaughterhouse - Survey - national survey	AHVLA	Objective sampling	Official sampling	food sample > neck skin	Domestic	Slaughter batch	473	376	78	298	0
Gallus gallus (fowl) - unspecified - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	0	1	0
Pigs - unspecified - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	6	0	2	0
Sheep - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	350	10	49	1
Zoo animals, all - Zoo - Clinical investigations [1)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	0	1	0

	C. upsaliensis	Thermophilic Campylobacter spp., unspecified	C. fetus	C. sputorum	Campylobacter spp., unspecified
Cats - pet animals - Veterinary clinics - Clinical investigations	5	0	0	0	1

Table Campylobacter in animals

	C. upsaliensis	Thermophilic Campylobacter spp., unspecified	C. fetus	C. sputorum	Campylobacter spp., unspecified
Cattle (bovine animals) - Farm - Clinical investigations	0	3	26	3	1
Dogs - pet animals - Veterinary clinics - Clinical investigations	60	0	0	0	6
Gallus gallus (fowl) - broilers - Slaughterhouse - Survey - national survey	0	0	0	0	0
Gallus gallus (fowl) - broilers - Slaughterhouse - Survey - national survey	0	0	0	0	0
Gallus gallus (fowl) - unspecified - Farm - Clinical investigations	0	1	0	0	0
Pigs - unspecified - Farm - Clinical investigations	0	4	0	0	0
Sheep - Farm - Clinical investigations	0	28	261	1	0
Zoo animals, all - Zoo - Clinical investigations [1)]	0	0	0	0	0

Comments:

[1)] Giraffe (1)

Footnote:

The table includes data on diagnoses made from clinical diagnostic material submitted to Government veterinary laboratories. The total units tested are not known because the laboratories do not routinely report negative results, unless the testing is carried out as part of an official control programme or survey.

The table also includes the results of a quantitative Campylobacter monitoring programme of broiler slaughter batches and broiler carcasses at slaughterhouse, based on EU technical specifications in Decision 2007/516/EC.

AHVLA = Animal Health and Veterinary Laboratories Agency in Great Britain. Scottish Agricultural College Consulting, Veterinary Services, part of Scotland's Rural Colleges (SRUC), supply data on recorded incidents in Scotland to AHVLA for inclusion in the Veterinary Investigation Diagnostic Analysis (VIDA) System.
AFBI = Agri-Food and Biosciences Institute in Northern Ireland

Table Campylobacter in animals

2.2.5 Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in cattle

Sampling strategy used in monitoring

Methods used for collecting data

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Results of the investigation

No surveys were carried out in 2013.

B. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from cattle

Results of the investigation

No surveys were carried out in 2013

C. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from pigs

Results of the investigation

No surveys were carried out in 2013.

D. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from poultry

Results of the investigation

No surveys were carried out in 2013.

E. Antimicrobial resistance in Campylobacter jejuni and coli in pigs

Sampling strategy used in monitoring

Frequency of the sampling

A study to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum β-lactamase (ESBL) E. coli in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter coli was carried out in 2013. Campylobacter coli isolates obtained from the national survey of pigs were tested in accordance with EFSA's recommendations. The survey was carried out from January to April 2013.

Type of specimen taken

Caecum (intact) at the point of evisceration.

Procedures for the selection of isolates for antimicrobial testing

Isolates were selected, tested and reported in accordance with EFSA's recommendations.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

C. coli was tested against panels of antimicrobials in accordance with EFSA's recommendations. The antimicrobials tested were ciprofloxacin, nalidixic acid, erythromycin, gentamicin, streptomycin and tetracyclines.

Cut-off values used in testing

Testing was performed in accordance with EFSA's recommendations and using epidemiological cut-off values. 'Resistance' is used to refer to microbiological resistance in this section.

Results of the investigation

C. coli was the only Campylobacter sp. organism examined from pigs for antimicrobial susceptibility and a total of 141 isolates were examined.

Ciprofloxacin resistance was detected in 13% of porcine C. coli isolates and all of these were also resistant to nalidixic acid. Three further isolates were resistant to nalidixic acid, but apparently susceptible to ciprofloxacin. No resistance to gentamicin was detected, whereas 67% (94/141) of isolates were resistant to streptomycin and 79% (112/141) were resistant to tetracyclines. Erythromycin resistance was observed in 27% (38/141) of isolates. Nine isolates (6%) were co-resistant to both ciprofloxacin and erythromycin.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is a possibility that antimicrobial resistant zoonotic organisms occurring in animals such as Campylobacter could pass to humans. Measures to protect the food chain as well as domestic cooking procedures eliminate or reduce the risk.

F. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

A quantitative Campylobacter monitoring programme of broiler slaughter batches and broiler carcasses, based on EU technical specifications in Decision 2007/516/EC. The monitoring will cover a 3 year timescale from March 2012 to April 2015. Campylobacter coli and Campylobacter jejuni from broilers obtained from this national survey were tested in accordance with EFSA's recommendations. Caeca from broilers were collected from abattoirs at slaughter. The samples were collected with a spread evenly distributed across the year with 1/12th of the total samples taken each month.

Type of specimen taken

Caecum (intact) at the point of evisceration.

Methods of sampling (description of sampling techniques)

Caeca: The study unit was a 'slaughter batch' defined as 'a delivery of chickens, which have been raised in the same flock, to a slaughterhouse on one single day'. The target population was large abattoirs that produce, in total, more than 85% of the annual UK broiler slaughter throughput. The sampling was randomised (by abattoir, day of sampling and batch) and weighted according to abattoir throughput.

Procedures for the selection of isolates for antimicrobial testing

Isolates were selected, tested and reported in accordance with EFSA's recommendations.

Laboratory methodology used for identification of the microbial isolates

Caecal samples were tested for detection and quantification of Campylobacter following ISO10272:2006 part 2. Confirmation and speciation of Campylobacter were undertaken as described in ISO 10272:2006, using biochemical methods. Samples were tested before 80 hours from collection.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

National reference laboratory (AHVLA).

C. coli and C. jejuni were tested against panels of antimicrobials in accordance with EFSA's recommendations. The antimicrobials tested were ciprofloxacin, nalidixic acid, erythromycin, gentamicin, streptomycin and tetracyclines.

Cut-off values used in testing

Testing was performed in accordance with EFSA's recommendations and using epidemiological cut-off values. 'Resistance' is used to refer to microbiological resistance in this section.

Results of the investigation

C. coli (33 isolates) and C.jejuni (61 isolates) were examined from broilers in 2013.

Ciprofloxacin resistance was demonstrated in 31% (19/61) of C. jejuni isolates from broilers and all of these isolates were also resistant to nalidixic acid. Tetracycline resistance was observed in 48% (29/61) of isolates, whereas resistance to erythromycin, streptomycin or gentamicin was not detected in C. jejuni from broilers.

Considering C. coli from broilers, 42% (14/33) of isolates were resistant to ciprofloxacin and nalidixic acid. A single isolate was resistant to erythromycin and this isolate was also resistant to ciprofloxacin/ nalidixic acid. 55% of isolates (18/33) were resistant to tetracyclines, whilst 15% (5/33) were resistant to

streptomycin and none to gentamicin.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is a possibility that antimicrobial resistant zoonotic organisms occurring in animals such as Campylobacter could pass to humans. Measures to protect the food chain as well as domestic cooking procedures eliminate or reduce the risk.

2.3 LISTERIOSIS

2.3.1 General evaluation of the national situation

A. Listeriosis general evaluation

History of the disease and/or infection in the country

Listeria monocytogenes is widely distributed in the environment, including soil, decaying vegetation and fodder such as silage in which the bacteria can multiply. In humans the disease most commonly occurs in pregnant women, neonates and people over the age of 60 years with a range of underlying medical conditions including cancer and diabetes. 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.

In animals, listeriosis is chiefly a disease of farmed ruminants, with cattle and sheep considered the most frequently clinically infected species. Infection is opportunistic, and may occur through umbilical infection in the neonatal period, or more commonly though the ingestion of soil or soil-contaminated feed, notably poor quality silage.

Laboratory reports of listeriosis in humans in the UK have fallen from a peak in the late 1980's following targeted provision of advice to pregnant women to avoid ripened soft cheeses and pâtés. Listeriosis is a rare disease in the UK and numbers remained low, at around 100 - 150 UK cases per year up to 2003 when an increase in the number of cases to around 200 per year was noted, mainly attributable to an increase in England and Wales. The rise in the number of cases has occurred particularly in people over 60 years of age and the reason for this increase is unknown. The number of 'pregnancy-associated' cases has remained relatively low. In an attempt to try and understand this increase, several surveys focused on ready-to-eat foods that have been linked to the recent rise and/or from case food histories have been carried out over recent years with the aim to investigate the microbiological quality of these products (results reported in previous annual reports). The potential link, if any, between listeriosis infection in animals and infection in humans still remains unclear.

In animals in the UK, the majority of cases occur between January and April when animals are housed. This peak in cases is linked to the feeding of poorly fermented soil-contaminated silage.

National evaluation of the recent situation, the trends and sources of infection

Food data:
Results of surveys carried out in 2013 are given in the tables. Listeria spp were detected in 24 of the 915 milk and dairy product samples tested during the year.

Animals:
During 2013, there were 201 incidents of listeriosis confirmed in animals in Great Britain and Northern Ireland, with diagnoses achieved via the submission of clinical material by private veterinarians for diagnostic investigation at the Animal Health Veterinary Laboratories Agency, Scotland's Rural Colleges and the Agri-food and Biosciences Institute. Of the total, 179 incidents were recorded in Great Britain and 22 in Northern Ireland.

In Great Britain there were 53 incidents in cattle, where Listeria spp was diagnosed as the cause of

abortion, mastitis, iritis or encephalitis, usually associated with the feeding of poor quality silage. In sheep and goats, there were 124 incidents where listeriosis was diagnosed, as the cause of meningitis, septicaemia or abortions. In 2013, the percentage of foetopathy cases in sheep and goats due to infection with Listeria spp as a percentage of all diagnoses was 2.8% out of a total 907 incidents of diagnosed fetopathy investigated during the year. This is lower than in 2012 (1.6%), but roughly consistent with previous years results of 3.4% (2011) and 2.5% (2010). There was one incident of listeriosis diagnosed in a backyard chicken (Gallus gallus) and one in a captive Tahr in 2013 in Great Britain.

In Northern Ireland, there were 10 incidents reported cattle, 9 incidents in sheep, 1 incident in a chicken, 1 report from a horse and 1 from a donkey during 2013.

During 2012, there were 220 incidents of listeriosis confirmed in animals in Great Britain and Northern Ireland: 175 incidents were recorded in Great Britain and 45 in Northern Ireland. This included 66 incidents in cattle and 139 incidents in sheep and goats. During 2011, listeriosis was diagnosed in 164 incidents in animals in the UK: of these, 146 and occurred in Great Britain and 18 in Northern Ireland.

Numbers of diagnoses of listeriosis vary between years, and is influenced by submission rates to diagnostic laboratories, but also by climatic factors which may influence silage quality or soil exposure for grazing animals. The data reported in the table for prevalence in animals summarises confirmed clinical diagnoses of listeriosis from specimens submitted to AHVLA, SRUC and AFBI laboratories during 2013. For Great Britain data, diagnoses use strict criteria and are recorded (once only per incident) using the Veterinary Investigation Diagnostic Analysis (VIDA) system.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

It is believed that consumption of contaminated foods is the main transmission route for both people and animals. Human infection acquired directly from animals is possible, but apart from a few cases it is not clear what, if any, connection there is between human listeriosis and animal listeriosis.

There was one incident of note reported in 2013: an investigation was undertaken following an outbreak of listerial encephalitis in a milking sheep flock, and the subsequent isolation of Listeria spp. from the bulk milk tank. The farm supplied milk for the production of unpasteurized hard and soft cheeses, and was also open to the public. Between February and April 2013, thirteen cases of nervous disease were reported in ewes, with clinical signs consisting variously of circling, unilateral paralysis, drooling or recumbency. Post-mortem examination of one ewe in April confirmed histopathological lesions typical of listerial encephalitis, although Listeria was not isolated from either the brain or the milk of this ewe. Listeria spp. were detected from bulk milk collected by the farmer on several sampling occasions in April and also in subsequent months, but Listeria was not isolated from pooled samples from individual ewes. Following the initial detection of Listeria spp., milk ceased to be sold for the manufacture of unpasteurized cheese. A farm visit was undertaken by a Veterinary Investigation Officer in June. There had been no further cases of listerial encephalitis in ewes, and no upsurge of clinical mastitis was reported. Swabs were taken from various items of dairy equipment. Listeria monocytogenes was yielded from cultures of a swab taken from the bulk milk tank above the milk line, raising the possibility of biofilms harbouring the bacteria. Although the possibility of clinical or subclinical listerial mastitis could not be discounted, it was considered that the most likely source of this contamination was environmental. A thorough clean of the internal workings of the bulk milk tank was recommended, in addition to a thorough expert review of cleaning processes and monitoring procedures. The farmer was also made aware of the industry Code of Practice for preventing or controlling ill health from animal contact at visitor attractions.

Recent actions taken to control the zoonoses

The Food Standards Agency's Strategy for 2010-2015 includes the outcome that ‘food produced or sold in the UK is safe to eat’, and a main priority is to ‘reduce foodborne disease using a targeted approach’. The FSA’s Foodborne Disease Strategy (FDS) for 2010-2015, established as one of the initiatives to deliver this objective, proposes a pathogen-specific approach to reducing human foodborne disease rates in the UK, and identifies Listeria monocytogenes (L. monocytogenes), which causes the most deaths, as a priority for action.

The five-year Listeria Risk Management Programme comprises three main workstreams, each informed by research and surveillance:
- Consumer behaviours and actions: activities to raise awareness and promote behaviours and actions to reduce the risk of listeriosis among key vulnerable groups, e.g. older people, pregnant women and people with existing medical conditions, particularly cancer patients.
- Procurement and provision of food to vulnerable people: activities to ensure the risk of listeriosis is considered as part of food procurement and food safety management in places where vulnerable people are cared for, e.g. hospitals.
- Industry compliance and enforcement: activities to improve industry compliance with the law focusing on sectors producing foods that are high-risk for Listeria monocytogenes, and to ensure enforcement in this area is robust and consistent.

To achieve the greatest impact, activities are being targeted at specific high-risk food industry sectors and particular vulnerable groups of the population and the places where they are cared for.

More information is available at: http://www.food.gov.uk/safereating/microbiology/listeria

Additional information

Surveillance system:
The UK government undertakes national microbiological food surveillance. The priorities of these surveys are closely linked to a strategy to reduce the level of foodborne disease. Surveys are carried out regularly on a variety of foods and processes to gather data on the possible effects of processing changes on pathogens and to monitor high-risk foods linked to human cases/outbreaks and the emergence of new pathogens. In addition to national surveillance, Wales, Scotland and Northern Ireland also have separate microbiological food surveillance programmes within their own regions.

The UK government also collates returns from all UK food authorities on official food enforcement activities in line with Regulation (EC) No 882/2004 on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in this report.

2.3.2 Listeria in foodstuffs

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - Retail - Surveillance	FSA	Objective sampling	Official sampling	food sample	Unknown	Single	25g	372	18	372	11
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - Retail - Surveillance	FSA	Objective sampling	Official sampling	food sample	Unknown	Single	25g	104	3	104	2
Cheeses made from cows' milk - hard - made from raw or low heat-treated milk - Retail - Surveillance	FSA	Objective sampling	Official sampling	food sample	Unknown	Single	25g	196	1	196	1
Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - Surveillance	FSA	Objective sampling	Official sampling	food sample	Unknown	Single	25g	243	2	243	1

	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - Retail - Surveillance	372	2	5
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - Retail - Surveillance	104	0	1

Table Listeria monocytogenes in milk and dairy products

	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Cheeses made from cows' milk - hard - made from raw or low heat-treated milk - Retail - Surveillance	196	0	0
Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - Surveillance	243	0	1

Footnote:

FSA = Food Standards Agency

2.3.3 Listeria in animals

Table Listeria in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Listeria	L. monocytogenes	Listeria spp., unspecified	L. ivanovii
Cattle (bovine animals) - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	63	29	34	0
Goats - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	8	7	1	0
Poultry, unspecified - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	1	1	0
Sheep - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	125	56	68	1
Solipeds, domestic - Farm - Clinical investigations (horse (1), donkey (1))	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	2	0	0
Zoo animals, all - Zoo - Clinical investigations [1)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	0	1	0

Comments:

[1)] Tahr

Footnote:

The table includes data on diagnoses made from clinical diagnostic material submitted to Government veterinary laboratories. The total units tested are not known because the laboratories do not routinely report negative results, unless the testing is carried out as part of an official control programme or survey.

In Great Britain, the total number of units positive for Listeria are numbers of recorded incidents. There may be more than one recorded diagnosis in a single incident.

AHVLA = Animal Health and Veterinary Laboratories Agency in Great Britain. Scottish Agricultural College Consulting, Veterinary Services, part of Scotland's Rural Colleges (SRUC), supply data on recorded incidents in Scotland to AHVLA for inclusion in the Veterinary Investigation Diagnostic Analysis (VIDA) System.
AFBI = Agri-Food and Biosciences Institute in Northern Ireland

2.4 E. COLI INFECTIONS

2.4.1 General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

National evaluation of the recent situation, the trends and sources of infection

Food:
No national surveys were carried out in 2013.

Animals:
No surveys were carried out for VTEC in cattle, sheep or pigs in the UK in 2013 - the last national survey in these species was conducted in 2003 in Great Britain, and results are in the report for 2004.

There were three suspected animal-associated outbreaks of VTEC O157 in humans recorded during 2013, none of which were confirmed by animal sampling.

In 2012, there were four outbreaks of human infection with VTEC O157 where an animal source of infection was considered likely. Investigations, including animal sampling , were carried out on all four of these premises and VTEC O157 was isolated from a variety of animals species, including cattle, sheep, pigs, goats, camelids and wild rabbits. In all outbreaks, molecular comparison of human isolates with those yielded form the animals identified indistinguishable variable number tandem repeat (VNTR) patterns, confirming the animals as the likely source of the human infection. In 2011, there were 5 outbreaks of VTEC O157 where animal-associated sources of human infection were suspected. Investigations, including animal sampling, were carried out on 4 of these premises, but VTEC O157 was not isolated from any of the samples taken. In 2010, there were 9 investigations carried out - with isolates of VTEC indistinguishable on PFGE from the human cases of disease detected on three of the premises investigated. The largest recorded animal-associated outbreak of VTEC infection in humans in Great Britain linked to an open farm premises occurred in September 2009, involving 93 human cases. Eleven of the 33 E. coli isolates obtained from animals present on the premise were found to be indistinguishable from those causing infection in the human cases (VTEC O157 PT 21/28 found in sheep, pigs, goats, cattle, ponies and rabbits).

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Foodborne outbreaks have been well documented, but many cases of VTEC O157 are sporadic and it is often difficult to confirm a source of infection in these circumstances. A number of case control studies in Great Britain have shown the importance of contact with animals and the animals' environment.

During 2013, three verified foodborne outbreaks of VTEC O157 were reported - one linked to consumption of under-cooked burgers and two to consumption of contaminated pre-packed watercress.

Additional information

Surveillance system:
The UK government undertakes national microbiological food surveillance. The priorities of these surveys are closely linked to a strategy to reduce the level of foodborne disease. Surveys are carried out regularly on a variety of foods and processes to gather data on the possible effects of processing changes on

pathogens and to monitor high-risk foods linked to human cases/outbreaks and the emergence of new pathogens. In addition to national surveillance, Wales, Scotland and Northern Ireland also have separate microbiological food surveillance programmes within their own regions.

The UK government also collates returns from all UK food authorities on official food enforcement activities in line with Regulation (EC) No 882/20041 on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in this report.

2.4.2 E. coli infections in humans

A. Verotoxigenic Escherichia coli infections in humans

Reporting system in place for the human cases

In England and Wales, systematic data based on voluntary laboratory reporting is only collected on verotoxigenic E. coli O157. Most laboratories examine faeces using Sorbitol MacConkey agar and anti-O157 latex agglutination kits. This serotype is usually associated with verocytotoxin production. Verotoxin is not specifically tested for.

In Scotland isolates of E.coli O157 and other serogroups are voluntarily reported to Health Protection Scotland (HPS) by diagnostic laboratories. The Scottish E.coli O157 Reference Laboratory (SERL) reports culture positive cases of E.coli O157 and other serogroups, and seropositives of E.coli O157. HPS combines laboratory data with exposure, clinical and outcome details obtained from local investigators, to compile an enhanced dataset. Enhanced surveillance for VTEC was initiated in Scotland in 1999 and for HUS in 2003.

In Northern Ireland reporting is based on laboratory reports.

Case definition

A person-infection episode, with microbiological confirmation of infection (culture or seropositive).

Diagnostic/analytical methods used

Most laboratories examine faeces using Sorbitol MacConkey agar and anti-O157 latex agglutination kits. This serotype is usually associated with verocytotoxin production. Verotoxin is not specifically tested for.

History of the disease and/or infection in the country

The first report in England and Wales was in 1982 and in Scotland in 1984. Up to 1995 there was a rising trend in the reporting of VTEC O157 throughout the UK. Since then the number of reported cases has stabilised at approximately 1000 - 1500 cases per year. Scotland has consistently recorded the highest rates per 100,000 population since the late 1980s.

National evaluation of the recent situation, the trends and sources of infection

Relevance as zoonotic disease

While foodborne outbreaks have been well documented, many cases of VTEC O157 are sporadic and it is often difficult to confirm a source of infection in these circumstances. A number of case control studies in Great Britain have shown the importance of contact with animals and the animals' environment.

2.4.3 Escherichia coli, pathogenic in animals

A. Verotoxigenic E. coli (VTEC) in Animals All animals

Monitoring system

Sampling strategy

Verocytotoxigenic-producing E.coli (VTEC) O157 outbreak investigations are undertaken according to agreed guidelines at the request of Consultants in Communicable Disease Control of Public Health England/Public Health Wales (PHW)/Health Protection Scotland (HPS)/ Public Health Agency Northern Ireland (HSCNI) where an animal-associated source is suspected. The investigations variously involve collaboration with other organisations, including the Environmental Health departments of Local Authorities and the Health and Safety Executive. Determination of phage type (PT), Verocytotoxin (VT) type and comparison of human and animal isolates by pulsed field gel electrophoresis (PFGE) and variable number of tandem repeat (VNTR) analysis are performed by the E. coli / Shigella / Yersinia / Vibrio Reference Unit of the Laboratory of Gastrointestinal Pathogens, Centre for Infections, Colindale. If isolates from animals circumstantially implicated in outbreaks have the same PT and indistinguishable PFGE or VNTR profiles from human cases, this is taken as confirmatory evidence of a causal association. In practice, there can be minor profile variation amongst some isolates associated with an outbreak investigation. VNTR profiles of strains within an outbreak can also show variation at a single tandem repeat locus; application of this method is under development. Other VTEC O157 PTs may be detected incidentally during the investigation of animal premises.

Frequency of the sampling

Animals at farm

where considered relevant/ necessary in the event of human disease cases linked to an agricultural premises

Type of specimen taken

Animals at farm

Faeces

Case definition

Animals at farm

an animal/sample/herd/flock from which VTEC has been isolated.

Diagnostic/analytical methods used

Animals at farm

Bacteriological method: ISO 16654:2001

Vaccination policy

In October 2012, the Veterinary Medicines Directorate announced that it has approved the importation and use of Econiche (a Canadian vaccine for cattle which aims to reduce faecal shedding of E. coli O157) in the UK, under its Special Treatment Certificate (STC) scheme. The use of the vaccine would be restricted to animals on open farms only, and although licensed for use in cattle, the private veterinary surgeon may apply to use the vaccine in other species under the rules of the cascade. It’s applicability and efficacy in the Great Britain open farm situation has not been directly assessed.

Other preventive measures than vaccination in place

Available controls for VTEC, including VTEC O157 in animals, rely on the application of good husbandry and hygiene measures particularly at the point of provision of food production. These principally require the hygienic production and pasteurisation of milk, the provision of clean animals to slaughter, and the application of hygiene practices in the processing of these animals and the meat produced from them. In addition, controls to minimise the risk of zoonotic spread on farms require the application of appropriate risk management procedures based upon those suggested for open farms. Visitors to livestock farms, including those open to the general public, ramblers and workers on commercial livestock farms are all at risk of exposure, and should ensure good hand hygiene is observed. Risk of foodborne human illness can be reduced by thoroughly cooking meat and meat products, and by avoiding cross-contamination of work surfaces and ready-to-eat foods. At abattoirs, Food Business Operators are required to check the hide or skins of livestock presented for slaughter for faecal contamination, and take the necessary steps to avoid contamination of the meat during slaughter.

Control program/mechanisms

The control program/strategies in place

None.

Recent actions taken to control the zoonoses

Information via leaflets and articles aimed at farmers, veterinarians and policy makers is available from the Animal Health Veterinary Laboratories Agency (AHVLA), the Health and Safety Executive and other Government departments' websites:
•http://www.defra.gov.uk/foodfarm/farmanimal/diseases/vetsurveillance/documents/vtec-leaflet.pdf
• http://www.scotland.gov.uk/Publications/2005/03/20839/54388

The AHVLA also visits farmer and veterinary meetings on request to talk about VTEC O157 and control of other zoonoses in farmed livestock and has participated in several training days for enforcement bodies during 2013. Reduction of the spread of E.coli O157 in animals relies on good hygiene, such as keeping any bedding clean and dry.

A new industry Code of Practice on Preventing or Controlling Ill Health from Animal Contact at Visitor Attractions was relased in 2012 and can be found at: http://www.face-online.org.uk/resources/preventing-or-controlling-ill-health-from-animal-contact-at-visitor-attractions-industry-code-of-practice
This Code of Practice provides advice to farmers and those responsible for other types of establishments where the public have access to animals, on practical steps to reduce the risk of ill health to visitors.

Results of the investigation

No surveys were carried out for VTEC in cattle, sheep or pigs in the UK in 2013 - the last national survey in these species was conducted in 2003 in Great Britain, and results are in the report for 2004.

During 2013, there were three investigations into outbreaks of human infection with VTEC O157 where animal-associated sources of human infection were suspected. All outbreaks were in England or Wales.Two outbreaks, each involving two human cases, were potentially attributed to contact with animals at visitor attractions (open farms). In one of these, VTEC O157 was not cultured from any animals on the farm, despite extensive sampling. In the second case, no animal sampling was undertaken. The third outbreak related to a national increase in human cases of VTEC O157 Phage type 2 infection, with a strong epidemiological association to consumption of watercress. VTEC O157 was not identified from cattle faecal samples collected from the field adjacent to the watercress beds which had been indentified as a potential source of the contaminated salad although only limited sampling was undertaken. The role of wildlife vectors (e.g. rabbits) was discussed. There were no outbreaks of VTEC O157 infection linked to

contact with farm animals reported in Scotland

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Cattle are the main reservoir of VTEC O157 in the UK, but the organism is also commonly found in other ruminants, especially sheep, and has been isolated from a wide range of other livestock and wildlife species. However, because shedding of the organism is intermittent and it does not cause disease in cattle, 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.

In England and Wales about 15% of general VTEC outbreaks have been linked to direct or indirect animal contact. Prior to the large outbreak at an open farm in 2009, involving 93 human cases, human disease outbreaks with animal contact links have generally each comprised fewer than ten cases. Most large outbreaks have been related to food rather than direct contact with animals. About 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.

An analysis of outbreak investigations associated with open farms in Great Britain over a 10 year period revealed that VTEC O157 was confirmed in 19 (60%) of 31 farm premises sampled, with the highest proportion of positive samples on positive premises (29%) in cattle, followed by sheep (24%), donkeys (15%), pigs (14%), horses (12%) and goats (10%). These premises were sampled because of perceived links with human case and not as part of a survey so the results may not be representative of all open farms.

Following the major outbreak of E. coli O157, phage type 21/28 in which microbiological, epidemiological and environmental investigations identified the main animal petting barn as the source of the outbreak at an open farm in Surrey, England in 2009, an independent review of the management of the outbreak, and the regulatory framework and control of risks relating to open farms was published. This is available at: http://www.griffininvestigation.org.uk/

Additional information

Table VT E. coli in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157
Cattle (bovine animals) - Farm - Surveillance (human disease outbreak investigation)	AHVLA/ DARD	Suspect sampling	Official and industry sampling	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	2	0	0
Goats - Farm - Surveillance (human disease outbreak investigations)	AHVLA/ DARD	Suspect sampling	Official and industry sampling	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	9	0	0
Other animals - unspecified - Farm - Surveillance (human disease outbreak investigation) [1)]	AHVLA/ DARD	Suspect sampling	Official and industry sampling	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	9	0	0
Pet animals, all - Surveillance (human disease outbreak investigation) [2)]	AHVLA/ DARD	Suspect sampling	Official and industry sampling	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	5	0	0
Pigs - Farm - Surveillance (human disease outbreak investigation)	AHVLA/ DARD	Suspect sampling	Official and industry sampling	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	3	0	0
Poultry, unspecified - Farm - Surveillance (human disease outbreak investigation)	AHVLA/ DARD	Suspect sampling	Official and industry sampling	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	5	0	0
Sheep - Farm - Surveillance (human disease outbreak investigation)	AHVLA/ DARD	Suspect sampling	Official and industry sampling	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	17	0	0
Solipeds, domestic - Farm - Surveillance (human disease outbreak investigation)	AHVLA/ DARD	Suspect sampling	Official and industry sampling	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	16	0	0

	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Cattle (bovine animals) - Farm - Surveillance (human disease outbreak investigation)	0	0

Table VT E. coli in animals

	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Goats - Farm - Surveillance (human disease outbreak investigations)	0	0
Other animals - unspecified - Farm - Surveillance (human disease outbreak investigation) [1)]	0	0
Pet animals, all - Surveillance (human disease outbreak investigation) [2)]	0	0
Pigs - Farm - Surveillance (human disease outbreak investigation)	0	0
Poultry, unspecified - Farm - Surveillance (human disease outbreak investigation)	0	0
Sheep - Farm - Surveillance (human disease outbreak investigation)	0	0
Solipeds, domestic - Farm - Surveillance (human disease outbreak investigation)	0	0

Comments:

[1)] Llama (2), Alpaca (2), wild birds (5)

[2)] Rabbits

Footnote:

The table includes data derived from VTEC O157 outbreak investigations undertaken where an animal- associated source is suspected or monitoring following a recent outbreak. Outbreak settings included an "open farm" and an outbreak with a strong epidemiological association to consumption of watercress where cattle faecal samples were collected from the field adjacent to the watercress beds which had been indentified as a potential source of the contaminated salad (limited sampling carried out)

There were no surveys for pathogenic VTEC in animals carried out in 2013.

2.5 TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1 General evaluation of the national situation

A. Tuberculosis general evaluation

History of the disease and/or infection in the country

The United Kingdom as a whole, is one of several EU Member States not recognized as officially TB free (OTF) under Directive 64/432/EEC, due to the incidence of TB in its national cattle herd.

Great Britain (England, Wales and Scotland)
Bovine tuberculosis (TB) is a serious endemic infectious disease of cattle in GB. The sustained progress achieved in controlling bovine TB in Great Britain throughout the 1950s, 1960s and 1970s by a test and slaughter regime stalled in the mid 1980s. The situation has gradually regressed since then and in the period between 1986 and 2001, the total number of TB herd breakdowns ('incidents') in Great Britain doubled every five years. From July 2003 onwards, this doubling rate has slowed down to every 10 years. There has been a gradual stabilisation of the main bTB incidence and prevalence indicators over the last few years, even though the greater testing effort has resulted in more positive herds being detected (at least until 2012).

The distribution of bovine TB incidents in Great Britain is geographically clustered. Areas of the South West and the West Midlands of England and the South and West of Wales still account for the vast majority of TB breakdowns and test reactors. TB incidents with evidence of infection (herds with OTF status withdrawn due to detection of typical TB lesions and/or isolation of Mycobacterium bovis in laboratory culture) occur sporadically outside those regions, usually as a result of the translocation of infected cattle from areas of endemic TB (cattle movements). Scientific evidence has shown that in the endemic TB areas of Great Britain, the Eurasian badger (Meles meles) constitutes a significant reservoir of infection for cattle.

Scotland was designated an OTF region in October 2009.

Northern Ireland:
The control of bovine TB in cattle in Northern Ireland commenced in the 1920s. The incidence of the disease fell rapidly to very low levels once a compulsory eradication programme was put in place in 1960. Since then the level of the disease has remained low but full eradication has not been achieved. Annual testing has been carried out since 1982 and following that, the incidence fell to a very low level in 1988. From 1996, there was evidence of an increase in disease until 2003 (peak incidence occurred during the spring of 2003: herd incidence = 10.2%; animal incidence = 0.99%). The herd incidence of TB had remained relatively level over 2007-2010 although there was sustained rise during 2011-2012 peaking at 7.46% in October 2012. A reasonably steady decline has been observed since then with annual TB herd and animal incidence sitting at 6.44% and 0.511%, respectively in December 2013.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

The risk of humans contracting TB in the UK from animals is very low due to the pasteurisation of milk, the cattle testing programme and meat inspection at slaughterhouses. Bovine TB is a recognised zoonosis and can cause human infection, however, in recent years, M. bovis has accounted for only approximately

0.5% of all culture-confirmed M. tuberculosis complex diagnoses in humans in the UK annually.

Recent actions taken to control the zoonoses

Consolidated EU hygiene regulations require that raw milk sold for drinking must be from OTF herds. In England and Wales, when the OTF status of a dairy herd is suspended, the Animal Health and Veterinary Laboratories Agency (AHVLA) will notify the Environmental Health Department of the Local Authority, as the body responsible for ensuring that all the milk sold from such herds undergoes pasteurisation. The medical authorities are also informed when the OTF status of a cattle herd of any type is withdrawn. Fewer than 100 dairy cattle herds are registered to produce raw cows' drinking milk in England and Wales and such herds have to be TB tested every year.

Sales to the final consumer of raw cows' drinking milk and cream have been banned in Scotland since 1983. The ban was extended in 2006 to include sheep, goats and buffaloes' milk.

In Northern Ireland, no raw milk is sold for human consumption. Dairy purchasers have routine access to the health status records of their supply herds and are notified when reactors are disclosed. Health authorities are informed of individual cases when there is a significant risk to human health.

Additional information

Under domestic TB legislation, the identification of suspect tuberculous lesions in the carcasses of domestic mammals other than cattle is notifiable to the Animal Health and Veterinary Laboratories Agency/Veterinary Services Northern Ireland. Furthermore, the identification of M. bovis in clinical or pathological specimens taken from any mammal (except humans) must be reported to AHVLA/DARDNI.

During 2013, M. bovis infection was confirmed by culture of the organism from 3 sheep, 4 goats, 22 pigs, 30 alpacas, 3 llamas, 18 domestic cats, 2 domestic dogs, 21 wild/park deer, 3 wild boar and 1 ferret. Some of these isolations (e.g. pigs, camelids) represent incidents involving more than one infected animal from the same holding. In Northern Ireland in 2013, 226 badgers (found dead, including road traffic accidents) were tested and 36 were found positive for M. bovis.

The first documented case of cat-to-human transmission of Mycobacterium bovis has been reported in southern England [PHE]. Previously, the absence of reports of confirmed cat-to-human transmission of M. bovis had led public health practitioners to consider the risk of transmission as negligible. However, as a precaution, human contacts of cats belonging to an unusual cluster of feline cases (Roberts et al., Vet Rec) were offered screening for TB. Active M. bovis disease was diagnosed in two close contacts of one infected cat who developed symptoms 7 months after the death of the cat. One of these had been found to have latent TB on initial screening, but did not have any symptoms at that time. Both are responding to treatment. Molecular typing showed that feline and human M. bovis isolates were indistinguishable. In the absence of any other known risk factors for M. bovis infection, transmission from an infected cat is considered to be the likely source of infection for these two individuals. Screening also identified latent TB infection in two other contacts of infected cats. However, their lack of active disease prevents confirmation of the species of mycobacteria and therefore, the source of their exposure cannot be determined. The overall risk of transmission of M. bovis from cats-to-humans was assessed as very low by the cross-Government Human Animal Infections and Risk Surveillance (HAIRS) group. Guidance has been revised so that household and close contacts of cats with confirmed M. bovis infection will be assessed and receive public health advice, and offered TB screening if deemed necessary.

2.5.2 Tuberculosis, mycobacterial diseases in humans

A. Tuberculosis due to Mycobacterium bovis in humans

Reporting system in place for the human cases

Access to reference laboratories able to differentiate M. bovis and M. tuberculosis exists for all publicly funded human diagnostic microbiology laboratories in the UK. The information collected on notified cases includes site of disease, bacteriology (smear positivity and culture results, including anti-microbial susceptibility), PCR and histology. In addition, outcome information is requested after nine months to one year on all notified cases to confirm the diagnosis, describe treatment outcome, chemotherapy prescribed and the occurrence of any drug reactions or resistance. Hospital diagnostic laboratories send all mycobacterial samples to reference laboratories for differentiation into M. bovis and M. tuberculosis and misclassification is likely to be very rare. Denominator data are not available on the number of persons investigated for tuberculosis or the number of samples cultured for Mycobacteria.

Case definition

Cases are recorded according to the notification system.

Notification system in place

Tuberculosis is notifiable under public health legislation in all countries in UK: notification of clinical cases of pulmonary and non-pulmonary tuberculosis, reporting of mycobacterial isolates from confirmed cases and death certification.

History of the disease and/or infection in the country

The distribution of human cases of M. bovis in the UK has remained similar over the last 15 years and, on average, there are approximately 20 - 50 (typically 40) reported cases per annum. The majority have occurred in older age groups and reflects reactivation of pre-existing infection.

Results of the investigation

Relevance as zoonotic disease

Bovine TB is a recognised zoonosis and can cause human infection. However, less than 1% of all culture-confirmed cases of TB in humans are due to infection with M. bovis and the majority of those cases are due to infection picked up abroad or reactivation in elderly people of latent infection contracted before milk pasteurisation became widespread. Misclassification of cases of M. bovis as M. tuberculosis is believed to be extremely rare. Thus laboratory reports of M.bovis correctly reflect the order of magnitude of the zoonotic problem.

2.5.3 Mycobacterium in animals

A. Mycobacterium bovis in bovine animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

The UK is not officially free (OTF) from TB, however the prevalence of the disease shows wide regional variations and the majority of cattle herds in the UK are OTF. In acknowledgement of the low and stable incidence of tuberculosis in Scottish herds, Scotland became an OTF region of the UK in October 2009 (Commission Decision 2009/761/EC). In order to maintain this status, a number of additional control measures for movements into Scotland were agreed by the UK administrations. New legislation has been put in place to support these arrangements which took effect from 28 February 2010 with the introduction of The Tuberculosis (Scotland) amendment Order 2009.

Free regions

Scotland (Commission Decision 2009/761/EC).

Additional information

The UK, as a country, cannot be considered officially free from TB (OTF) under Directive 64/432/EEC due to the incidence of TB in the national herd. Nevertheless, the majority of individual cattle herds in the UK do have OTF status at any given time.

Monitoring system

Sampling strategy

The TB testing programme applied in the UK follows the principles of Council Directive 64/432/EEC, as amended.

Frequency of the sampling

Great Britain (England, Wales and Scotland):
Compulsory tuberculin testing of cattle herds continued to take place every one to four years according to the proportion of herds in a specific area sustaining a confirmed TB breakdown over the previous two, four or six years. Furthermore, individual herds in two, three and four yearly testing areas may be subject to routine annual testing if they present an increased public or animal health risk (e.g. producer-retailers of raw drinking cows' milk, herds owned by dealers, bull hirers, etc.).

Since 1 January 2010, England has been split into three large, well-defined TB testing areas or zones namely:

1.a core endemic area (counties of the Southwest of England and West Midlands where TB incidence is highest) where all herds are on annual testing;
2.a ³10km-wide 'buffer' zone around the endemic area, where herds are tested every two years, and
3.the remainder of the country where the incidence is very low and the vast majority of herds are tested every 4 years by default, except in the small TB enclave in East Sussex which is on annual testing and also surrounded by a two-year testing buffer.

The three testing areas have been defined on the basis of an annual national review and local assessments of historical TB herd incidence and reflect a decreasing TB epidemiological risk from south-west to north-east of the country. This also ensures that the overall percentage of herds in the annual,

two-yearly and four-yearly testing zones with OTFW breakdowns at the end of the year continues to be aligned with Annex A of Directive 64/432/EEC and that the testing effort and resources are focused where they are likely to make the greatest impact. TB testing intervals for England are reviewed every year. Defra expanded the core annual testing area and the two-yearly testing buffer zone of England in 2011 and 2012.

In Wales, all herds are tested every year.

In Scotland, with OTF status, the testing interval is every four years and some herds are now exempted from routine testing.

Statutory pre-movement testing is carried out on all animals over 42 days of age moving out of herds that are subjected to routine TB testing every year or two (see below).

Northern Ireland:
All cattle herds are tested at least annually. Additional testing is carried out at the animal or herd level on a risk basis.

Methods of sampling (description of sampling techniques)

In the UK, the primary screening test for TB in cattle is the single intradermal comparative cervical tuberculin (SICCT) test, using avian and bovine purified protein derivative (PPD) tuberculins as per Annex B to Directive 64/432/EEC. The interpretation of test results is in line with this Directive, although a more severe interpretation is applied upon confirmation of infection in a herd (OTF status withdrawn). Where inconclusive test reactors (IRs) are disclosed, they are required to be isolated and retested once after 42 days. Any IRs that do not resolve at this retest are classed as reactors and removed to slaughter.

The programme of regular tuberculin herd testing is complimented by veterinary inspection of cattle carcases during routine meat production at slaughterhouses. Where suspicious lesions of TB (granulomas) are detected at routine slaughter they are submitted for laboratory examination. Animals with tuberculous lesions at routine slaughter are traced back to the herd of origin, which is then subjected to tuberculin check testing if no alternative diagnosis is made. Test reactors and contact animals presented for slaughter are subject to post mortem inspection. Lymph node samples or lesions of TB are submitted for laboratory examination. The affected organ or part of the carcase (or the whole carcase if more than one organ is affected) are removed and do not enter the food chain.

All M. bovis isolates are routinely genotyped to inform epidemiological investigation of the spread and origin of TB breakdowns. Strain typing of M. bovis isolates is by spacer oligonucleotide typing (spoligotyping) and by analysis of variable number tandem repeats (VNTR).

Great Britain - England, Wales and Scotland:
The deployment of the ancillary interferon-gamma (IFN-γ) blood test (Bovigam) continued in 2013, to enhance the sensitivity of the cattle testing programme. Since October 2006, the use of the IFN-γ test, in conjunction with the skin test, has been mandatory in certain prescribed circumstances, primarily as an ancillary parallel test in new Officially TB Free status withdrawn breakdowns outside of TB hotspot areas and also for rapid re-testing of animals with two successive IR results in annual or biennial testing areas of England. The blood test is also used occasionally in herds with persistent, confirmed breakdowns in high incidence areas.

Northern Ireland:
Use of the γIFN test continued during 2013. It is mainly used as a voluntary ancillary test to the SICCT in herds where there are significant numbers of intradermal reactors and/or infection is confirmed and its use

allows earlier removal of diseased animals than the SICCT alone.

Case definition

Evidence of M. bovis infection is confirmed in test reactors and direct contact animals by the disclosure of characteristic gross lesions of TB and/or by culture of the bacterium from cattle specimens. In suspect TB cases detected during routine meat inspection, infection is confirmed only if M. bovis can be isolated from the suspect lesions. A confirmed TB incident (OTF status withdrawn breakdown) is one in which at least one animal has been found with post mortem evidence of M. bovis infection.

Vaccination policy

Vaccination of cattle against TB is not carried out in the UK and is expressly forbidden by the domestic animal health legislation, in line with Directive 78/52/EEC.

A Badger Vaccination Grant, to support privately delivered badger vaccination projects in Wales, was established in 2013 and the badger vaccination project in the Intensive Action Area (IAA) completed its second of five years and resulted in the vaccination of 1,352 badgers.

Other preventive measures than vaccination in place

Two badger culling pilot trials in the High Risk Area (in West Somerset and West Gloucestershire) were completed in 2013.

Control program/mechanisms

The control program/strategies in place

Routine tuberculin skin testing and slaughter of any reactors is the mainstay of the TB control programme in the UK. A revised Tuberculosis (England) Order 2007 came into force on 6 April 2007. Among other things, this extended pre-movement testing to all cattle over 42 days of age moving out of one- and two-yearly tested herds in the 60 days prior to movement, although some exemptions apply. Routine TB surveillance tests also qualify as pre-movement tests if the animals are moved within 60 days after that test. Other than these routine tests, pre-movement tests are arranged and paid for by the herd owner.

The Welsh Assembly Government introduced pre-movement testing in Wales on 2 May 2006, amended in 2007 in line with changes in the legislation applying to England.

The Scottish Government introduced compulsory pre- and post-movement testing requirements for Scotland in September 2005. This legislation also requires Scottish keepers to ensure that all cattle over 42 days old, originating from one or two yearly testing parishes, have been pre-movement tested within 60 days prior to movement. Scottish keepers then need to make arrangements to conduct post movement testing of these cattle 60-120 days after arriving on their holding. Following Scotland attaining OFT status in October 2009, there is a requirement for cattle of 42 days of age or more from low incidence areas of England (three and four yearly tested herds) to be tested prior to movement to Scotland unless they have spent their whole lives in low incidence areas or they are being sent direct to slaughter in Scotland.

These Orders retained the obligation to notify the regional offices of the Animal Health Veterinary Laboratories Agency of any suspicion of TB in live cattle and deer and cattle/deer carcases. They also introduced a legal duty to notify of the suspicion of TB in the carcase of any farmed mammal and mammals kept as pets. Furthermore, under the new Orders the identification of M. bovis in clinical or pathological specimens taken from any mammal (except humans) became notifiable in Great Britain.

In Northern Ireland, routine tuberculin skin testing, compulsory purchase and removal of any reactors, movement restrictions and routine carcase inspection of human consumption animals are the mainstays of the TB control programme in Northern Ireland. All cattle herds throughout Northern Ireland are tested

at least annually with over 25% of herd subject to more frequent testing. Failure to test as required results in removal of OTF status. There is no pre-movement testing, except for export if over 42 days of age or where an individual animal has not been tested within 15 months. In Northern Ireland, a herd loses OTF status when lesions typical of TB are disclosed at slaughter or any laboratory test is positive. It will also lose OTF status in any case where more than five skin reactors are disclosed and otherwise where considered epidemiologically necessary.

Recent actions taken to control the zoonoses

Continuation of development and application of the programme.

Measures in case of the positive findings or single cases

In GB, once identified, reactor cattle (and, if necessary, any in-contacts) are valued and compulsorily removed. Compensation is paid to the herd owner according to the age, sex, production type and pedigree status of the slaughtered animal, by reference to a table of average market prices set monthly in 47 different categories of cattle. Slaughtered reactors are subject to post mortem examination by Official Veterinarians for evidence of macroscopic lesions of TB. Tissue specimens are collected for bacteriological culture and molecular typing at the national TB reference laboratory. In herds with multiple reactors only a representative number of carcases may be sampled for bacteriological examination. Movements of cattle on and off affected premises are immediately restricted, except for those animals consigned to slaughter. Restrictions on cattle movements are withdrawn when the herd has undergone a series of tuberculin skin tests at 60-day minimum intervals, with negative results. Any cattle moved out of an infected herd between the last herd test with negative results and the disclosure of reactors are forward traced and tested (if still alive on another holding). Any cattle on holdings adjoining an infected herd are also tuberculin tested to check for lateral spread or exposure to a common environmental source of infection. Back-tracings of the herds of origin of reactors are also undertaken, where appropriate. Six months after the restoration of OTF status, affected herds undergo another tuberculin skin test. If this test is negative, a second skin test takes place 12 months later and, if the results are negative, the herd reverts to the normal testing frequency for the area.

In NI, reactors are individually valued and compulsorily removed to one DARD contracted abattoir. Removed animals are subject to Veterinary Public Health Unit (VS) Ante Mortem Examination and Post Mortem Examination. Appropriate samples are taken for further laboratory examination, including histopathology, culture and VNTR typing. Movements from the herd, except directly to slaughter in NI, are immediately restricted and where considered epidemiologically necessary movements into the herd may also be restricted. A testing regime with an inter-test interval of about 60 days is instigated. Appropriate tracing forwards and backwards and lateral herd risk assessment is carried out with movement controls and testing applied as necessary. Cleansing and disinfection of premises is required. Restoration of OTF status is dependent on completion of the appropriate number of consecutive tests with negative results. Herds are retested after a four to six month interval once OTF status is regained and thereafter annually or more frequently if considered necessary.

Great Britain:
Where inconclusive reactors to tests are detected, they are required to be isolated and retested until their status has been resolved. If positive test reactors are detected, they are removed to slaughter. Lymph node samples or lesions of tuberculosis are submitted for laboratory examination. Where lesions of TB are suspected at routine slaughter, they are also submitted for laboratory examination.

Removal of movement restrictions on herds with OTF status suspended or withdrawn depends on the successful completion of tuberculin skin herd tests with negative results (one herd test if disease in OTF suspended status herd or two consecutive herd tests if infection confirmed - OTF status withdrawn herds). Cleansing and disinfection of the premises with OTF status withdrawn herds is also required. Public health advice is given to the herd keeper and health authorities are informed. Purchasers of bulk milk are advised of application of restrictions to their suppliers.

Movements of animals into and out of a OTF status withdrawn herd prior to the detection of infection are traced using a computerised database. Forward-traced animals and back-traced herds may be placed under movement restriction (OTF status suspended) until appropriate tests have been carried out.

Northern Ireland:
Where inconclusive reactors to tests are detected, the animal is required to be isolated and retested. If the herd has OTF status, the status is changed to OT suspended. The inconclusive reactors are retested once. If, at the retest, the inconclusive reactor is not negative the animal is declared a reactor and is compulsorily removed to slaughter.

Where lesions of TB are suspected at routine slaughter OTF status is suspended (OTS). Lesion material is submitted for laboratory examination. If TB is confirmed the herd becomes OT withdrawn (OTW). If not, remaining negative to laboratory tests for TB, in the absence of an alternative diagnosis, remains OTS.

Movements of cattle off affected premises are immediately restricted, except for animals directly slaughtered in Northern Ireland. Movement restrictions are withdrawn when the herd has undergone the required testing schedule and cleansing and disinfection. One clear herd test is required in the case of disease in OT suspended status herds and two consecutive clear herd tests are required in the case of OT withdrawn status herds.

Where a herd is OTW, forward tracing and appropriate testing is carried out. Back-tracings of reactors are also undertaken, as appropriate. Back-traced herds are placed under movement restriction (OTF status suspended) until appropriate tests have been carried out.

Any cattle on holdings adjoining an infected herd which are considered by the Veterinary Officer dealing with the breakdown to be at increased risk of TB infection are subject to an increased frequency of testing.

Herds are retested after a four to six month interval once OTF status is regained and thereafter annually or more frequently if considered necessary.

Results of the investigation

England and Wales:
In total 84,476 herds in England and Wales had a tuberculin skin test in 2013 (8,216,249 animals). A total of 32,777 positive animals were identified (25,747 test reactors and 1,073 culture-positive slaughterhouse cases in England, and 5,883 test reactors and 74 culture-positive slaughterhouse cases in Wales). A total of 4,737 new breakdowns were detected (c.f. 5,037 in 2012), of which 3,217 resulted in the withdrawal of OTF herd status (c.f. 3,438 in 2012). As in 2012, only 41 of the new OTFW breakdowns occurred in the low risk area of England, where herds are tested every four years. For half (20) of those OTFW breakdowns in the low risk area of England there is conclusive epidemiological evidence showing that they were caused by movements of undetected infected cattle from herds in the annual testing area of GB, without subsequent secondary spread of TB to other herds (i.e. isolated introduced cases). Overall,

46,179 IFN-γ tests were carried out in 2013 in England and Wales

Northern Ireland:
Approximately 22,980 herds were tuberculin tested during 2013 (approx. 1.65 million cattle) and 16,913 IFN-γ tests were carried out in 2013. There were 1,479 new TB herd breakdowns where a skin test reactor was detected in a herd where no reactor animal had been identified in previous 12 months. Overall there were 1,644 herds with confirmed infection in 2013. There was a decrease of 2,626 reactors, or 24% compared with 2012 and there was a decrease of 218 breakdown herds or 12.7% compared to 2012.

National evaluation of the recent situation, the trends and sources of infection

Additional information

Individual herd keepers are given public health advice and the Public Health Authorities are informed of individual cases when there is a significant risk to human health.

Milk from dairy herds under TB restrictions destined for human consumption must undergo heat treatment (pasteurisation). From 1 January 2006, the milk from tuberculin skin (and gamma-interferon) test reactors cannot enter the human food chain according to Regulation (EC) No. 853/2004 of the European Parliament. The local health authorities are notified when M. bovis infection is confirmed in tuberculin reactors or in cattle during routine slaughter where considered a human health risk.

B. Mycobacterium bovis in farmed deer

Monitoring system

Sampling strategy

United Kingdom - Great Britain (England, Scotland, Wales):
Under the Tuberculosis (Deer) Order 1989 (as amended), TB in deer became notifiable in Great Britain on 1 June 1989. Any owner or person in charge of deer is required to notify the presence of affected or suspected animals to the state veterinary service - the Animal Health and Veterinary Laboratories Agency (AHVLA). Under the same order, an AHVLA inspector may require a deer owner or keeper to arrange for TB testing to be undertaken at the owners/keepers expense. Premises on which TB is suspected or confirmed may be put under movement restrictions pending further investigations. However, post mortem, culture and epidemiological investigations from suspected animals are normally undertaken by the Agriculture Departments at public expense.

The Tuberculosis (Deer) Notice of Intended Slaughter and Compensation Order, 1989 came into force on 1 September 1989. It requires owners/keepers to detain deer suspected of having TB pending their slaughter. Following mandatory slaughter, the owner/keeper receives compensation.

There is no compulsory routine tuberculin testing for the approximately 30,000 farmed and 25,000 park deer kept in Great Britain. Any tuberculin testing is limited to deer placed under TB restrictions, mainly following reports of TB in carcases. Therefore, surveillance for TB in deer relies almost exclusively on post mortem inspections of farmed, park and wild deer culled for venison production and ad hoc submissions of wild deer carcases. Live deer intended for export to EC Member States are also tested in the 30 days prior to export, according to EC rules. As with cattle, tuberculin testing of deer is by the SICCT test. All testing of deer, apart from that for imported animals, is carried out at the expense of the owner.

United Kingdom - Northern Ireland
The principle legislation dealing with TB in deer is the Tuberculosis Control Order (Northern Ireland) 1999. Under this legislation, bovine tuberculosis in deer is notifiable in Northern Ireland. Under this legislation, the keeper of a deer must inform the Divisional Veterinary Officer if the deer is affected with TB or suspected of being affected. A veterinary surgeon who identifies or examines an affected deer or a deer suspected of being affected must also inform the Divisional Veterinary Officer. No routine live animal testing is carried out but meat inspection in deer slaughterhouses is carried out by DARD Veterinary Service.

Vaccination policy

Vaccination is not permitted.

Measures in case of the positive findings or single cases

In GB, If lesions suggestive of TB are found in farmed and park deer at slaughter, the herd of origin is back-traced and movements of animals and carcases onto or off the premises are restricted. Affected farmed deer herds are placed under movement restrictions and comparative tuberculin testing is carried out at 120-day intervals until negative results are obtained. In park deer herds, where these testing requirements are almost impossible to fulfil, the premises may remain under permanent restrictions until destocked. Test reactors are compulsorily slaughtered and compensation paid. Tuberculin testing is also carried out on any contiguous cattle premises.

Lesions suggestive of TB found in wild deer by stalkers and huntsmen are sent for bacteriological culture

to identify the causative organism. If M. bovis is isolated, all cattle herds located within 3 km of the tuberculous carcase must undergo tuberculin check testing.

If lesions suggestive of TB are found in farmed and park deer at routine slaughter an additional detailed inspection must be carried out. The following parts and lymph nodes must be examined in detail (if they have not been examined already): the udder (in females); the supramammary/ superficial inguinal nodes; and the prescapular nodes. The affected part(s) of the carcase or the whole carcase may be declared unfit for human consumption. If a TB lesion is in single part/organ and associated lymph nodes that part/organ and lymph nodes are declared unfit for human consumption. If there are localised TB lesions in more than one part/organ or if TB is generalised or if there are TB lesions accompanied by emaciation, the carcase, offal and blood are declared unfit for human consumption.

In NI, BTB found in deer is notified to the local DVO through HQ. Where there is possible contact with cattle herds and a risk of spread exists, relevant action will be taken on the cattle herd as appropriate movement restriction and testing.

Notification system in place

TB in deer is notifiable in Great Britain under the Tuberculosis (Deer) Order 1989 (as amended) and in Northern Ireland under the Tuberculosis Control Order (Northern Ireland) 1999.

National evaluation of the recent situation, the trends and sources of infection

Great Britain:
Due to the persistence of M. bovis infection in cattle and badgers in parts of England and Wales, occasional spillover of infection to other mammals is to be expected. Lesions typical of TB have been observed sporadically in deer in GB for many years. M. bovis infection has been confirmed in five of the six species of wild deer present in the country, with variable frequency depending on the species and geographical area.

Every year about 20% of the national wild deer population is culled, mainly to prevent excessive population growth and damage to crops and woodland. Statutory submissions of deer carcasses with suspect TB lesions suggest that the incidence of bovine TB in wild deer herd is low and localised. Meat inspection of farmed deer provides an additional source of surveillance data to support the view that TB is not widespread in the farmed deer population. Stalkers and deer managers may receive training in carcass inspection and have a statutory obligation to report suspicion of disease to the local AHVLA office.

A field survey of TB prevalence in wild deer in the South-west Peninsula and the Cotswolds (England) in 2006 indicated M. bovis infection was present at a very low prevalence (less than 1%, except in one area where it was present at 3.8% in fallow deer). In the Cotswolds high prevalences were found in two of the three areas sampled (15.9% and 8.1%), particularly in fallow deer (Dama dama). In all areas surveyed, fallow deer were the species most likely to have the highest prevalence of M. bovis infection. It was concluded that, under current conditions of low to moderate density and TB prevalence, the majority of infected wild deer populations in SW England and Wales are most likely to act as spill-over hosts of M. bovis and, unlike badgers, do not pose a significant risk to cattle.

Northern Ireland
There are 3 species of wild or feral deer in Northern Ireland: Dama dama (fallow deer), Cervus nippon (sika deer) and Cervus elaphus (red deer). A proportion of the red deer are enclosed. A survey carried out in 1995, in which deer of the three species were sampled, demonstrated a prevalence of 5.8% (397 deer sampled). A later surveillance exercise carried out in 2009, in which fallow and sika deer were

sampled, revealed a prevalence of 2% (146 deer sampled). However, the low number of deer in NI (less than 3,500 estimated), their restricted range, limited contact with cattle, and the enteric nature of the infection, suggests that their role is likely to be limited if not entirely insignificant.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

No cases have ever been reported in the UK of human M. bovis infection attributable to close contact with tuberculous deer, their carcasses or ingestion of deer meat.

Table Tuberculosis in other animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis
Sheep [1)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	37	3	3	0
Goats [2)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	15	7	7	0
Pigs [3)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	111	39	35	0
Alpacas - Farm - Clinical investigations [4)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	91	35	33	0
Badgers - wild - Natural habitat - Survey (Northern Ireland) [5)]	NRL	Convenience sampling	Official sampling	animal sample > organ/tissue	Domestic	Classification not possible	Animal	226	36	36	0
Cats - pet animals - Veterinary clinics - Clinical investigations [6)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	79	40	22	0
Deer - Clinical investigations (wild and park deer) [7)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	78	27	27	0
Dogs - pet animals - Veterinary clinics - Clinical investigations [8)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	11	4	3	0
Lamas - Farm - Clinical investigations [9)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	4	3	3	0
Pet animals, all - Veterinary clinics - Clinical investigations [10)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	4	1	1	0
Wild boars [11)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	4	3	3	0
Zoo animals, all - Zoo - Clinical investigations [12)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Classification not possible	Animal	5	2	1	0

Table Tuberculosis in other animals

	Mycobacterium spp., unspecified	M. avium complex	M. fortuitum	M. microti
Sheep [1)]	0	0	0	0
Goats [2)]	0	0	0	0
Pigs [3)]	0	2	0	2
Alpacas - Farm - Clinical investigations [4)]	0	0	0	2
Badgers - wild - Natural habitat - Survey (Northern Ireland) [5)]	0	0	0	0
Cats - pet animals - Veterinary clinics - Clinical investigations [6)]	1	1	1	15
Deer - Clinical investigations (wild and park deer) [7)]	0	0	0	0
Dogs - pet animals - Veterinary clinics - Clinical investigations [8)]	0	1	0	0
Lamas - Farm - Clinical investigations [9)]	0	0	0	0
Pet animals, all - Veterinary clinics - Clinical investigations [10)]	0	0	0	0
Wild boars [11)]	0	0	0	0
Zoo animals, all - Zoo - Clinical investigations [12)]	0	1	0	0

Comments:

[1)] Routine meat inspection at slaughterhouses or submission of tissue specimens by state and private veterinarians from suspect tuberculous animals.

[2)] Routine meat inspection at slaughterhouses or submission of tissue specimens by state and private veterinarians from suspect tuberculous animals.

[3)] Routine meat inspection at slaughterhouses or submission of tissue specimens by state and private veterinarians from suspect tuberculous animals.

Table Tuberculosis in other animals

Comments:

[4)] Clinical investigations - submission of carcasses or tissue specimens by state and private veterinarians from suspect tuberculous animals (TB reactors, contacts and suspect clinical cases)

[5)] Wild badgers found dead, including road traffic accidents

[6)] Clinical investigations - submission of diagnostic material or tissue specimens by state and private veterinarians from suspect tuberculous animals (suspect clinical cases)

[7)] Clinical investigations - submission of carcasses or tissue specimens by state and private veterinarians from suspect tuberculous animals disclosed at post mortem examination

[8)] Clinical investigations - submission of diagnostic material or tissue specimens by state and private veterinarians from suspect tuberculous animals (suspect clinical cases)

[9)] Clinical investigations - submission of carcasses or tissue specimens by state and private veterinarians from suspect tuberculous animals (TB reactors, contacts and suspect clinical cases)

[10)] Ferret (3), Rabbit (1), Clinical investigations - submission of diagnostic material or tissue specimens by state and private veterinarians from suspect tuberculous animals (suspect clinical cases).

[11)] Clinical investigations - submission of tissue specimens by state and private veterinarians from suspect tuberculous animals disclosed at post mortem.

[12)] Roan antelope (1), Bennets Wallaby (1), Paca (1), monkey (1), wallaby (1)

Footnote:

NRL = National Reference Laboratory

Table Bovine tuberculosis - data on herds - Community co-financed eradication programmes

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of herds	Total number of herds under the programme	Number of herds checked	Number of positive herds	Number of new positive herds	Number of herds depopulated	% positive herds depopulated	Indicators		
								% herd coverage	% positive herds Period herd prevalence	% new positive herds Herd Incidence
Northern Ireland	24098	24098	23868	1901	1479	8	.42	99.05	7.96	6.2
United Kingdom [1)]	53676	53676	64398	7245	3868	3	.04	119.98	11.25	6.01
Wales	12639	12639	20078	1810	869	2	.11	158.86	9.01	4.33
Total : [2)]	90413	90413	108344	10956	6216	13	.12	119.83	10.11	5.74
Total - 1	92051	92051	109612	10871	6732	22	.2	119.08	9.92	6.14

Comments:

[1)] England

[2)] N.A.

Footnote:

In the table 'United Kingdom' refers to England only. For 2013, data is reported separately for all three countries of the United Kingdom that had co-financed eradication programmes during the year - England, Wales and Northern Ireland. Scotland is an Officially Tuberculosis Free region of the United Kingdom and the data for Scotland are therefore included in the table for countries that do not receive community co-financing for TB eradication programmes.

For Northern Ireland data:
- 'Total number of herds' and 'herds under programme' is based on the number of cattle herds requiring a TB herd test during the year.
- The data for the number of positive herds and new positive herds refers to herds with TB reactors.

For England and Wales data:
- The data includes total number of herd tests, which means that herds may have been tested more than once throughout the year (i.e. 1 CPH = multiple tests).
- The number of positive herds includes both all herds that had their Officially TB Free (OTF) status withdrawn (“OTFW”) or suspended (“OTFS”) at some time during 2013 due to a TB breakdown (i.e. new and ongoing TB breakdowns).
- The figure for the number of herds depopulated includes total depopulations of entire cattle holdings and any partial slaughter of discrete epidemiological groups within an infected holding that were carried out for the

Table Bovine tuberculosis - data on herds - Community co-financed eradication programmes

purposes of controlling outbreaks where the herd's Official TB Free status had been withdrawn.

Table Bovine tuberculosis - data on animals - Community co-financed eradication programmes

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of animals	Number of animals to be tested under the programme	Number of animals tested	Number of animals tested individually	Number of positive animals	Slaughtering		Indicators	
						Number of animals with positive result slaughtered or culled	Total number of animals slaughtered	% coverage at animal level	% positive animals - animal prevalence
Northern Ireland	1587766	1568589	1620056	1620056	8271	8271	9374	103.28	.51
United Kingdom [1)]	5312017	5312017	6272732	6272732	25747	25747	26603	118.09	.41
Wales	1100864	1100864	1943517	1943517	5883	5883	6102	176.54	.3
Total : [2)]	8000647	7981470	9836305	9836305	39901	39901	42079	123.24	.41
Total - 1	8028289	8028289	9446957	9446957	47538	47538	50319	117.67	.5

Comments:

[1)] England

[2)] N.A.

Footnote:

In the table 'United Kingdom' refers to England only. For 2013, data is reported separately for all three countries of the United Kingdom that had co-financed eradication programmes during the year - England, Wales and Northern Ireland. Scotland is an Officially Tuberculosis Free region of the United Kingdom and the data for Scotland are therefore included in the table for countries that do not receive community co-financing for TB eradication programmes.

For Northern Ireland:
- 'Total number of animals' and 'Number of animals under the programme' is based on data derived from the June Agricultural Census.
- 'Number of animals to be tested under the programme' based on the average number of cattle presented at TB herd tests over the last 4 years. The 'number of animals tested is the actual number tested during the year.
- 'Number of positive animals' refers to TB reactors only.
- 'Total number of animals slaughtered' refers to TB reactors, gamma interferon reactors & negative in-contact animals.

For England and Wales:
- 'Number of animals tested' and 'Number of animals tested individually' includes animals which may have been tested and counted more than once and explains why the animal coverage exceeded 100%.
- 'Number of positive animals' and 'Number of animals with positive result slaughtered or culled' include the numbers of skin test reactors, unresolved (twice) inconclusive reactors and gamma interferon blood test

Table Bovine tuberculosis - data on animals - Community co-financed eradication programmes

reactors, regardless of their post-mortem and culture findings.
- 'Total number of animals slaughtered' include, in addition to those in 'Number of positive animals' and 'Number of animals with positive result slaughtered or culled' columns, non-reactor cattle taken as direct contacts to known infected animals in OTFW herd breakdowns and Inconclusive reactors.

Table Bovine tuberculosis - data on status of herds at the end of the period - Community co-financed eradication programmes

If present, the row "Total -1" refers to analogous data of the previous year.

	Status of herds and animals under the programme													
	Total number of herds and animals under the programme		Unknown		Not free or not officially free				Free or officially free suspended		Free		Officially free	
					Last check positive		Last check negative							
Region	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals
Northern Ireland	24098	1568589	0	0	502	90355	793	89002	1443	121409			21360	1267823
United Kingdom [1)]	53677	5312017												
Wales	12639	1100864	0	0	439	38237	0	0	430	37543	306	26653	11464	998521
Total : [2)]	90414	7981470	0	0	941	128592	793	89002	1873	158952	306	26653	32824	2266344
Total - 1	92058	7971034												

Comments:

[1)] England

[2)] N.A.

Footnote:

In the table 'United Kingdom' refers to England only. For 2013, data is reported separately for all three countries of the United Kingdom that had co-financed eradication programmes during the year - England, Wales and Northern Ireland. Scotland is an Officially Tuberculosis Free region of the United Kingdom and the data for Scotland are therefore included in the table for countries that do not receive community co-financing for TB eradication programmes.

For Northern Ireland:
- 'Total number of herds and animals under the programme - Herds' refers to the number of cattle herds requiring a TB herd test during the year.
- 'Total number of herds and animals under the programme - Animals' is based on the average number of cattle presented at TB herd tests over the last 4 years.

For England and Wales:
- Total number of herds under TB-related movement restrictions i.e. herds where OTF status was withdrawn or suspended either because of test reactors or other reasons (for example overdue TB tests) at the end of the reported period.
- 'Last check positive - herds' represents OTFW
- 'Free or officially free suspended - herd' represents OFTS

Table Bovine tuberculosis - data on status of herds at the end of the period - Community co-financed eradication programmes

- 'Free - herds' - represents overdue tests but not under disease restriction (OD).
Data for England currently not available.

Table Bovine tuberculosis in countries and regions that do not receive Community co-financing for eradication programmes

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
Scotland [1)]	12951	1704434	12948	99.98	3	.02	risk based	162550	2470	14	6
Total : [2)]	12951	1704434	12948	99.98	3	.02	N.A.	162550	2470	14	6

Comments:

[1)] Scotland has OTF status and implements a risk-based routine surveillance testing strategy which exempts herds that qualify as 'low risk' from routine four yearly testing, according to an algorithm published on the Scottish Government website. In 2013, 2271 OTF herds were routinely skin tested and a further 1886 OTF herds were exempted from routine testing as 'low risk'.

[2)] N.A.

Footnote:

Since 2009, Scotland has been an Officially Tuberculosis Free region of the UK and is not included in the co-financed bovine TB eradication plan for the UK. The data for the rest of the UK (England, Wales and Northern Ireland) are included in the tables for countries and regions that receive community co-financing for the eradication programme.

2.6 BRUCELLOSIS

2.6.1 General evaluation of the national situation

A. Brucellosis general evaluation

History of the disease and/or infection in the country

Humans:
In England, Wales and Scotland cases of brucellosis in humans usually occur as a result of infection acquired outside the countries. In Northern Ireland infection has been recorded in those whose work may bring them into close contact with infected cattle.

Animals:
Great Britain - England, Wales, Scotland: all livestock in Great Britain are officially free of infection from Brucella abortus, Brucella melitensis, Brucella ovis and Brucella suis. All cattle herds within Great Britain achieved Officially Brucellosis Free (OBF) status for Brucella abortus on 1 October 1985 and Great Britain achieved regional freedom in 1996.

Northern Ireland: Northern Ireland does not have Officially Free status for Brucella abortus, but is officially free of Brucella melitensis, Brucella ovis and Brucella suis.

Brucella melitensis, B. canis, B. ovis and B. suis have never been recorded in United Kingdom.

National evaluation of the recent situation, the trends and sources of infection

During the year 2013, there were no cases of brucellosis of cattle in Great Britain, which has retained its Officially Brucellosis Free Status. There were also no herds detected as infected with Brucella abortus in Northern Ireland during the year. No sheep or goat herds were detected positive for Brucella mellitensis during the annual sheep and goat survey in 2013.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Cases of brucellosis in humans are usually recorded associated with infection acquired outside Great Britain. In Northern Ireland cases of Brucella abortus were occasionally aquired when infection was transmitted by infected cattle.

Additional information

During 2013, a total of 2,135 dogs for export were tested for brucellosis; all were negative. Serology of 289 alpacas, 28 deer, 8 camels, 7 elephants, 1 Vicuna and 4 oryx all for import/export requirements, yielded negative results.

2.6.2 Brucellosis in humans

A. Brucellosis in humans

Reporting system in place for the human cases

Brucellosis notification is not mandatory in the UK, unless believed acquired as a result of occupation. Diagnoses are made by serology or blood culture. Ascertainment of cases is through voluntary reporting of isolations by publicly funded human diagnostic microbiology laboratories (Health Protection Agency, Public Health Wales, Health Protection Scotland and Public Health Agency Northern Ireland). Specialist reference facilities are available.

Case definition

Positive serology or blood culture

Diagnostic/analytical methods used

Serology or blood culture

Notification system in place

See reporting system above.

History of the disease and/or infection in the country

Human brucellosis in Britain has become rare since the introduction in 1967 of a scheme to eradicate the disease in cattle. Most new infections are likely to be acquired abroad although chronic cases of infection acquired in the UK before eradication of Brucella abortus in cattle continue to be reported. In England and Wales the number of indigenously acquired infections has fallen from over 200 a year in the early 1970s to low levels at present. Currently most reports are of Brucella melitensis, which does not occur in the UK sheep/goat population. Most cases occur in people who are believed to have acquired their infections overseas, mainly in Middle Eastern and Mediterranean countries. In Scotland Laboratory reports of human cases have declined from a peak of 400 per year in 1970 to approximately 1 or 2 cases per year. In Northern Ireland, cases of brucellosis are associated with infection in cattle.

2.6.3 Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Free regions

Great Britain is officially free of infection from Brucella abortus. Northern Ireland does not have Officially Free status for Brucella abortus.

Monitoring system

Sampling strategy

Great Britain - England, Wales, Scotland:
Brucellosis is a notifiable disease and there is a statutory surveillance programme for the disease in Great Britain. As in previous years, the principle surveillance system in 2013 was quarterly testing of bulk milk samples from dairy herds by the ELISA test, together with the requirement for notification and investigation of abortions or premature calvings and post import testing. (Since April 2007, beef cattle in England and Wales are no longer routinely blood sampled every 2 years as part of the surveillance programme).

Farmers are legally required to notify the Animal Health and Veterinary Laboratories Agency (AHVLA) of any abortions or premature calvings that take place in their herd under Article 10 of the Brucellosis (England) Order 2000 and equivalent legislation in Wales and Scotland. This applies to both dairy and beef herds. Abortions and premature calvings are investigated by a veterinary surgeon in all beef herds and in some dairy herds based on risk analysis. Samples are taken from aborting animals and those calving prematurely (271 days or less from insemination) and tested both serologically and by culture. If a suspected Brucella organism has been cultured, it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order 1989.

Type of specimen taken

Blood, milk, placental material and swabs as appropriate.

Case definition

Infection is confirmed on culture and isolation of the organism.

Diagnostic/analytical methods used

Serology and culture.

Vaccination policy

Vaccination of animals is not allowed.

Measures in case of the positive findings or single cases

Great Britain - England, Wales, Scotland:
Herds giving positive results to the milk ELISA test are subjected to follow-up investigations by blood testing individual cattle. Cattle sera are tested by a serology indirect ELISA and complement fixation test.

Herd restrictions which stop the movement of animals off the premises, except under the authority of a movement license, are imposed once a reactor is identified (on suspicion). The animal is required to be kept in isolation and slaughtered within 21 days. Other animals on the farm can be sent, under license, to a slaughterhouse, but no other movements are permitted until the incident is resolved. Investigations into contact with contiguous herds are undertaken to assess the risk of the infection spreading. Tracing is carried out and animals which have left the infected herd since the last negative herd test are tested. For confirmed breakdowns in Great Britain, a herd slaughter is usually carried out. All contiguous herds are tested as well as herds with cattle movements to and from the affected herd. Before restrictions can be lifted the premises has to be cleansed and disinfected with an approved disinfectant and subjected to veterinary inspection.

Animals (reactors, infected and contact) are valued before compulsory slaughter. The amount of compensation paid for reactors and contacts is in accordance with a table of values based on the current average market price for the type of animal.
Whenever the Officially Brucellosis Free (OBF) status of a dairy herd is suspended, the Environmental Health Department of the Local Authority is informed so that a heat treatment order may be served to ensure all milk is heat treated before human consumption.

Notification system in place

In Great Britain, notification is required under the Brucellosis (England) Order 2000 and its equivalents in Wales and Scotland. The Zoonoses Order 1989 requires the isolation of Brucella species in any laboratory to be reported to the Competent Authority.

Results of the investigation

Great Britain - England, Wales, Scotland:
During 2013, AHVLA Weybridge tested 39,409 bulk milk samples from 9,667 farms as part of the national surveillance programme. Routine monitoring of cattle abortions and premature calvings was carried out with 5,279 cases investigated during the year. Overall, there were no cases of brucellosis in cattle in Great Britain confirmed during 2013.

National evaluation of the recent situation, the trends and sources of infection

Great Britain - England, Wales, Scotland:
All herds within Great Britain achieved Officially Brucellosis Free (OBF) status on 1 October 1985.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Great Britain - England, Wales, Scotland:
As livestock in Great Britain are officially free of infection from Brucella abortus, Brucella melitensis, Brucella ovis and Brucella suis, they are not regarded as likely sources of new cases of infection in humans. Some cases of chronic human infections may have been acquired from cattle before B. abortus was eradicated.

B. Brucella melitensis in goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

The entire country is free. The UK is officially free of caprine brucellosis. Brucella melitensis has never been recorded in the UK.

Monitoring system

Sampling strategy

A sample of herds is checked each year in the Annual Sheep and Goat survey.

Frequency of the sampling

Annual sampling.

Type of specimen taken

Blood, organ/tissues as appropriate.

Case definition

Isolation of the organism.

Diagnostic/analytical methods used

Microbiological techniques to confirm. Serology to monitor.

Vaccination policy

Vaccination is not permitted.

Results of the investigation

During the year 2013, surveillance for brucellosis was provided by the National Sheep and Goat Survey. 642 blood samples from 183 goat herds in Great Britain and 131 samples from 24 goat hers in Northern Ireland were tested, all with negative results.

In addition, investigations into 18 goat abortions in Great Britain and 4 goat abortions in Northern Ireland, were investigated. All were negative on test for brucellosis.

National evaluation of the recent situation, the trends and sources of infection

The UK remains free of Brucella melitensis.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is no evidence of humans being infected with brucellosis asociated with goats in the UK. Brucella melitensis infection in man is acquired from outside the UK.

C. Brucella melitensis in sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

The entire country is free. Brucella melitensis and Brucella ovis have never been recorded in animals in United Kingdom. The country remains Officially Brucellosis Free.

Monitoring system

Sampling strategy

A sample of herds is checked each year in the Annual Sheep and Goat survey.

Frequency of the sampling

Annual survey.

Type of specimen taken

Blood, organ/tissues as appropriate.

Case definition

Isolation of the organism

Diagnostic/analytical methods used

Microbiological techniques to confirm. Serology to monitor.

Vaccination policy

No vaccination is permitted.

Notification system in place

Brucella in sheep is a notifiable disease under national legislation. Isolation of the organism in a laboratory must also be reported to the Competent Authority under the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991.

Results of the investigation

During 2013, surveillance for freedom from B. melitensis was provided for by the National Sheep and Goat Survey in addition to routine surveillance of samples submitted from cases of abortions.

In the survey, total of 21,353 blood samples from 1,307 flocks were tested in Great Britain, all with negative results. In Northern Ireland, 3,805 animals in 220 flocks were tested, all with negative results

A total of 1155 and 331 sheep abortions were investigated in Great Britain and Northern Ireland, respectively. All were negative on tests for brucellosis.

National evaluation of the recent situation, the trends and sources of infection

The country remains officially brucellosis free. Brucella melitensis and Brucella ovis have never been recorded in animals in United Kingdom.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is no evidence of humans being infected with brucellosis associated with sheep in the UK.

D. B. suis in animal - Pigs

Monitoring system

Sampling strategy

Boars intended for use as donors for artificial insemination are tested for brucellosis. Testing also carried out on pigs for export according to the importer's requirements.

Results of the investigation

During 2013, totals of 3,230 and 1,392 pig samples taken for AI and export were tested in Great Britain and Northern Ireland, all with negative results.

A total of 203 diagnostic submissions in Great Britain and 46 diagnostic submissions in Northern Ireland were tested during the year - all with negative results.

National evaluation of the recent situation, the trends and sources of infection

Brucella suis has never been recorded in animals in the UK.

E. B. abortus in animal - Cattle (bovine animals) - Control programme - mandatory (Northern Ireland)

Monitoring system

Sampling strategy

For veterinary administrative purposes, the province is divided into 10 regions, each with a divisional veterinary office. The regions are sub-divided into "patches", each managed by a veterinary officer (VO) and team of technical officers. A centralised animal health database (Animal and Public Health Information System or APHIS), incorporating an animal movement and test management system is used for all aspects of Brucellosis testing. The animal health database is used to administer between-herd movement of cattle, captured in real-time using a movement document system and with terminals located in markets and abattoirs. The animal movement and test management system facilitates management of herd-level and animal-level tests, with serological results recorded at animal level. Screening for Brucellosis comprises serological testing of eligible cattle, ELISA testing of bulk milk tank samples from dairy herds, pre-movement testing and sampling at slaughter of cattle older than 72 months. Monthly bulk milk sampling commenced in 2001 and all dairy herds were included in the screening programme within the following year. The requirement for pre-movement testing was introduced in December 2004.

The Department of Agriculture and Rural Development for Northern Ireland (DARD) carries out a programme of blood testing of all herds containing breeding stock (and milk testing of all dairy herds). Routine brucellosis blood sampling is carried out on cattle herds in Northern Ireland on an annual basis, with the exception of most dairy herds, which are routinely blood sampled on a biennial basis (with associated monthly bulk milk ELISA testing). The blood samples are tested by means of a serum agglutination test (SAT) in accordance with the techniques described in Annex C of Directive 64/432/EC. If any SAT reading above or equal to 30 iu is detected at this test, the sample is again tested by means of a possible combination of the SAT test, ELISA test and complement fixation test (CFT). Any animal giving an SAT test result of above or equal to 30 iu of agglutination per ml or any CFT reading of < 20 iu is classified as an inconclusive reactor and is required to be isolated and retested. A risk analysis is carried out and if significant risk factors exist, then an ELISA test is requested on subsequent tests. Derestriction of the animal’s movements within the country may occur if the iELISA and CFT results are negative and SAT remains less than 102 iu. Animals with SAT readings of ≥ 102 iu may be taken as reactors, as may animals with CFT readings of ≥ 20 iu. Those with iELISA positive results may be removed, again depending on significant risk factors.

Abortions are required to be notified and a restriction notice is issued for these animals, prohibiting their movement off the premises and requiring them to be isolated. The animals are tested by the DARD Veterinary Service using SAT, CFT and ELISA tests until a negative test at 21 days post-calving is obtained.

Frequency of the sampling

As described in monitoring system above.

Type of specimen taken

blood, milk, vaginal swab, tissues/organ as appropriate

Case definition

Culture and isolation of the organism.

Diagnostic/analytical methods used

Serology and culture.

Vaccination policy

Vaccination policy: Vaccination of animals is not allowed.

Measures in case of the positive findings or single cases

Herd restrictions are imposed once a reactor is identified. The reactor/s is required to be kept in isolation until slaughtered. When the presence of Brucella abortus is confirmed by culture of tissue samples taken at point of slaughter either:
•all breeding and potential breeding animals (reactors, infected and contact) are valued and slaughtered; or
•the breeding animals in the herd are subject to routine testing.

The OBF status of the herd is not restored until at least two clear herd tests have been completed, the last test being at least 21 days after any animals pregnant at the time of the outbreak have calved. In practice, this may mean the restriction and testing of all breeding cattle in a herd through an entire calving cycle.

In the case of reactors and contact animals, compensation is paid to a limit of 75% of the average market value subject to a ceiling based on market returns. When an animal is intended to be slaughtered, the amount of compensation is based on the market value of the animal. The market value is an amount agreed between the competent authority and the owner of the animal. Where agreement cannot be reached the owner has the option to nominate an independent valuer to value the animal. Where either the competent authority or the owner is dissatisfied with the determination of market value they may submit an appeal to an independent panel.

Investigations into contact with contiguous herds are undertaken to assess the risk of spread of infection. Herds of origin, transit herds or other herds considered to be at risk are tested. Forward tracing is carried out and animals which have left the infected herd since the last negative herd test, are tested. Contiguous herds are tested as well as herds with cattle movements to and from the affected herd. Before restrictions can be lifted, the premises has to be cleansed and disinfected with an approved disinfectant and subjected to veterinary inspection.

Notification system in place

Statutory notification of abortions under the Brucellosis Control Order (Northern Ireland) 2004. The isolation of Brucella species in a laboratory is reportable under the Zoonoses Order (Northern Ireland) 1991.

Results of the investigation

In 2013, 22,489 herds were checked. In total, 26 herds were detected positive. Overall, 848,811 animals were tested individually and 32 animals were detected as positive. The annual herd incidence was 0.13% in December 2013 and the annual animal incidence was 0.003% in the same month compared to an annual herd incidence of 0.12% and an annual animal incidence of 0.007% for the same period in 2012.

There have been no confirmed breakdowns since February 2012.

National evaluation of the recent situation, the trends and sources of infection

During the period 1990 to 1996, outbreaks of Brucellosis were sporadic, with significant clustering restricted to the southern part of the province. During 1997, three primary outbreaks resulted in secondary and tertiary spread to more than 60 farms. There was a fall in brucellosis incidence in Northern Ireland from its peak (annual herd incidence of 1.43%) at the start of 2002 to a low point in October 2005 (0.34%).

Subsequently, a rise in herd incidence from October 2005 peaked in October 2006 (0.6%) and then stayed relatively level until autumn 2007 when there was another rise in incidence. There has been a marked decrease in annual herd incidence from the end of 2008 to the end of December 2012, with herd incidence being at the lowest level of the last 10 year period. The culture confirmed herd incidence for 2013 was 0.00%.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

In Northern Ireland, human cases of brucellosis have occurred in the past associated with occupational contact with infected cattle.

Table Brucellosis in other animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Brucella	B. abortus	B. melitensis	B. suis
Pigs [1)]	NRL	Selective sampling	Industry sampling	animal sample > blood	Domestic	Animal	4622	0	0	0	0
Alpacas - Farm - Surveillance [2)]	NRL	Selective sampling	Industry sampling	animal sample > blood	Domestic	Animal	289	0	0	0	0
Deer - Farm - Surveillance [3)]	NRL	Selective sampling	Industry sampling	animal sample > blood	Domestic	Animal	28	0	0	0	0
Dogs - pet animals - Surveillance [4)]	NRL	Selective sampling	Industry sampling	animal sample > blood	Domestic	Animal	2135	0	0	0	0
Zoo animals, all - Zoo - Surveillance [5)]	NRL	Selective sampling	Industry sampling	animal sample > blood	Domestic	Animal	20	0	0	0	0

	Brucella spp., unspecified
Pigs [1)]	0
Alpacas - Farm - Surveillance [2)]	0
Deer - Farm - Surveillance [3)]	0
Dogs - pet animals - Surveillance [4)]	0
Zoo animals, all - Zoo - Surveillance [5)]	0

Comments:

Table Brucellosis in other animals

Comments:

[1)] Import/export testing. Breeding animals at AI centre or clinical diagnostic submission.

[2)] Import/export testing

[3)] Import/export testing

[4)] Import/export testing

[5)] Import/export testing. Oryx (4), elephant (7), Vicuna (1), camels (8)

Footnote:

NRL: National Reference Laboratories

Table Bovine brucellosis - data on herds - Community co-financed eradication programmes

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of herds	Total number of herds under the programme	Number of herds checked	Number of positive herds	Number of new positive herds	Number of herds depopulated	% positive herds depopulated	Indicators		
								% herd coverage	% positive herds Period herd prevalence	% new positive herds Herd Incidence
Northern Ireland	24098	22339	22489	28	26	0	0	100.67	.12	.12
Total : [1)]	24098	22339	22489	28	26	0	0	100.67	.12	.12
Total - 1	25776	25776	22691	23	23	1	4.35	88.03	.1	.1

Comments:

[1)] N.A.

Footnote:

Total number of herds: the number of cattle herds in which cattle were presented at a brucellosis herd test during the last 4 years.
Number of herds checked: herds with a herd level brucellosis test where the number of cattle exceeds 0 (19,696 herds had a herd test where cattle presented for testing)

Table Bovine brucellosis - data on animals - Community co-financed eradication programmes

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of animals	Number of animals to be tested under the programme	Number of animals tested	Number of animals tested individually	Number of positive animals	Slaughtering		Indicators	
						Number of animals with positive result slaughtered or culled	Total number of animals slaughtered	% coverage at animal level	% positive animals - animal prevalence
Northern Ireland	1587766	923179	926166	848811	32	32	35	100.32	0
Total : [1)]	1587766	923179	926166	848811	32	32	35	100.32	0
Total - 1	1625446	919770	938678	879831	64	64	277	102.06	.01

Comments:

[1)] N.A.

Footnote:

Total number of animals:obtained from the June Agricultural census data.
Number of animals to be tested under the programme: based on the average number of catle presented at brucellosis herd tests over the last 4 years.
Percentage coverage at animal level: not equal to 100% because of repeat herd testing and births and deaths throughout the year.

Table Bovine brucellosis - data on status of herds at the end of the period - Community co-financed eradication programmes

If present, the row "Total -1" refers to analogous data of the previous year.

	Status of herds and animals under the programme													
	Total number of herds and animals under the programme		Unknown		Not free or not officially free				Free or officially free suspended		Free		Officially free	
					Last check positive		Last check negative							
Region	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals
Northern Ireland	22339	923179	0	0	3	140	10	187	203	8223			22113	914629
Total : [1)]	22339	923179	0	0	3	140	10	187	203	8223	0	0	22113	914629
Total - 1	25776	919770	0	0	7	1539	15	919	333	12644			25399	904668

Comments:

[1)] N.A.

Footnote:

Total number of herds under the programme: number of cattle herds requiring a brucellosis testing during the year.

Total number of animals under the programme: based on the average number of cattle presented at a brucellosis herd test during the last 4 years.

Table Ovine or Caprine Brucellosis in countries and regions that do not receive Community co-financing for eradication programme

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of suspended herds
United Kingdom	140188	6234752	140188	100	0	0	1734	25931	0	0	0	335	0	0
Total : [1)]	140188	6234752	140188	100	0	0	1734	25931	0	0	0	335	0	0

Comments:

[1)] N.A.

Footnote:

The table gives results of the National Sheep and Goat Survey which is carried out annually and involves sampling nearly 2000 flocks in the UK to confirm disease freedom.

The "number of animals tested with serological blood tests" and the "number of animals examined microbiologically" refers to aborted sheep or goat foetuses examined for Brucella.

Table Bovine brucellosis in countries and regions that do not receive Community co-financing for eradication programme

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk			Information about			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbio logically	Number of animals positive microbio logically
																		Sero logically	BST		
United Kingdom [1)]	77132	8343198	77132	100	0	0	1220	13212	0	9667	39409	0	5279	0	0	0	0	0	0	0	0
Total : [2)]	77132	8343198	77132	100	0	0	1220	13212	0	9667	39409	0	5279	0	0	0	0	0	0	0	0

Comments:

[1)] Great Britain - England, Scotland and Wales

[2)] N.A.

Footnote:

In the table, 'United Kigdom' refers to data from Great Britain - England, Scotland and Wales. Northern Ireland had a community co-financed programme in 2013.

2.7 YERSINIOSIS

2.7.1 General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

National evaluation of the recent situation, the trends and sources of infection

Infection with yersiniosis is not notifiable in humans or animals in the UK.

Human data: A small number of human cases are reported each year on a voluntary basis.

Food: There were no food surveys carried out in 2013.

Animal Data: during the year, there were 83 cases of yersiniosis reported in the UK in animals (11 in Great Britain and 72 in Northern Ireland) from clinical diagnostic samples submitted by private veterinarians to the Animal Health and Veterinary Laboratories Agency, the Scotland's Rural Colleges and the Agri-food and Biosciences Institute. The number of diagnoses is generally small and it is therefore difficult to comment on trends.

Analysis of all incidents of fetopathy in sheep and goats in Great Britain, indicated Yersinia pseudotuberculosis accounted for 0.7% out of a total 907 incidents of all diagnoses of fetopathy investigated during the year.

In 2012, 50 cases, in 2011, 44 cases and in 2010, 23 cases of yersiniosis (including fetopathy) were diagnosed in animals in the UK.

A study to estimate the prevalence of Yersinia, as well as other pathogens, in UK pigs at slaughter was carried out in 2013. A total of 624 carcase swabs and 620 tonsil samples, from 624 pigs, were tested for the presence of Yersinia. After accounting for clustering of pigs within farms, the prevalence of Yersinia was 32.9% (95% CI 28.8-37.0) for tonsil samples, and the prevalence in the carcase swab samples was 1.9% (95% CI 0.8-3.0).

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Transmission usually occurs by ingestion of contaminated food or water and less commmonly by direct contact with infected animals, and rarely from person-to-person spread by the faecal oral route. Y. 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. Y. pseudotuberculosis has been isolated from various species of wild and domestic mammals, birds and reptiles.

2.7.2 Yersiniosis in humans

A. Yersinosis in humans

Reporting system in place for the human cases

Surveillance is based on voluntary laboratory reporting but the extent to which the organism is looked for varies.

Case definition

Confirmed laboratory report

History of the disease and/or infection in the country

In the UK, the annual number of reported cases varied between 32 and 68 from 1998 - 2012, with the highest number of reported cases during any one year being 88 cases reported in 1999.

National evaluation of the recent situation, the trends and sources of infection

There were 55 cases of human yersiniosis reported in 2012, the same number as in 2011. The number of cases reported has remained much the same over recent years, with no obvious trend.

Relevance as zoonotic disease

Yersiniosis in humans is mostly caused by Yersinia enterocolitica, and humans usually acquire infection through food contaminated with the faeces of infected animals.

2.7.3 Yersinia in animals

A. Yersinia enterocolitica in pigs

Monitoring system

Sampling strategy

Animals at slaughter (herd based approach)

A study to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum β-lactamase (ESBL) E. coli in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter coli was carried out in 2013. This was the first UK-wide study of Toxoplasma, HEV, PRRSv and ESBL E. coli in pigs.

The study design was consistent, where possible, with the technical specifications for the EU baseline survey for Salmonella in slaughter pigs (Commission Decision 2006/668/EC), with a target sample size of 600 pigs. In anticipation of non-responses or inadequate samples, a further 10% of pigs were scheduled for sampling.

The study was carried out at the 14 largest abattoirs of the 169 approved premises in the UK who between them process 80% of pigs slaughtered in the UK. Sampling was weighted so that the number of carcases to sample in each of the selected abattoirs was proportional to the throughput of the abattoir. Overall, 654 pigs were scheduled for sampling during the study period.

Frequency of the sampling

Animals at slaughter (herd based approach)

Sampling was scheduled to take place between 14th January 2013 and 12th April 2013. The sampling schedule was randomized so that the day of sampling and the carcase to be sampled on a given day was based on a random selection. The sampling day within each month was randomly chosen from the days the selected slaughterhouse was usually open. The individual carcase to be sampled was randomly chosen from the total number of carcases that the selected slaughterhouse processed daily. The total number of carcases to be sampled was stratified by calendar month.

Type of specimen taken

Animals at slaughter (herd based approach)

Tonsils and a carcass swab

Methods of sampling (description of sampling techniques)

Animals at slaughter (herd based approach)

Samples were collected by trained staff of the Food Standards Agency (FSA) in Great Britain and by the Veterinary Public Health Unit of the Department of Agriculture and Rural Development (DARD) in Northern Ireland. Tonsils were collected at the evisceration point and two carcase swabs at pre-chill. One carcase swab was taken on the left or right side of the carcase using one single sponge for all four sites described in Annex A of Standard ISO 17604 (hind limb, abdomen, mid-dorsal region, jowl). The second carcase swab was taken, using the same sites, but on the opposite side of the carcase. One carcass swab was tested for Salmonella and one for Yersinia.

All samples taken were from carcasses deemed fit for consumption by the Competent Authority. The

exclusion criteria were as follows: any carcase that was totally condemned; animals with a live weight of less than 50kg; animals that had undergone emergency slaughter; and animals kept in the UK for less than 3 months prior to slaughter were excluded from the study.

Diagnostic/analytical methods used

Animals at slaughter (herd based approach)

Yersinia enterocolitica was isolated by the cold enrichment method. A tonsil scrape was added to one universal of Phosphate Buffer Solution (PBS) and a carcase swab was rinsed in PBS to achieve approximately a 10% v/v suspension. In addition, 2ml of a control sample, spiked with 2 to 3 colonies of Y. enterocolitica (NCTC 10460 FD NO. 3067), was added to a universal of PBS (10% v/v) and processed in parallel with each batch of test samples. The samples were stored at 2-8degreesC and sub-cultured weekly; 0.1ml was subcultured onto Yersinia selective agar (Oxoid CIN MED PO0287A) for 3 successive weeks. The plates were incubated at 30degreesC and examined at 24 hours and 48 hours. Identification of Y. enterocolitica was confirmed by colony morphology and biochemical tests (API 20E, Biomerieux).

Any samples that arrived at the testing laboratory more than 96 hours after sample collection were excluded from testing/analysis.

Results of the investigation

Overall, 624 carcase swabs and 620 tonsil samples, from 624 pigs, were tested for the presence of Yersinia. One third (204/620; 32.9%) of the tonsil samples tested positive for Yersinia compared with only 1.9% (12/of 624) of the carcase swabs. For tonsil samples, the prevalence was 32.9% (95% CI 28.8-37.0), after accounting for clustering within farms, and for carcase swabs the prevalence was 1.9% (95% CI 0.8-3.0).

Of the 620 pigs for which both sample types were collected, 10 (1.6%) pigs tested positive in both samples with the remaining 196 (31.6%) pigs testing positive in only one sample. The kappa test confirmed the poor agreement between the sample types (kappa statistic=0.06) with, unsurprisingly, very strong evidence that the tonsils identified significantly more positive pigs than the carcase swabs ($p \leq 0.001$). The proportion of pigs that tested positive for Yersinia in the tonsils was not found to vary significantly between the different months of sampling ($p=0.22$).

The majority of the positive pigs (87.3%) and carcases (91.7%) were infected with Y. enterocolitica. A further 21 (10.3%) of the positive pigs were infected with Y. pseudotuberculosis. After accounting for within-farm clustering, the prevalence of Y. enterocolitica carriage was 28.7% (95% CI 24.8-32.7) whilst the prevalence on carcases was 1.8% (95% CI 0.7-2.8). The prevalence of Y. pseudotuberculosis carriage was 3.4% (95% CI 2.0-4.8). There was no apparent clustering of the less common Yersinia species (Y. frederiksenii/ intermedia, Y. kristensenii and Y. pseudotuberculosis) within a particular geographic region.

Roughly a quarter of the pigs aged <6 months and >12 months were found to carry Yersinia in the tonsils compared to roughly a third of those aged 6-12 months ($p=0.22$). All of the positive carcase swabs were from pigs aged 6-12 months.

The abattoirs participating in the survey processed 80% of the UK pig slaughter throughput; this coverage combined with the randomized sampling approach provides a robust and representative estimates of prevalence.

There are a number of issues to consider when interpreting the data presented in this report. The sampling schedule (the day of sampling and the carcase to be sampled) was randomised, hence for some abattoirs more than one carcase was sampled on a given day which could have resulted in pigs being

sampled from the same farm on the same day. However this only occurred in two instances and would suggest limited clustering of pigs. In addition, all of the prevalence and seroprevalence data presented were adjusted to take into account within-farm clustering.

National evaluation of the recent situation, the trends and sources of infection

The prevalence of Y. enterocolitica carriage was significantly higher in this study compared with the 2003 UK abattoir survey [28.7% (95% CI 24.8-32.7) versus 10.2% (95% CI 8.9–11.5)] and is higher than Y. enterocolitica carriage reported in other studies. However the studies are not directly comparable: in this study, tonsil samples were tested for Yersinia spp. compared to caecal samples in the 2003 survey and higher rates of carriage were found in the 2003 survey during December to May, which includes the sampling timeframe for this study. Therefore the increase seen may be, in part, an artefact of the study design; if sampling had been carried out throughout the year, lower isolation rates may have been observed thus reducing the overall prevalence. The apparent rise in the prevalence of Yersinia should be treated with caution given the lack of a comparable method across the studies. Y. pseudotuberculosis was identified in 10.3% of the positive pigs (3.4% prevalence overall); in a previous study in England by Ortiz Martinez et al. (2010) 18% of the pigs were found to carry Y. pseudotuberculosis.

This is the first time a UK-wide study, representative of the UK pig population, has been undertaken to assess the contamination of carcases with Yersinia. Although over one quarter of the pigs were found to be carrying Y. entercolitica, very few carcases (≤ 2%) were contaminated with this organism.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

The number of confirmed human cases of Y. enterocolitica and other Yersinia spp. in the UK has declined in recent years with 55 confirmed cases in 2012. The number of cases in the UK are low compared to other European countries, probably due to the low consumption of raw pork in the UK (Rosner et al., 2010). Pigs are considered to be the primary reservoir of human pathogenic Y. enterocolitica strains, mainly because of the high prevalence of such strains in pigs and the high genetic similarity between human and porcine isolates. Yersinia was identified in the recent EFSA opinion on meat inspection in pigs as one of the four major public health hazards.

Approximately one quarter of slaughter pigs were found to be infected with Y. enterocolitica, however very few carcases (≤ 2%) were contaminated with this organism. It is encouraging that so few carcases were found to be contaminated with the organism indicating that the processes applied at the abattoir to reduce contamination of the carcases are having a positive effect and are effective in preventing widespread contamination of carcases.

Most Y. enterocolitica types associated with human infections belong to bioserotypes 1B/O:8, 2/O:9, 3/O:3, 4/O:3, and 2/O:5,27. In a previous study of English pigs at slaughter, the most common biotypes of Y. enterocolitica were 2/O:9 (33%) and 2/O:5 (26%) (Ortiz Martinez et al., 2010). Biotyping of the isolates was not undertaken in this study because of the low prevalence and therefore hazard on the carcasses, so the predominant type and range of biotypes cannot be reported.

Additional information

Information on the 2013 slaughterhouse survey of pigs taken from 'Powell et al. (2014) Study of Salmonella, Toxoplasma, Hepatitis E virus, Yersinia, Porcine Reproductive and Respiratory Syndrome virus, antimicrobial resistance in Campylobacter and extended spectrum beta lactamase E. coli in UK pigs at slaughter: OZ0150 final report' (available on Defra website). The project was funded by Defra, the Food Standards Agency, the British Pig Executive, the Veterinary Medicines Directorate, Public Health England and Public Health Wales. We thank Industry for supporting this work and the abattoirs for participating in this study.

Table Yersinia in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Yersinia	Y. enterocolitica	Y. pseudotuberculosis	Yersinia spp., unspecified
Cattle (bovine animals) - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	47	20	12	15
Goats - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	1	0	1
Other animals - unspecified - Clinical investigations [1)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	1	1	0
Other poultry - Farm - Clinical investigations [2)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	0	1	0
Pigs - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	2	0	0
Pigs - Slaughterhouse - Survey - national survey	AHVLA/AFBI	Objective sampling	Official sampling	animal sample > tonsil	Domestic	Animal	620	204	178	21	1
Pigs - Slaughterhouse - Survey - national survey	AHVLA/AFBI	Objective sampling	Official sampling	food sample > carcase swabs	Domestic	Animal	624	12	11	0	1
Sheep - Farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	29	11	15	3

	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified	Y. kristensenii
Cattle (bovine animals) - Farm - Clinical investigations			20	0
Goats - Farm - Clinical investigations			1	0
Other animals - unspecified - Clinical investigations [1)]			1	0

Table Yersinia in animals

	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified	Y. kristensenii
Other poultry - Farm - Clinical investigations [2)]			0	0
Pigs - Farm - Clinical investigations			2	0
Pigs - Slaughterhouse - Survey - national survey			178	4
Pigs - Slaughterhouse - Survey - national survey			11	0
Sheep - Farm - Clinical investigations			11	0

Comments:

[1)] Alpaca (1), Hare (1)

[2)] Partridge (1)

Footnote:

The table includes the results of a national survey of pigs at slaughterhouse carried out to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum β-lactamase (ESBL) E. coli in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter coli. The survey was carried out using, where possible or applicable, the sampling protocols in Commission Decision 2006/668/EC. In total, 624 carcase swabs and 620 tonsil samples were collected from 624 pigs and were tested for the presence of Yersinia. Y.frederiksenii/intermedia were detected in two samples (one from a carcass swab and one from a tonsil sample) but since it is not possible to differentiate these strains using conventional biochemical tests alone, these have been reported as Yersinia spp unspecified.

The table also includes data on diagnoses made from clinical diagnostic material submitted to Government veterinary laboratories. The total units tested are not known because the laboratories do not routinely report negative results, unless the testing is carried out as part of an official control programme or survey.

In Great Britain, the total number of units positive for Yersinia are numbers of recorded incidents. There may be more than one recorded diagnosis in a single incident.

AHVLA = Animal Health and Veterinary Laboratories Agency in Great Britain. Scottish Agricultural College Consulting, Veterinary Services, part of Scotland's Rural Colleges (SRUC), supply data on recorded incidents in Scotland to AHVLA for inclusion in the Veterinary Investigation Diagnostic Analysis (VIDA) System.
AFBI = Agri-Food and Biosciences Institute in Northern Ireland

2.8 TRICHINELLOSIS

2.8.1 General evaluation of the national situation

A. Trichinellosis general evaluation

History of the disease and/or infection in the country

Humans:
There have been no known cases of human trichinosis acquired from infected meat from animals reared in the United Kingdom either in the UK or in other countries that have received meat and meat products from the UK since 1975. Overall, there were no laboratory-confirmed cases of Trichinellosis between 1987 and 1999 in the UK. Ten cases of trichinellosis were diagnosed in England and Wales between 2000 and 2010, which included an outbreak of eight cases in 2000 associated with the consumption of imported pork salami. The remaining 2 cases were travel-related.

Animals:
The last positive diagnosis in pigs in Great Britain was in 1978. In Northern Ireland, the last confirmed case of Trichinellosis in pig meat was in 1979. This case was linked to suspected illegally imported meat.

National evaluation of the recent situation, the trends and sources of infection

There were no human cases of trichinosis reported in England, Wales, Scotland or Northern Ireland in 2013.

There is no evidence to indicate that Trichinella exists in pigs, wild boar or horses in the UK, as shown by the negative results from carcasses that are tested annually.

Pigs, horses and wild boar are routinely monitored for the presence of Trichinella. In the UK in 2013, 423,5516 muscle samples from domestic pigs were examined for Trichinella. In addition, 3,205 horses, 985 farmed wild boar and 105 feral wild boar muscle samples were examined. All samples yielded negative results.

An ongoing survey of Trichinella in foxes is carried out by the Food Standards Agency (FSA) in the United Kingdom. In total, 1,051 samples were examined from January 2013 to December 2013. One sample was detected positive for Trichinella spp.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Trichinosis is a food-borne parasitic disease that is spread primarily by the consumption of raw or undercooked meat products containing larvae of the nematode of the Trichinella spp. Symptoms are associated first with the gastrointestinal tract and later with the muscles as the worm penetrates and develops there. The main source of human infection is raw or undercooked meat products from pigs or wild boar, but meat products from other animals may also be a source (e.g. horse, bear and walrus).

Additional information

From January 2006, enhanced testing for Trichinella, by the EU pepsin digest method, was extended to the domestic slaughter of all boars, sows and farmed wild boar that are processed in a slaughterhouse and feral wild boar processed in an Approved Game Handling Establishment. In 2008, a voluntary programme for testing feral wild boar hunted for own consumption or direct supply was also introduced. Testing of samples is undertaken by laboratories in the slaughterhouse, accredited contract laboratories

or at the accredited contract laboratory appointed by government. All laboratories take part in a laboratory quality assurance programme organised by the National Reference Laboratory.

2.8.2 Trichinellosis in humans

A. Trichinellosis in humans

Reporting system in place for the human cases

Disease caused by Trichinella in humans is not notifiable. Ascertainment of cases is through voluntary reporting of isolations by publicly funded human diagnostic microbiology laboratories.

Case definition

Isolation of the parasite

Notification system in place

The disease is not notifiable in humans in UK

History of the disease and/or infection in the country

No known cases of human trichinellosis acquired from infected meat from animals reared in the UK have been identified since 1975.

There were no laboratory-confirmed cases of Trichinellosis between 1987 and 1999. An outbreak of 8 cases was reported in 2000 and was traced to pork salami sent as a gift from outside the UK. Two further cases, believed to have been acquired overseas, were recorded - one in 2001 and one in 2010.

Results of the investigation

There were no human cases of trichinosis reported in England, Wales, Scotland or Northern Ireland in 2013.

2.8.3 Trichinella in animals

A. Trichinella in horses

Monitoring system

Sampling strategy

Surveillance system:
Regulation (EC) No. 2075/2005 lays down specific rules on official controls for Trichinella in meat. It requires carcases of horses to be sampled in slaughterhouses.

Frequency of the sampling

Every carcase at slaughter

Type of specimen taken

As per legislation. Sample size 5 grams

Case definition

Detection of Trichinella spp. larvae.

Diagnostic/analytical methods used

Digestion method as per the legislation

Results of the investigation including the origin of the positive animals

A total of 3,205 horses were tested at slaughter in 2013. There were no positive findings during the year.

Notification system in place

Notified to the Food Standards Agency and Department of Environment, Food and Rural Affairs (Defra) in Great Britain / Department of Agriculture and Rural Development in Northern Ireland.

National evaluation of the recent situation, the trends and sources of infection

Horses are routinely monitored for the presence of Trichinella at the slaughterhouse. There was no evidence to indicate that trichinellosis existed in the UK horse population in 2013.

B. Trichinella in pigs

Officially recognised regions with negligible Trichinella risk

The UK has applied to be a region with negligible risk from Trichinella. There is no evidence to indicate that Trichinella exists in pigs or wild boar in the UK, as shown by the negative results from carcasses and wildlife that are tested annually.

Monitoring system

Sampling strategy

General

Surveillance system:
Regulation (EC) No. 2075/2005 lays down specific rules on official controls for Trichinella in meat. It also lays down the methods of detection to be used and requires carcases of domestic swine to be sampled in slaughterhouses and tested for the presence of Trichinella as part of the post mortem inspection. Carcasses of horses, wild boar and other farmed and wild animal species susceptible to Trichinella infection are also required to be sampled in slaughterhouses or game handling establishments.

Carcases of domestic swine kept solely for fattening and slaughter can be exempt from testing if they come from a holding or category of holding that has been officially recognised by the Competent Authority as free from Trichinella in accordance with the procedure set down in the Regulation. Systematic testing of all finishing pigs may also be reduced if the country or region can demonstrate that it is an area of negligible risk for Trichinella according to the Regulation.

Frequency of the sampling

General

As per the legislation for sows, boars and wild boar together with a proportion of finishing pigs.

Type of specimen taken

General

As per the legislation. Sample size 1 gram for domesticated pigs, 2 grams for breeding animals and 5 grams for farmed/wild boar.

Methods of sampling (description of sampling techniques)

General

As per the legislation

Case definition

General

Detection of Trichinella spp. larvae.

Diagnostic/analytical methods used

General

From January 2006, testing for Trichinella spiralis, by the EU muscle digest method as per legislation.

Results of the investigation including description of the positive cases and the verification of the Trichinella species

In the UK in 2013, 423,5516 muscle samples from domestic pigs were examined for Trichinella. All samples yielded negative results.

For wild boar - farmed and feral:

Farmed wild boars - UK: 985 tested, 0 positive
Feral wild boars - UK: 105 tested, 0 positive.

Fattening pigs not raised under controlled housing conditions in integrated production system

National evaluation of the recent situation, the trends and sources of infection

Since January 2006 all boars, sows, farmed wild boar processed in a slaughterhouse and feral wild boar processed through an Approved Game Handling Establishment together with a proportion of finishing pigs are routinely monitored for the presence of Trichinella. There was no evidence to indicate that trichinellosis existed in the UK domesticated pig population or the farmed/wild boar population in 2012. The last positive diagnosis in pigs in Great Britain was in 1978. In Northern Ireland, the last confirmed case of Trichinellosis in pig meat was in 1979. This case was linked to suspected illegally imported meat.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

No known cases of human trichinosis acquired from infected meat from animals reared in the United Kingdom have been identified either in the UK or in other countries that have received meat and meat products from the UK since 1975.

There were no human cases reported in England, Wales, Northern Ireland or Scotland in 2011. The last recorded outbreak in the UK, albeit involving imported food, was of eight cases reported in 2000.

Table Trichinella in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Trichinella	T. spiralis	Trichinella spp., unspecified
Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Surveillance [1)]	FSA	Selective sampling	Official and industry sampling	animal sample > organ/tissue	Domestic	Animal	4715	0	0	0
Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Surveillance [2)]	FSA	Selective sampling	Official and industry sampling	animal sample > organ/tissue	Domestic	Animal	552	0	0	0
Solipeds, domestic - horses - Slaughterhouse - Surveillance [3)]	FSA	Census	Official and industry sampling	animal sample > organ/tissue	Domestic	Animal	3205	0	0	0
Foxes - Monitoring [4)]	FSA	Convenience sampling	Official sampling	animal sample > organ/tissue	Domestic	Animal	1051	1	0	1
Pigs - unspecified - Surveillance [5)]	FSA	Selective sampling	Official and industry sampling	animal sample > organ/tissue	Domestic	Animal	4230249	0	0	0
Wild boars - farmed - Slaughterhouse - Surveillance [6)]	FSA	Census	Official and industry sampling	animal sample > organ/tissue	Domestic	Animal	985	0	0	0
Wild boars - wild - Game handling establishment - Surveillance [7)]	FSA	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	105	0	0	0

Comments:

[1)] Sampling strategy: pigs from export establishments and Competent Authority sampling. Official meat inspection and food business operator sampling. Sample size 1gram.

[2)] Sampling strategy: pigs from export establishments and Competent Authority sampling. Official meat inspection and food business operator sampling. Sample size 1gram.

[3)] Official meat inspection. Sample size 5grams

Table Trichinella in animals

Comments:

[4] Sample size:5g sample

[5] Sampling strategy: pigs from export establishments and Competent Authority sampling. Official meat inspection and food business operator sampling. Sample size 1gram.

[6] Official meat inspection. Sample size 5grams

[7] Official meat inspection. Sample size 5grams

Footnote:

FSA= Food Standards Agency
Official veterinarians carrying out meat inspection, report from self-testing establishments in Great Britain. The National Reference Laboratory reports from other approved establishments and provides testing services to the FSA. The Department of Agriculture and Rural Development reports for Northern Ireland. The FSA collates the data for the UK and data from both sources are combined in the prevalence table.

2.9 ECHINOCOCCOSIS

2.9.1 General evaluation of the national situation

A. Echinococcus spp. general evaluation

History of the disease and/or infection in the country

Echinococcus granulosus is present in areas in Scotland, England and Wales. E. multilocularis has not been found in the indigenous UK animal population.

Humans:
The number of indigenously acquired human cases of hydatidosis (E. granulosus) in the UK is usually very low, with an average of one new case identified approximately every five years. Indigenously aquired E. multilocularis infection has not been diagnosed in humans in the UK.

Animals:
In Great Britain, E. granulosus (sheep strain) is present in the sheep and cattle population. Hydatid disease in animals is not notifiable in the UK and the identification of the parasite in animal tissues is not reportable. Identification of the cyst at meat inspection in animal tissues requires the condemnation of all or part of the carcase and/or the offal as may be judged appropriate to the circumstances of the case by an Official Inspector or Official Veterinarian. Meat inspection in all approved slaughterhouses is carried out by or is under the supervision of an Official Veterinarian in Great Britain and the post mortem findings are recorded centrally.

In Northern Ireland, Veterinary Service staff are situated in all meat plants and carry out post mortem inspection of all carcases, including inspection for evidence of hydatid cysts.

E. multilocularis has not been found in indigenous animals in the UK.

National evaluation of the recent situation, the trends and sources of infection

Echinococcus granulosus:
The following figures are reported findings of hydatid disease at post mortem inspection of sheep and cattle for human consumption at licensed abattoirs in the UK during 2013: 2283336 cattle were subject to meat inspection and 2,749 were affected with hydatid cysts (0.12%); 14563539 sheep subject to meat inspection during the year of which 33050 (0.23%) were affected with hydatid cysts, 14665 goats subject to meat inspection during the year of which 2 (0.01%) were affected with hydatid cysts and 5056 horses subject to meat inspection during the year of which 202 (4%) were affected with hydatid cysts.

The impact of the disease on the health of the individual animal is negligible, with only marginal economic losses to the individual farmer from condemnation of affected organs, principally the liver.

Echinococcus multilocularis:
As part of an annual, continuous monitoring programme in wild definitive hosts to demonstrate disease freedom in the UK, faecal samples are collected from Red Foxes (Vulpes vulpes) and tested for the presence of E.multilocularis and E. granulosus. In total in 2013, 362 faecal samples were collected in Great Britain and a further 170 were collected and tested in Northern Ireland. Of the total 532 foxes tested in the UK during the year, all tested negative for E.multilocularis and E. granulosus. These results are supported by previous surveys and give 99.5% confidence that E. multilocularis is not present in the

UK Red Fox population at a prevalence of 1% or greater.

Recent actions taken to control the zoonoses

Echinococcus multilocularis:

Under EU Commission Delegated Regulation (EU) No 1152/2011, which came into force on the 1st January 2012, surveillance of the wild definitive hosts (Red Foxes) is required to demonstrate disease freedom to justify continued preventive health measures to control E. multilocularis infection in dogs and prevent further geographical spread of the parasite to free areas within the EU. That surveillance requires the testing each year of a specified number of foxes randomly sampled from across Great Britain and Northern Ireland.

2.9.2 Echinococcosis in humans

A. Echinococcus spp. in humans

Reporting system in place for the human cases

Disease caused by Echinococcus granulosus in humans is not notifiable. Ascertainment of cases is through voluntary reporting of isolations by publicly funded human diagnostic microbiology laboratories

History of the disease and/or infection in the country

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

Indigenously acquired E. multilocularis infection has not been diagnosed in humans in the UK.

2.9.3 Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Region	Units tested	Total units positive for Echinococcus	E. granulosus	E. multilocularis
Cattle (bovine animals) - Slaughterhouse - Surveillance [1)]	FSA	Census	Official sampling	animal sample	Domestic	Animal	United Kingdom	2283336	2749	0	0
Sheep - Slaughterhouse - Surveillance [2)]	FSA	Census	Official sampling	animal sample	Domestic	Animal	United Kingdom	14563539	33050	0	0
Goats - Slaughterhouse - Surveillance [3)]	FSA	Census	Official sampling	animal sample	Domestic	Animal	United Kingdom	14665	2	0	0
Solipeds, domestic - horses - Slaughterhouse - Surveillance [4)]	FSA	Census	Official sampling	animal sample	Domestic	Animal	United Kingdom	5056	202	0	0
Foxes - wild - Survey - national survey	Defra	Convenience sampling	Official sampling	animal sample > faeces	Domestic	Animal	United Kingdom	532	0	0	0

	Echinococcus spp., unspecified
Cattle (bovine animals) - Slaughterhouse - Surveillance [1)]	2749
Sheep - Slaughterhouse - Surveillance [2)]	33050
Goats - Slaughterhouse - Surveillance [3)]	2
Solipeds, domestic - horses - Slaughterhouse - Surveillance [4)]	202
Foxes - wild - Survey - national survey	0

Table Echinococcus in animals

Comments:

[1)] Official meat inspection.

[2)] Official meat inspection

[3)] Official meat inspection

[4)] Official meat inspection

Footnote:

FSA = Food Standards Agency.
Defra = Department for Environment, Food and Rural Affairs

As part of an annual continuous monitoring programme in wild definitive hosts to demonstrate disease freedom in the UK, Red Foxes (Vulpes vulpes) carcasses are collected and faeces samples taken from these carcasses are tested for the presence of E. multilocularis. In total in 2013, 362 foxes were tested in Great Britain and a further 170 were tested in Northern Ireland

2.10 TOXOPLASMOSIS

2.10.1 General evaluation of the national situation

A. Toxoplasmosis general evaluation

History of the disease and/or infection in the country

An estimated 350,000 people become infected with Toxoplasma each year in the UK, of which 10-20% are symptomatic. Although the clinical signs are usually mild, infection can be associated with serious sequelae including eye disease and disability. People who are immunocompromised and pregnant women newly infected with Toxoplasma are particularly vulnerable; in the latter, miscarriage, stillbirth and deformities of the child can occur. Tissue cysts are highly infectious for humans and other animals and, in addition to direct transmission from cat faeces or material from aborting sheep, undercooked meat has been identified as an important source of human infection.

Toxoplasmosis is only notifiable in humans in Scotland. In the rest of UK, the human cases relate to voluntary laboratory reporting.

In animals in the UK, toxoplasmosis is not notifiable or reportable. In animals, surveillance relates to examination of samples received for diagnostic or monitoring reasons at government veterinary laboratories. Isolates from private laboratories are not reported. Toxoplasmosis is endemic in the UK sheep population.

National evaluation of the recent situation, the trends and sources of infection

Animal Data:
Great Britain (England, Scotland and Wales):
Toxoplasma gondii was the implicated cause in 23.3% of incidents of fetopathy where a diagnosis was reached in sheep and goats in Great Britain in 2013 (n=907). Toxoplasmosis was the third most common cause of fetopathy in sheep in Great Britain during 2013. This is an increase compared to previous years where Toxoplasma abortion accounted for approximately one fifth of all all incidents of fetopathy in sheep and goats where a diagnosis was made, with 18.5% in 2012, 17.8% in 2011, 22.5% in 2010, 23.1% in 2009, and 22.9% in 2008.

During 2013, there were 214 diagnoses of abortion due to toxoplasmosis in sheep and one diagnosis in goats confirmed in Great Britain. The 2013 figures are similar to previous years: 247 recorded diagnoses of abortion due to toxoplasmosis in sheep and one diagnosis in goats in 2012, 145 in sheep and one in goats in 2011, 215 in sheep and one in goats in 2010, 204 in sheep and in one case in goats in 2009 and 201 in sheep with none in goats in 2008. These figures arising from clinical investigations are the number of incidents recorded from 2008 - 2012. An incident is defined as the first diagnosis of a disease from a clinical diagnostic submission from an animal or group of animals on a single premises within a defined period of time.

Serological examinations for Toxoplasma gondii using the latex agglutination test (LAT) are undertaken by the Animal Health and Veterinary Laboratories Agency (AHVLA) on sera submitted to regional diagnostic laboratories. During 2013, 528 (65.3%) of 808 sheep sera received (from 216 separate submissions) tested positive for T. gondii. This compares to 444 (51.3%) positive sera from 864 samples (213 submissions) received in 2012. In goats, 32 (50.0%) of 64 sera (17 separate submissions) tested positive.

None of the 52 pig sera (two separate submissions) tested positive. Five dog sera (two submissions), one alpaca serum and one deer serum all tested negative. These findings provide a summary of the serological status of samples submitted for diagnosis, monitoring and screening purposes during 2013 but do not constitute a structured survey. Positive samples, as defined here, have LAT titres of 1/64 or greater and indicate a history of exposure to this protozoan parasite.

Northern Ireland:
Toxoplasma gondii was not diagnosed as a cause of bovine abortion in Northern Ireland in 2013. T. gondii was diagnosed as the cause of ovine abortion in 66 out of 209 cases (19.9%) in which significant pathogens were detected. In 2013, T. Gondii was identified in 26 cattle sera out of a total of 41 samples submitted. In sheep there were 202 positive samples out of a total of 499 sera submissions. These results are similar to 2012 in cattle but slightly lower in sheep : evidence of T. gondii infection was identified in 25 cattle sera samples out of a total of 34 samples submitted during the year. In sheep, there were 455 positive samples out of a total of 533 sera submissions. In 2011, there were 627 sheep sera tested with 283 identified as positive for T gondii. The increase in the identification of cases of T. gondii infection in 2012 is due to the significant increase in the number of samples submitted to AFBI for diagnostic purposes following abortions. This is attributed to the publicity campaign about the perceived risk of introduction of Schmallenberg virus. Positive samples, as defined for this report, have LAT titres of 1/64 or greater and indicate a history of exposure to parasite.

United Kingdom - survey in pigs at slaughterhouse:
A study to estimate the prevalence of Toxoplasma, as well as other pathogens, in UK pigs at slaughter was carried out in 2013. This was the first UK-wide study of Toxoplasma prevalence in pigs. A total of 620 plasma samples, from 620 pigs were tested for Toxoplasma - after accounting for clustering of pigs within farms, the seroprevalence of Toxoplasma was 7.4% (95% CI 5.3-9.5).

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

The disease may be acquired through the consumption of undercooked infected meat, or food contaminated with cat faeces, or from handling contaminated soil or cat litter trays. A vaccine is available for sheep but not for humans.

Recent actions taken to control the zoonoses

The Control of Substances Hazardous to Health (COSHH) Regulations 2002 require employers and the self employed to assess risks to health from harmful substances, including micro-organisms, and to take steps to prevent or control those risks, and The Management of Health and Safety at Work Regulations 1999 require employers and the self employed to further assess any risks which affect pregnant women.

Updated information on zoonoses and appropriate control measures can be found in HSE Agriculture Information sheet 2 - Common Zoonoses in Agriculture (available at www.HSE.gov.uk/pubns/ais2.pdf). There is also the 1997 publication Infection risks to new and expectant mothers in the workplace - a guide for employers, by the Advisory Committee on Dangerous Pathogens (ref: ISBN 0-7176-1360-7)

2.10.2 Toxoplasmosis in humans

A. Toxoplasmosis in humans

Reporting system in place for the human cases

In England and Wales, disease caused by Toxoplasma gondii in humans is not notifiable. Ascertainment of cases is through voluntary reporting of isolations by publicly funded human diagnostic microbiology laboratories. Most reported cases will be of clinical disease rather than asymptomatic infection. There is currently no formal programme of antenatal or postnatal screening for congenitally acquired Toxoplasma infection in England and Wales. Congenitally acquired Toxoplasma infection or congenital toxoplasmosis are not notifiable under public health regulations.

In Scotland, however, Toxoplasmosis is a notifiable disease.

In Northern Ireland the surveillance system is based on laboratory reports.

History of the disease and/or infection in the country

It is known that voluntary reporting underestimates the level of infection when compared with systematic serosurveys. Seroprevalence is known, from serosurveys, to increase with age and to be higher in rural populations.

National evaluation of the recent situation, the trends and sources of infection

An estimated 350,000 people become infected with Toxoplasma each year in the UK, of which 10-20% are symptomatic.
(Advisory Committee on the Microbiological Safety of Food (ACMSF) (2011). Risk profile in relation to Toxoplasma in the food chain. Available:
http://www.food.gov.uk/multimedia/pdfs/consultation/criskproToxoplasmafoodchain.pdf).

2.10.3 Toxoplasma in animals

A. Toxoplasma in Animals Pigs - Survey - national survey

Monitoring system

Sampling strategy

A study to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum β-lactamase (ESBL) E. coli in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter coli was carried out in 2013. This was the first UK-wide study of Toxoplasma, HEV, PRRSv and ESBL E. coli in pigs.

The study design was consistent, where possible, with the technical specifications for the EU baseline survey for Salmonella in slaughter pigs (Commission Decision 2006/668/EC), with a target sample size of 600 pigs. In anticipation of non-responses or inadequate samples, a further 10% of pigs were scheduled for sampling.

The study was carried out at the 14 largest abattoirs of the 169 approved premises in the UK who between them process 80% of pigs slaughtered in the UK. Sampling was weighted so that the number of carcases to sample in each of the selected abattoirs was proportional to the throughput of the abattoir. Overall, 654 pigs were scheduled for sampling during the study period.

Frequency of the sampling

Sampling was scheduled to take place between 14th January 2013 and 12th April 2013. The sampling schedule was randomized so that the day of sampling and the carcase to be sampled on a given day was based on a random selection. The sampling day within each month was randomly chosen from the days the selected slaughterhouse was usually open. The individual carcase to be sampled was randomly chosen from the total number of carcases that the selected slaughterhouse processed daily. The total number of carcases to be sampled was stratified by calendar month.

Type of specimen taken

One blood sample (EDTA plasma), post bleed, along with the whole heart and whole tongue, were taken for testing. Only the blood sample was tested for the purposes of this survey - the heart and tongue tissue from seropositive pigs have been stored for possible future molecular investigations using nucleic acid amplification testing (NAAT).

Methods of sampling (description of sampling techniques)

Samples were collected by trained staff of the Food Standards Agency (FSA) in Great Britain and by the Veterinary Public Health Unit of the Department of Agriculture and Rural Development (DARD) in Northern Ireland. All samples taken were from carcasses deemed fit for consumption by the Competent Authority. The exclusion criteria were as follows: any carcase that was totally condemned; animals with a live weight of less than 50kg; animals that had undergone emergency slaughter; and animals kept in the UK for less than 3 months prior to slaughter were excluded from the study.

Diagnostic/analytical methods used

The Sabin-Feldman Dye Test was used for serodiagnosis (Reiter-Owonaet al., 1999).

Any samples that arrived at the testing laboratory more than 96 hours after sample collection were

excluded from testing/analysis.

Results of the investigation

Of the 620 pigs for which samples were available for testing, 46 were seropositive giving a seroprevalence of 7.4% (95% CI 5.3-9.5) after accounting for clustering of pigs within farms. The seropositivity of Toxoplasma varied from 5.5% in pigs aged less than 6 months, to 6.6% in those aged between 6 and 12 months, to 11.1% in pigs aged 12 months or older but the difference was not statistically significant (p=0.42).

The abattoirs participating in the survey processed 80% of the UK pig slaughter throughput; this coverage combined with the randomized sampling approach provides a robust and representative estimates of prevalence.

There are a number of issues to consider when interpreting the data presented in this report. The sampling schedule (the day of sampling and the carcase to be sampled) was randomised, hence for some abattoirs more than one carcase was sampled on a given day which could have resulted in pigs being sampled from the same farm on the same day. However this only occurred in two instances and would suggest limited clustering of pigs. In addition, all of the prevalence and seroprevalence data presented were adjusted to take into account within-farm clustering.

National evaluation of the recent situation, the trends and sources of infection

Advisory Committee on the Microbiological Safety of Food (ACMSF) (2011). Risk profile in relation to Toxoplasma in the food chain. Available: http://www.food.gov.uk/multimedia/pdfs/consultation/criskproToxoplasmafoodchain.pdf.

The seroprevalence of Toxoplasma gondii in this study was 7.4% (95% CI 5.3-9.5). As recognised in the ACMSF Toxoplasma risk profile, previous seroprevalence data for UK-reared pigs is sparse. Nevertheless, this figure is comparable with those published several decades ago in which 4-12% of UK pigs tested positive using the Dye Test (Rawal, 1959; McColm et al., 1981; Jackson et al., 1987) and the estimate also falls within the range of recent seroprevalence estimates from other European countries such as the Netherlands, Ireland, Portugal, Italy and Spain.

Seroprevalence had decreased in several European countries from the 1990s due to increasingly intensive management systems, however, as consumer demand for outdoor-reared pork meat is increasing, the prevalence of Toxoplasma may show a parallel increasing trend again due to greater access of pigs to environmental sources of infection. Outdoor farming currently accounts for around 40% of commercial pig breeding herds in the UK. In this survey, only one of the Toxoplasma-positive pigs was recorded as being born outdoors but the information concerning the production system was relatively poorly completed so it was not possible to accurately assess any potential association with seroprevalence. Nevertheless, this survey provides a useful baseline against which to measure future trends in seroprevalence as husbandry practices evolve.

Seropositivity in the human population has been found to vary geographically within the UK, with the highest levels thought to be in Northern Ireland and the lowest in England and Scotland; within GB, seropositivity is generally highest in the west (ACMSF 2011). Porcine seroprevalence might also be expected to vary between regions due to differences in local husbandry practices and geographical or climatic features; all factors that may affect oocyst survival and dispersal. However, no clear spatial heterogeneity was identified in these results. In this study, pigs were sampled during January to May

hence the possible impact of seasonality should be considered. Most of the pigs sampled in this study would have been born in late summer/ early autumn and this may have a bearing on their exposure and sero-status.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

It is difficult to gauge the public health implications of the findings for a number of reasons. Firstly, the correlation between seropositivity and the number of viable cysts of T. gondii in edible tissue has not yet been fully elucidated (ACMSF 2011). In addition, the relative contribution of the foodborne route of transmission to the overall human disease burden, as well as the contribution of different food vehicles, is unknown (ACMSF 2011). Thus, whilst the seroprevalence identified in this survey is considerably lower than that found in a recent survey of sheep in Great Britain, in which 74% of animals tested seropositive (Hutchinson et al., 2011), the significance of this difference to UK consumers is unclear.

The results of this survey provide a nationally representative baseline seroprevalence against which future survey results and the effectiveness of control measures can be monitored. However, a number of other data gaps remain which will be imperative to explore before the scale of the risk posed by pork and pork products can be accurately inferred.

Additional information

Information on the 2013 slaughterhouse survey of pigs taken from 'Powell et al. (2014) Study of Salmonella, Toxoplasma, Hepatitis E virus, Yersinia, Porcine Reproductive and Respiratory Syndrome virus, antimicrobial resistance in Campylobacter and extended spectrum beta lactamase E. coli in UK pigs at slaughter: OZ0150 final report' (available on Defra website). The project was funded by Defra, the Food Standards Agency, the British Pig Executive, the Veterinary Medicines Directorate, Public Health England and Public Health Wales. We thank Industry for supporting this work and the abattoirs for participating in this study.

Table Toxoplasma in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii	Toxoplasma spp., unspecified
Sheep - Farm - Clinical investigations [1)]	AHVLA/ AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Classification not possible	Animal	unknown	416	416	0
Sheep - Farm - Monitoring [2)]	AHVLA	Convenience sampling	Not applicable	animal sample > blood	Domestic	Latex agglutination test (LAT)	Animal	808	528	528	0
Goats - Farm - Clinical investigations [3)]	AHVLA/ AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Classification not possible	Animal	unknown	2	2	0
Goats - Farm - Monitoring [4)]	AHVLA	Convenience sampling	Not applicable	animal sample > blood	Domestic	Latex agglutination test (LAT)	Animal	64	32	32	0
Cattle (bovine animals) - Farm - Clinical investigations (Northern Ireland) [5)]	AFBI	Suspect sampling	Not applicable	animal sample > blood	Domestic	Latex agglutination test (LAT)	Animal	41	26	26	0
Pigs - Slaughterhouse - Survey - national survey [6)]	AHVLA/AFBI	Objective sampling	Official sampling	animal sample > blood	Domestic	Classification not possible	Animal	620	46	46	0

Comments:

[1)] Clinical incidents of toxoplasma abortion. Sample type = abortion material. Diagnostic tests IFAT and/or histopathology

[2)] England and Wales only. Serum samples submitted to regional laboratories. Does not constitute a structured survey.

[3)] Clinical incidents of toxoplasma abortion. Sample type = abortion material. Diagnostic tests IFAT and/or histopathology

[4)] England and Wales only. Serum samples submitted to regional laboratories. Does not constitute a structured survey.

[5)] Northern Ireland only

[6)] Sabin-Feldman Dye Test.

Footnote:

The table includes the results of a national survey of pigs at slaughterhouse carried out to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory

Table Toxoplasma in animals

Syndrome virus (PRRSv) and extended spectrum β-lactamase (ESBL) E. coli in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter coli. The survey was carried out using, where possible or applicable, the sampling protocols in Commission Decision 2006/668/EC.

The table includes data on diagnoses made from clinical diagnostic material submitted to Government veterinary laboratories (AHVLA/AFBI/SRUC). The total units tested are not known because the laboratories do not routinely report negative results unless testing carried out as part of an official control programme or survey.

Serological investigations (convenience sampling) for Toxoplasma gondii using the latext agglutination test (LAT) are undertaken by the AHVLA in England and Wales on serum samples submitted to Government regional laboratories. The findings provide a summary of the serological status of animals from which samples have been submitted for diagnosis, monitoring and screening purposes during the year, but do not constitute a structured survey. Positive samples recorded in the table have LAT titres of 1/64 or greater and indicate a history of exposure to the parasite.

2.11 RABIES

2.11.1 General evaluation of the national situation

A. Rabies general evaluation

History of the disease and/or infection in the country

The United Kingdom is recognised as having rabies free status by the O.I.E.

Human rabies is extremely rare in the UK. The last indigenous human death from classical rabies occurred in 1902. Since 1902, there have been 26 reported cases of human rabies in the UK. Of these, 25 resulted from infection whilst abroad. There was one case of rabies caused by infection with European Bat Lyssavirus type 2 in 2002, which was caused by a bite from an indigenous bat.

The last case of indigenous terrestrial rabies in an animal in the UK was in 1922. Rare cases of rabies in animals in quarantine (the most recent in 2008) have not affected the UK's rabies free status.

In total, nine bats have tested positive for live European Bat Lyssavirus during the passive surveillance programme in Great Britain that has been undertaken since 1987.

National evaluation of the recent situation, the trends and sources of infection

If rabies is suspected on the basis of clinical signs in humans or animals, it is compulsory to notify the relevant government departments and further investigations are carried out.

Humans:
There were no human cases of rabies reported in 2013.

Animals:
In 2013, two cats, six dogs, a rabbit and 27 zoo bats, were submitted for laboratory testing. All these samples tested negative for rabies.

The Animal Health and Veterinary Laboratories Agency (AHVLA) has a longstanding programme of passive scanning surveillance for European Bat Lyssavirus (EBLV) in bats in Great Britain (GB). This programme involves testing dead bats usually submitted by bat workers. Between 1987 and December 2005, the AHVLA tested 5,838 bats for Lyssavirus and in that time, only four cases tested positive for live EBLV. This passive surveillance has continued 2006-2013, with a total of 6448 bats tested. Reduced total numbers tested since 2010 reflect reduced testing of Pipistrelle spp.

A three year active surveillance programme for testing bats for EBLV in England and Scotland took place between 2003-2006. The species targeted were Daubenton's bats in Northern England and Scotland, and Serotines in Southern England. Natterer's and Pipistrelle's bats were also tested in small numbers. This survey identified one (of 273 examined) Serotine bat (Eptesicus serotinus) from southern England to be antibody positive for EBLV1 in 2004. Results indicated a low seroprevalence estimate of EBLV-2 in Britain's Daubenton's bats of about 2%. All oral swabs tested were negative. Preliminary results from ongoing serosurveillance of Daubenton's bats in Northern England suggest a similar, consistently low seroprevalence against EBLV-2.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as

a source of infection)

European Bat Lyssaviruses (EBLVs) are related to rabies virus. These viruses have been known to infect not only the primary hosts (insectivorous bats) but, on very rare occasions, other animal hosts and humans. EBLV 1 and EBLV 2 have been identified in 12 bats species, with over 90% of EBLV 1 identified in serotine bats, with Myotis species (including Daubenton's) associated with EBLV 2. Only EBLV 2 has been detected in the UK.

Recent actions taken to control the zoonoses

Although free of classical rabies for many decades, there is still concern about the disease being reintroduced into the UK by imported animals, mainly pets. Defra follows its generic contingency plan should classical rabies be identified in animals in Great Britain and similar arrangements exist for Northern Ireland. Defra's revised Contingency Plan for Exotic Animal Diseases was laid before Parliament in December 2008. A Rabies Disease Control Strategy is published.

2.11.2 Rabies in humans

A. Rabies in humans

Reporting system in place for the human cases

Rabies is notifiable in humans under public health legislation. If rabies is suspected on the basis of clinical signs, it is compulsory to notify the competent authority and further investigations are carried out. Doctors in the United Kingdom have a statutory duty to notify a proper officer of the local authority in which the case was reported who is then obliged to inform the Centre for Infections Communicable Disease Surveillance Centre (CfI) on behalf of the Office of National Statistics (ONS).

Case definition

The case criteria are based on a clinical picture of acute encephalomyelitis that progresses to coma or death within 10 days and detection of viral antigen in a clinical specimen, identification of neutralising antibody in an unvaccinated person or virus isolation from tissues of the patient.

History of the disease and/or infection in the country

Indigenous human rabies is extremely rare in the UK. The last case of human terrestrial rabies acquired in the UK was in 1902, however occasional travel-related cases do occur. In the last 10 years there have been four cases of human rabies in the UK, all acquired abroad (from Nigeria, Philippines, India and South Africa). The sole exception was a rare case of rabies acquired in the UK, caused by infection with European Bat Lyssavirus type 2 in 2002, which was caused by a bite from an indigenous bat.

National evaluation of the recent situation, the trends and sources of infection

2.11.3 Lyssavirus (rabies) in animals

A. Lyssavirus (rabies) in Animals All animals

Monitoring system

Sampling strategy

If rabies is suspected on the basis of clinical signs in an animal, it is compulsory to notify the relevant government departments and further investigations are carried out. In England, Wales and Scotland, the Animal Health and Veterinary Laboratories Agency (AHVLA) and in Northern Ireland the Department for Agriculture and Rural Development Veterinary Services must be notified.

Type of specimen taken

Organs/tissues: central nervous system tissue

Case definition

Rabies is confirmed if OIE prescribed tests confirm the presence of the rabies virus in the animal's tissues.

Diagnostic/analytical methods used

A number of tests may be used, including Fluorescent Antibody Test (FAT), Tissue culture test (RTCIT), Mouse inoculation test, PCR etc.

Vaccination policy

Vaccination is permitted in the United Kingdom.

Table Rabies in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Region	Units tested	Total units positive for Lyssavirus (rabies)	Rabies virus (RABV)	EBLV-1
Bats - wild - Monitoring - passive	NRL	Suspect sampling	Official sampling	animal sample > brain	Domestic	Animal		320	0	0	0
Bats - zoo animal - Zoo - Surveillance	NRL	Selective sampling	Official sampling	animal sample > brain	Domestic	Animal		27	0	0	0
Cats - pet animals - Surveillance (at quarantine)	NRL	Selective sampling	Official sampling	animal sample > brain	Imported from outside EU	Animal		2	0	0	0
Dogs - pet animals - Surveillance (at quarantine)	NRL	Selective sampling	Official sampling	animal sample > brain	Imported from outside EU	Animal		6	0	0	0

	EBLV-2	Lyssavirus (unspecified virus)
Bats - wild - Monitoring - passive	0	0
Bats - zoo animal - Zoo - Surveillance	0	0
Cats - pet animals - Surveillance (at quarantine)	0	0
Dogs - pet animals - Surveillance (at quarantine)	0	0

2.12 STAPHYLOCOCCUS INFECTION

2.12.1 General evaluation of the national situation

2.13 Q-FEVER

2.13.1 General evaluation of the national situation

A. Coxiella burnetii (Q-fever) general evaluation

History of the disease and/or infection in the country

Humans:
In the UK, most Q fever cases are thought to be associated with exposure to farm animals or farm environments, however the source and route of transmission for most sporadic cases is usually not determined.

Animals:
Q fever is considered an endemic disease in UK livestock. A small number of cases of Q fever associated with abortion in cattle, sheep or goats are diagnosed each year.

National evaluation of the recent situation, the trends and sources of infection

Human disease:
Although Q fever cases in humans are generally considered sporadic, outbreaks were reported in 2006, 2007 and 2011. The annual mean incidence rate of human infection in the UK (based on analysis of data from 1999 to 2008) is around 0.18 cases per 100,000 population/year. Mean annual incidence rates are usually higher in Northern Ireland (1.17 per 100,000/year for the period 1999 - 2008) than in England and Wales (0.14 per 100,000/year) and Scotland (0.37 per 100,000/year). The regional distribution of human cases is similar to the distribution and density of sheep populations, with the majority of cases reported from South West England, Wales, Scotland and Northern Ireland (although there were fewer human cases than might be expected in the northern regions of England).

Animal Disease:
Between three and eight incidents of clinical disease due to Q fever infection in livestock have been reported annually from 2008 - 2013. These are incidents where Q fever is considered to be the cause of abortion in livestock, usually ruminants. In addition, C. burnetii may be detected by PCR in placental or uterine material from submissions where Q fever was not considered to be contributing to the clinical problem of abortion. Such incidents will not be recorded as Q fever abortion under the Veterinary Investigation Diagnostic Analysis (VIDA) system reports, but are still considered of zoonotic interest as the presence of C. burnetii had been confirmed.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

The organism is shed in the urine, faeces, milk and products of parturition of infected ruminants. The organism can survive in the environment for prolonged periods and withstand many disinfectants and extremes of temperature. Humans are usually infected through inhalation of dust or aerosols containing C. burnetii, most frequently at the time of calving, lambing or kidding (including abortion outbreaks) or at slaughter. Farm workers, veterinarians, and abattoir workers have historically been at high risk of

infection, however the source and route of transmission for most sporadic cases is usually not determined. In the UK, cases generally peak during the spring/early summer lambing season when infected animals shed high numbers of organisms during lambing. Other modes of transmission to humans, including tick bites and human to human transmission, are rare. There is a weight of evidence against the foodborne route of transmission for C. burnetii. C. burnetii can be excreted into milk but is destroyed by pasteurisation.

Recent actions taken to control the zoonoses

Recent UK outbreaks and a large outbreak in humans in Europe have raised awareness of the risks of contracting this disease, especially to those exposed to high concentrations of the organism from placenta or birth fluids. Advice to farmers on reducing the risks from infection are highlighted annually by the veterinary and public health aurthorities in the UK. Information for farmers on Q fever infection is available at: http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/QFever/

2.13.2 Coxiella (Q-fever) in animals

A. C. burnetii in animal

Monitoring system

Sampling strategy

Government funded scanning surveillance programmes are delivered by the Animal Health and Veterinary Laboratories Agency (AHVLA), the Scottish Agricultural College Consulting, Veterinary Services (SACCVS) and the Agri-Food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. Through this scanning surveillance programme, a small number of cases of Q fever associated with abortion in cattle, sheep or goats are diagnosed each year.

Frequency of the sampling

Clinical diagnostic samples submitted by private veterinarians during disease investigations. Usually submissions received for investigation of ruminant abortion.

Type of specimen taken

Tissue samples/cotyledons and foetal fluid submitted for clinical diagnosis. Blood samples

Diagnostic/analytical methods used

Routinely using modified Ziehl Nielsen (MZN) stain followed by PCR confirmation. Also ELISA and histopathology.

PCR method: Jones, R.M., Twomey, F., Hannon, S., Errington, J., Pritchard, G.C & Sawyer, J (2010) Detection of Coxiella burnetii in placenta and abortion samples from British ruminants using real-time PCR Veterinary Record 167, 965-967.

ELISA: Horigan, M.W., Bell, M.M., Pollard, T.R., Sayers, A.R & Pritchard, G.C. Q fever diagnosis in domestic ruminants: comparison between Complement Fixation and commercial ELISA tests. Journal of Veterinary diagnostic Investigation.

Vaccination policy

Vaccination for Q fever infection is not generally undertaken in the UK.

Control program/mechanisms

The control program/strategies in place

Advice to farmers on preventing infection is regularly updated and risks from infection are highlighted annually by the veterinary and public health authroties in the UK.

Control of Q fever is aimed primarily at disease surveillance, and also provision of advice on disease control through management and good hygiene measures on farm. Information on Q fever and the updated guidance on measures to avoid infection is available on the Defra, Scottish Government, Welsh Assembly Government, Department for Agriculture and Rural Development, Public Health England and Health and Safety Executive websites. (A leaflet, entitled “Q fever: information for farmers” provides

general advice for farmers and others involved with farm livestock, both for their own personal protection and to reduce health risks to the wider population - available at : http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1210834106356).

Notification system in place

Q fever is not notifiable in animals in the UK. In Northern Ireland, Q fever is a designated organism under the Zoonoses Order (NI) 1991. If found during post mortem, the Agri-Food and Biosciences Institute (AFBI) will notify DARD, and an advisory letter which includes public health advice will be issued to the animals' owner.

Results of the investigation

Overall, there was no evidence of an increase in Q fever in livestock based on submissions to government veterinary laboratories during 2013.

There were three incidents (all in dairy herds) of Q fever abortion in England and Wales confirmed in 2013. There were no confirmed diagnoses in Scotland or Northern Ireland. Diagnoses were made by routine examination of MZN-stained placental smears followed by confirmatory PCR testing or histopathology. In one incident, where six out of a group of 40 heifers had produced still-born full term calves, Coxiella burnetii was the sole pathogen detected. This herd had a history of importing cattle, including a batch of heifers from the Netherlands. In the other two incidents, co-infection with another abortifacient (Neospora caninum in one case, Bacillus licheniformis in the other) was demonstrated. Additionally in a fourth submission, PCR detected the presence of C. burnetii in stomach content from an aborted bovine foetus, but insufficient material was submitted to confirm Q fever as the cause of abortion.

In all cases, the potential zoonotic hazard of Q fever was highlighted to the submitting private veterinary surgeon and the farmer information sheet was provided.

National evaluation of the recent situation, the trends and sources of infection

There were six incidents (three cattle, three goats), involving a total of 8 reported cases, of Q fever abortion in England and Wales confirmed in 2012. There were no confirmed diagnoses in Scotland or in Northern Ireland. In all submissions, Coxiella burnetii was the sole pathogen identified from the abortion investigations. This contrasts to previous years where concurrent co-infections were frequently identified. Of the confirmed cattle incidents, all involved dairy herds where single or multiple abortions had been reported. The three goat submissions, although classified individually as incidents as they occurred on different livestock premises, shared a common epidemiological link to a single farm of breeding goats, with the confirmed Q fever abortion diagnosis occurring within five days of movement of the respective affected animals from this source farm.

There were seven incidents of Q fever abortion reported in 2011 - five incidents were in cattle, two were in sheep. There were 4 incidents of Q fever infection reported in 2010 (two incidents were in cattle, one in sheep and one in goats) and 3 incidents of Q fever infection reported in 2009 (two in cattle, one in goats). These incidents were all reported in Great Britain - there were no recorded incidents of Q fever diagnosis in Northern Ireland during this period.

Survey: A PCR survey using abortion material collected from randomly selected abortion submissions from farms in England and Wales where Q fever was not suspected was carried out in 2010/2011. During 2010, testing of 192 ovine cotyledons, all from different farms, did not reveal any positives which indicates that prevalence in the sample population is less than 1% (95% confidence). During 2011, C. burnetii was detected in nine (7.3%)of the 124 cattle cotyledons and in one of the nine goat samples. C. burnetii was not detected in any of the pig (4) or alpaca (2) samples tested in the survey. This survey highlighted the potential zoonotic risks of C. burnetii infection for people handing bovine abortion material. (Reference: Pritchard GC; Smith RP; Errington J; Hannon S; Jones RM; Mearns R (2011) Prevalence of Coxiella

burnetii in livestock abortion material using PCR. Veterinary Record 169 (15) 391)

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii	No of clinically affected herds
Cattle (bovine animals) - Farm - Clinical investigations [1)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Classification not possible	Animal	unknown	4	4	4

Comments:

[1)] Detection - post mortem and ancillary MZN and PCR test.

Footnote:

The table includes data on diagnoses made from clinical diagnostic material submitted to Government veterinary laboratories. The total units tested are not known because the laboratories do not routinely report negative results, unless the testing is carried out as part of an official control programme or survey.

AHVLA = Animal Health and Veterinary Laboratories Agency in Great Britain. Scottish Agricultural College Consulting, Veterinary Services, part of Scotland's Rural Colleges (SRUC), supply data on recorded incidents in Scotland to AHVLA for inclusion in the Veterinary Investigation Diagnostic Analysis (VIDA) System.
AFBI = Agri-Food and Biosciences Institute in Northern Ireland

2.14 WEST NILE VIRUS INFECTIONS

2.14.1 General evaluation of the national situation

2.14.2 West Nile Virus in animals

A. West Nile Virus in Animals

Monitoring system

Sampling strategy

About 350 birds per year are sampled as part of the UK's West Nile Virus surveillance programe. Sampling is carried out from April to October during the mosquito season. Target species are sampled (small passerines, corvids, waterside birds), birds with neurological signs and mass mortality incidents.

Horses are sampled post import or if clinical suspicion indicates sampling is necessary.

Type of specimen taken

- Wild birds: brain and kidney post mortem. Serum samples from live wild birds.
- Horses: serum samples

Diagnostic/analytical methods used

- Wild birds: WNV real time PCR on brain and kidney (dead birds). WNV cELISA on wild bird serum samples (live birds). WNV TaqMan rtPCR and PanFlavivirus rtRTPCR
- Horses: WNV cELISA on serum samples

Control program/mechanisms

The control program/strategies in place

Annual wild bird surveillance. WNV infection is notifiable in horses in the UK.

Results of the investigation

No West Nile Virus infection detected during the year. In the imported horse, the results of testing were cELISA positive but IgM ELISA negative so this case was considered either a historical infection or cross-reaction with unknown flavivirus

Table West Nile Virus in Animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Vaccination status	Analytical Method	Sampling unit	Region	Units tested	Total units positive for West Nile Virus
Solipeds, domestic - horses - Farm - Clinical investigations [1)]	AHVLA	Suspect sampling	Official sampling	animal sample > blood	Domestic	no	ELISA	Animal	United Kingdom	8	0
Birds - wild - Natural habitat - Surveillance [2)]	AHVLA	Selective sampling	Official sampling	animal sample	Domestic	no	Classification not possible	Animal	United Kingdom	311	0
Solipeds, domestic - Farm - Surveillance (post import testing) [3)]	AHVLA	Suspect sampling	Official sampling	animal sample > blood	Intra EU trade	no	ELISA	Animal	United Kingdom	1	1

Comments:

[1)] cELISA

[2)] Sample type: brain and kidney (dead birds), serum sample (live birds). Analytical method: WNV TaqMan rtPCR and PanFlavivirus rtRTPCR

[3)] cELISA positive, IgM ELISA negative - considered either a historical infection or cross-reaction with unknown flavivirus

Footnote:

The table includes data on the annual wild bird surveillance testing and testing of horses carried out in 2013 in Great Britain.

AHVLA: Animal Health and Veterinary Laboratories Agency in Great Britain

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1 ESCHERICHIA COLI, NON-PATHOGENIC

3.1.1 General evaluation of the national situation

A. Escherichia coli general evaluation

National evaluation of the recent situation, the trends and sources of infection

3.1.2 Antimicrobial resistance in Escherichia coli, non-pathogenic

A. Antimicrobial resistance of E. coli in animal - All animals - Monitoring

Sampling strategy used in monitoring

Frequency of the sampling

A study to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum β-lactamase (ESBL) E. coli in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter coli was carried out in 2013. This was the first UK-wide study of Toxoplasma, HEV, PRRSv and ESBL E. coli in pigs. The Escherichia coli isolates from pigs were tested in accordance with EFSA's recommendations. The survey was carried out from January to April 2013.

Type of specimen taken

Caecum (intact) at the point of evisceration.

Procedures for the selection of isolates for antimicrobial testing

Isolates were selected, tested and reported in accordance with EFSA's recommendations. E. coli were recovered from non-selective culture media (i.e. culture plates for recovery of enterobacteriaceae, without additional antimicrobials).

Laboratory methodology used for identification of the microbial isolates

Isolates were identified as E. coli based on colony morphology and basic biochemical reactions.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

National reference laboratory (AHVLA). E. coli were tested against panels of antimicrobials in accordance with EFSA's recommendations. The antimicrobials tested were ampicillin, cefotaxime, chloramphenicol, ciprofloxacin, nalidixic acid, gentamicin, streptomycin, sulphonamides, tetracyclines and trimethoprim.

Cut-off values used in testing

Testing was performed in accordance with EFSA's recommendations and using epidemiological cut-off values. 'Resistance' is used to refer to microbiological resistance in this section.

Results of the investigation

The total number of E. coli isolates available for examination from pigs was 157. Considering the antimicrobials of particular public health relevance, cefotaxime resistance was observed in 0.6% of isolates and ciprofloxacin resistance in 1.3% of isolates. [The isolate resistant to cefotaxime was not co-resistant to ciprofloxacin]. Considering the other antimicrobials tested, resistance was observed to tetracyclines (67%), sulphonamides (52%), trimethoprim (41%), streptomycin (37%), ampicillin (31%), chloramphenicol (22%) and gentamicin (3%).

3.2 ENTEROCOCCUS, NON-PATHOGENIC

3.2.1 General evaluation of the national situation

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1 CRONOBACTER

4.1.1 General evaluation of the national situation

4.2 HISTAMINE

4.2.1 General evaluation of the national situation

4.3 STAPHYLOCOCCAL ENTEROTOXINS

4.3.1 General evaluation of the national situation

5. FOODBORNE

Foodborne outbreaks are incidences of two or more human cases of the same disease or infection where the cases are linked or are probably linked to the same food source. Situation, in which the observed human cases exceed the expected number of cases and where a same food source is suspected, is also indicative of a foodborne outbreak.

A. Foodborne outbreaks

System in place for identification, epidemological investigations and reporting of foodborne outbreaks

Public Health England has operated a system of surveillance for general outbreaks of infectious intestinal disease (foodborne and non-foodborne) in England and Wales since 1992 and similar systems exist in Scotland and Northern Ireland.

The Centre for Infectious Disease Surveillance and Control of Public Health England, Health Protection Scotland, Public Health Wales and Public Health Agency Northern Ireland receive preliminary reports of general outbreaks of Infectious Intestinal Disease (IID) from laboratories, health authorities or boards and local authority environmental health departments. The appropriate health protection unit/health authority/board is contacted in order to collect a minimum dataset on each outbreak. The investigating consultant is asked to either complete an electronic standardised questionnaire or submit the details online onto a web-based relational database when the outbreak investigation is complete. Completed electronic questionnaires returned to the national surveillance centre are entered onto the web-based relational database. The following data are collected via the questionnaires:
- Health protection unit/health authority/board
- Date of outbreak
- Place of outbreak (hospital, restaurant, school, community etc.)
- Pathogen
- Mode of transmission (Foodborne, person to person, mixed, other)
- Number of cases, admissions to hospital and deaths

For foodborne outbreaks:
- Implicating food vehicle
- Evidence (microbiological, epidemiological)
- Additional data as required by the EFSA technical specifications for food-borne outbreak reporting

The investigation and reporting of foodborne outbreaks within the European Union became mandatory from 2004 (Directive 2003/99/EC). In order to align with the new requirements laid out by the European Food Safety Authority (EFSA) in 2007, as well as modernising the system by enhancing and improving the capture of outbreak information, a stand alone, web-based surveillance system from GSURV: eFOSS (PHE electronic Foodborne and non-foodborne Gastrointestinal Outbreak Surveillance System), commenced in England and Wales in 2009.

Surveillance of general outbreaks of IID provides information on the specific risk factors associated with different pathogens and also trends in the importance of these factors. However the completeness of the surveillance data is mainly dependent on the sensitivity of detecting outbreaks at local level. The ease of identification of outbreaks is associated with the same factors that affect laboratory report surveillance.

The full analysis of outbreak data are often not completed until sometime after the outbreak has finished. From time to time, additional data are collected or specific surveillance studies set up, either nationally or localised, to provide information on certain aspects of a disease outbreak or specific zoonotic pathogen.

In Scotland, surveillance of general outbreaks of Infectious Intestinal Disease is undertaken via ObSurv. This is a voluntary system in which a standard data set is collection on all general outbreaks of infectious intestinal disease. The system does not collect information on outbreaks that affect only a single household.

Description of the types of outbreaks covered by the reporting:

The definitions used in this report are those given in the EFSA Manual for reporting of foodborne outbreaks in accordance with Directive 2003/99/EC for the year 2013.

The UK only reports data for general outbreaks of foodborne infections. A general outbreak is an incident in which two or more people, from more than one household, or residents of an institution, thought to have a common exposure, experience a similar illness or proven infection (at least one of them having been ill). Data on household outbreaks are not included in the 2013 UK dataset. This is because it is considered that household outbreaks will be under-ascertained by comparison with general outbreaks, not all household outbreaks involve acquiring infection in the home and it is considered unlikely in most cases that household outbreaks are verifiable according to the definitions for the purposes of reporting in the Trends and Sources Report.

For previous years, the definitions in the relevant annual EFSA manuals were used. The UK submitted all the foodborne outbreak data as possible outbreaks from 2007 to 2009. The reporting of only "possible" outbreaks was specifically a legal issue - publication of this information in these defined categories made it difficult for the UK authorities to prosecute in instances where the foodborne outbreak was reported as a "possible" outbreak as opposed to a "verified" outbreak. In addition, the legal aspects were not considered consistent with the criteria provided in the Guidance Document.

For 2013 the UK has reported data using the new reporting system for the distinction between outbreaks based on the evidence implicating a foodstuff. Both foodborne outbreaks with weak and strong evidence are reported.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

There were a total of 79 general outbreaks of foodborne infectious disease reported in the UK in 2013. Of these, 65 outbreaks were reported where the strength of the evidence implicating the foodstuff was classified as strong. The annual number of general foodborne outbreaks reported in 2013 was higher than the annual number in 2012 but lower than 2011.

The rise in the number of outbreaks could be due to an increase in outbreaks caused by Campylobacter spp (19/79 in 2013, 7/55 in 2012) and Clostridium Perfringens (16/79 in 2013; 5/55 in 2012). Of the 19 Campylobacter outbreaks and 16 Clostridium Perfringens outbreaks reported in 2013, 16 and 14 outbreaks respectively had strong evidence implicating a food vehicle.

Outbreaks of Campylobacter have increased since 2009 and concurrently Campylobacter is now one of the most frequently implicated causative agent in reported outbreaks representing 24% of all outbreaks. In 2013, as in preceding years, most Campylobacter outbreaks were associated with consumption of undercooked poultry liver pâté or parfait from food service establishments. Clostridium perfringens accounted for 20% (16/79), a 56% increase from the previous year.

Salmonella spp. and norovirus each accounted for 14% (11/79) of the outbreaks, VTEC O157 accounted for 5% (4/79), Listeria monocytogenes accounted for 2.5% (2/79) and Cryptosporidium accounted for only1.2% (1/79). A pooled total of 17 outbreaks accounting for 21.5% of all outbreaks were caused by suspected toxins, viruses, bacteria or unknown organisms.

A total of 2766 people were affected resulting in resulting in 72 hospitalised cases and three deaths. Similar to previous years, outbreaks caused by Salmonella spp. accounted for the majority of people affected (860; 31%) and the highest number of hospitalisations (45; 62%).

There was no regional pattern in the distribution of general foodborne outbreaks. 23 outbreaks were reported in the South of England, 21 in the North of England, 20 in the Midland and East of England, 9 in London and 1 outbreak in Wales. Five outbreaks occurred nationally.

In 2013, a total of five possible foodborne outbreaks were reported in Scotland. One each of E.coli 0157, Salmonella Branderup, Salmonella Mikawsima, Listeria monocytogenes and Scombrotoxin. There were no foodborne outbreaks reported during the year where the strength of the evidence implicating the foodstuff was classified as strong.

There were no recorded general food-borne disease outbreaks in Northern Ireland in 2013 where the strength of the evidence implicating the foodstuff was classified as strong. There was one in 2012 and none in 2011.

Relevance of the different causative agents, food categories and the agent/food category combinations

England and Wales 2013:
Poultry meat was the implicating food vehicle in 32% (25/79) of the outbreaks accounting for the largest proportion. Red meat accounted for the second largest proportion with 23% (18/79). Crustacean & shellfish accounted for 16% (13/79) and composite/mixed foods accounted for 5% (4/79). Vegetables and fruits and other foods were each implicated in 2.5% (2/79) while rice, condiments and sauces, milk/dairy products and potable water were implicated in 1.2% (1/79) of outbreaks each. Eleven outbreaks had no known food vehicle.

Seventy three per cent (14/19) of the Campylobacter outbreaks were caused by poultry meat while 66% (4/6) of the Salmonella spp. outbreaks were caused by red meat.

The evidence implicating a food vehicle in outbreaks included descriptive epidemiology alone in 47% (37/79), analytical epidemiology alone in 19% (15/79), microbiological evidence alone in 9% (7/79), microbiological and analytical evidence in 6% (5/79), microbiological and descriptive evidence in 5% (4/79), analytical and descriptive in 4% (3/79) and all three evidence in 4% (3/79) of the outbreaks. Five outbreaks had no evidence as no food vehicle was implicated.

Relevance of the different type of places of food production and preparation in outbreaks

England and Wales 2013:
Analysis of the data for England and Wales for 2013 indicated that most outbreaks occurred in the food service sector (56%, 44/79) and included restaurants, pubs, hotels, event caterers, etc. The remaining outbreaks occurred in institutional or residential settings (15%; 12/79) such as prisons and nursing homes, retail settings (5%; 4/79) and other foodborne settings (22/79; 28%).

More than one contributory factor may be identified in an outbreak. The contributory factors reported included: inadequate heat treatment (26/79), cross contamination (12/79), unprocessed contaminated ingredient (11/79), infected food handler (7/79), storage too long or too warm (6/79), , , inadequate chilling (6/79), poor personal hygiene (4/79) and poor hand washing facilities (3/79)). Twenty five outbreaks had no identified contributory factor.

Descriptions of single outbreaks of special interest

On 12 September 2013, a local Health Protection Team (HPT) noted a cluster of 3 Salmonella Goldcoast cases with similar sample dates and resident within a 10km radius. During September 2013, 17 cases of Salmonella enterica serotype Goldcoast were reported in England. This was more than expected from previous years, so was investigated as an outbreak.

Forty three cases were identified; these were predominantly male, over 50 and clustered in the South East of England. Whelk consumption was significantly associated with illness in the case-control study. Twenty one cases ate whelks that could be directly traced back to factory X. Factory X was inspected by EHOs and three Remedial Action Notices were served, factory X recalled whelks which were not for further processing. One whelk from factory X was found to contain Salmonella Goldcoast at point-of-sale; environmental samples from factory X were positive for Salmonella Goldcoast. Genetically, the human, whelk and environmental Salmonella Goldcoast isolates were shown to be almost identical.

Epidemiological, environmental, microbiological and food chain evidence support the conclusion that this outbreak was associated with consumption of whelks processed by factory X. Whelks from Factory X were recalled and control measures implemented to ensure that future whelks produced by Factory X will be safe. As a result of this outbreak investigation, the OCT recommend that the lessons learned at factory X are shared with industry and Local Authorities to help prevent similar issues from occurring in other such premises in the future.
(Reference: Inns T, Beasley G, Lane C, Hopps V, Peters T, Pathak K, Perez-Moreno R, Adak G, Shankar A. Outbreak of Salmonella enterica Goldcoast infection associated with whelk consumption, England, June to October 2013; Outbreak Control Team.Euro Surveill. 2013 Dec 5;18(49).)

Table Foodborne Outbreaks: summarised data

	Weak evidence or no vehicle outbreaks					
	Number of outbreaks	Human cases	Hospitalized	Deaths	Strong evidence Number of Outbreaks	Total number of outbreaks
Salmonella - S. Typhimurium	1	6	2	0	4	5
Salmonella - S. Enteritidis	0	0	0	0	2	2
Salmonella - Other serovars	3	116	19	0	3	6
Campylobacter	3	34	0	0	16	19
Listeria - Listeria monocytogenes	1	3	3	0	2	3
Listeria - Other Listeria	0	0	0	0	0	0
Yersinia	0	0	0	0	0	0
Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	2	13	2	0	3	5
Bacillus - B. cereus	0	0	0	0	0	0
Bacillus - Other Bacillus	0	0	0	0	0	0
Staphylococcal enterotoxins	0	0	0	0	0	0
Clostridium - Cl. botulinum	0	0	0	0	0	0
Clostridium - Cl. perfringens	2	15	0	0	14	16

	Weak evidence or no vehicle outbreaks					
	Number of outbreaks	Human cases	Hospitalized	Deaths	Strong evidence Number of Outbreaks	Total number of outbreaks
Clostridium - Other Clostridia	0	0	0	0	0	0
Other Bacterial agents - Brucella	0	0	0	0	0	0
Other Bacterial agents - Shigella	0	0	0	0	0	0
Other Bacterial agents - Other Bacterial agents	0	0	0	0	0	0
Parasites - Trichinella	0	0	0	0	0	0
Parasites - Giardia	0	0	0	0	0	0
Parasites - Cryptosporidium	0	0	0	0	1	1
Parasites - Anisakis	0	0	0	0	0	0
Parasites - Other Parasites	0	0	0	0	0	0
Viruses - Norovirus	5	56	0	0	7	12
Viruses - Hepatitis viruses	0	0	0	0	0	0
Viruses - Other Viruses	0	0	0	0	0	0
Other agents - Histamine	1	10	10	0	0	1
Other agents - Marine biotoxins	0	0	0	0	0	0
Other agents - Other Agents	0	0	0	0	0	0

	Weak evidence or no vehicle outbreaks					
	Number of outbreaks	Human cases	Hospitalized	Deaths	Strong evidence Number of Outbreaks	Total number of outbreaks
Unknown agent	1	8	0	0	13	14

Table Foodborne Outbreaks: detailed data for Campylobacter

Please use CTRL for multiple selection fields

C. jejuni

	Value
FBO Code	2013/38
Number of outbreaks	1
Number of human cases	8
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	Liver, bacon, offal
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/14
Number of outbreaks	1
Number of human cases	23
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver pate.
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: cohort study

C. jejuni

	Value
FBO Code	2013/99
Number of outbreaks	1
Number of human cases	17
Number of hospitalisations	2
Number of deaths	0
Food vehicle	Other, mixed or unspecified poultry meat and products thereof
More food vehicle information	Crispy aromatic duck.
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Cross-contamination
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/35
Number of outbreaks	1
Number of human cases	11
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Milk
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Farm
Place of origin of problem	Farm
Origin of food vehicle	Domestic
Contributory factors	Other contributory factor
Mixed Outbreaks (Other Agent)	Cryptosporidium spp.
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/79
Number of outbreaks	1
Number of human cases	23
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Several different chicken dishes.
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: case-control study

Campylobacter spp., unspecified

	Value
FBO Code	2013/93
Number of outbreaks	1
Number of human cases	12
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver pate.
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: cohort and case control study

C. jejuni

	Value
FBO Code	2013/63
Number of outbreaks	1
Number of human cases	22
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Various chicken dishes.
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Residential institution (nursing home or prison or boarding school)
Place of origin of problem	Residential institution (nursing home or prison or boarding school)
Origin of food vehicle	Unknown
Contributory factors	Cross-contamination
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/127
Number of outbreaks	1
Number of human cases	56
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver parfait.
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Others
Place of origin of problem	Others
Origin of food vehicle	Unknown
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: case control study. Other contributory factors: inadequate heat treatment.

Campylobacter spp., unspecified

	Value
FBO Code	2013/152
Number of outbreaks	1
Number of human cases	46
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Turkey meat and products thereof
More food vehicle information	Turkey
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/87
Number of outbreaks	1
Number of human cases	9
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver pate.
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/125
Number of outbreaks	1
Number of human cases	3
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Other, mixed or unspecified poultry meat and products thereof
More food vehicle information	Duck bon bons
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/40
Number of outbreaks	1
Number of human cases	28
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver pate.
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/100
Number of outbreaks	1
Number of human cases	34
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver parfait.
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: cohort study Other contributary factors: inadequate heat treatment, inadequate chilling, storage time/ temperature abuse.

Campylobacter spp., unspecified

	Value
FBO Code	2013/136
Number of outbreaks	1
Number of human cases	13
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver parfait.
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: cohort study.

Campylobacter spp., unspecified

	Value
FBO Code	2013/102
Number of outbreaks	1
Number of human cases	5
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Cicken liver pate
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2013/154
Number of outbreaks	1
Number of human cases	30
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver pate
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Others
Place of origin of problem	Others
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: cohort and case-control study

Table Foodborne Outbreaks: detailed data for Clostridium

Please use CTRL for multiple selection fields

C. perfringens

	Value
FBO Code	2013/90
Number of outbreaks	1
Number of human cases	17
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	Roast beef
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

C. perfringens

	Value
FBO Code	2013/145
Number of outbreaks	1
Number of human cases	13
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	Roast beef joint
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Residential institution (nursing home or prison or boarding school)
Place of origin of problem	Residential institution (nursing home or prison or boarding school)
Origin of food vehicle	Domestic
Contributory factors	Inadequate chilling
Mixed Outbreaks (Other Agent)	
Additional information	

C. perfringens

	Value
FBO Code	2013/80
Number of outbreaks	1
Number of human cases	26
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken bhuna curry
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Take-away or fast-food outlet
Place of origin of problem	Take-away or fast-food outlet
Origin of food vehicle	Unknown
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	CAMPYLOBACTER SPP. AND ENTEROBACTERIACEAE
Additional information	Other contributory factors: cross contamination, other

C. perfringens

	Value
FBO Code	2013/15
Number of outbreaks	1
Number of human cases	30
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Thai green chicken curry
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: detection in food vehicle and analytical epidemiological evidence (cohort study)

C. perfringens

	Value
FBO Code	2013/34
Number of outbreaks	1
Number of human cases	19
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	Cooked beef meat
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	MICROBIOLOGICAL-DETECTION IN FOOD VEHICLE & ENVIRONMENTAL SAMPLES

C. perfringens

	Value
FBO Code	2013/33
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Meat and meat products
More food vehicle information	Cicken, turkey and ox liver pate
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Mobile retailer or market/street vendor
Place of origin of problem	Mobile retailer or market/street vendor
Origin of food vehicle	Unknown
Contributory factors	Cross-contamination
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: detection in food vehicle and descriptive epidemiological evidence.

C. perfringens

	Value
FBO Code	2013/24
Number of outbreaks	1
Number of human cases	19
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken curry.
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Residential institution (nursing home or prison or boarding school)
Place of origin of problem	Residential institution (nursing home or prison or boarding school)
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

C. perfringens

	Value
FBO Code	2013/55
Number of outbreaks	1
Number of human cases	116
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Buffet meals
More food vehicle information	Split peas tarka dhal and mixed vegetable curry
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: detection in food vehicle and descriptive epidemiological evidence and analytical epidemiological evidence (cohort study). Other contributory factors: inadequate chilling, cross contamination.

C. perfringens

	Value
FBO Code	2013/50
Number of outbreaks	1
Number of human cases	7
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	Beef joint
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Residential institution (nursing home or prison or boarding school)
Place of origin of problem	Residential institution (nursing home or prison or boarding school)
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

C. perfringens

	Value
FBO Code	2013/49
Number of outbreaks	1
Number of human cases	14
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	Beef joint
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Residential institution (nursing home or prison or boarding school)
Place of origin of problem	Residential institution (nursing home or prison or boarding school)
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

C. perfringens

	Value
FBO Code	2013/21
Number of outbreaks	1
Number of human cases	150
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken balti dish.
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	School or kindergarten
Place of origin of problem	School or kindergarten
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: cohort study.

C. perfringens

	Value
FBO Code	2013/135
Number of outbreaks	1
Number of human cases	45
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken biryani
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Household
Place of origin of problem	Household
Origin of food vehicle	Unknown
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: detection in food vehicle, analytical epidemiological evidence (cohort study).

C. perfringens

	Value
FBO Code	2013/109
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	Pork sandwiches
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Mobile retailer or market/street vendor
Place of origin of problem	Mobile retailer or market/street vendor
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Other contributory factors: inadequate chilling, storage time/ temperature abuse

C. perfringens

	Value
FBO Code	2013/89
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	Pork steaks
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Residential institution (nursing home or prison or boarding school)
Place of origin of problem	Residential institution (nursing home or prison or boarding school)
Origin of food vehicle	Unknown
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Escherichia coli, pathogenic

Please use CTRL for multiple selection fields

Verotoxigenic E. coli (VTEC) - VTEC O157

	Value
FBO Code	2013/153
Number of outbreaks	1
Number of human cases	6
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Vegetables and juices and other products thereof
More food vehicle information	Pre-packed watercress
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Others
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic
Contributory factors	Other contributory factor
Mixed Outbreaks (Other Agent)	
Additional information	VTEC O157 PT2, VT2 Nature of evidence: detection in food vehicle and descriptive epidemiological evidence

Verotoxigenic E. coli (VTEC) - VTEC O157

	Value
FBO Code	2013/101
Number of outbreaks	1
Number of human cases	22
Number of hospitalisations	8
Number of deaths	0
Food vehicle	Vegetables and juices and other products thereof
More food vehicle information	Pre-packed watercress
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Others
Place of origin of problem	Mobile retailer or market/street vendor
Origin of food vehicle	Domestic
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	VTEC O157 PT2, VT2 Nature of evidence: descriptive epidemiological evidence and case- control study

Verotoxigenic E. coli (VTEC) - VTEC O157

	Value
FBO Code	2013/74
Number of outbreaks	1
Number of human cases	3
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	Beef burgers
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Others
Place of origin of problem	Others
Origin of food vehicle	Unknown
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	Other contributory factors: inadequate heat treatment

Table Foodborne Outbreaks: detailed data for Listeria

Please use CTRL for multiple selection fields

L. monocytogenes - L. monocytogenes, unspecified

	Value
FBO Code	2013/149
Number of outbreaks	1
Number of human cases	4
Number of hospitalisations	4
Number of deaths	1
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Crab meat
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Mobile retailer or market/street vendor
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic
Contributory factors	Cross-contamination
Mixed Outbreaks (Other Agent)	
Additional information	LISTERIA MONOCYTOGENES fAFLP V.3 Nature of evidence: detection in food vehicle and in environment, descriptive epidemiological evidence.

L. monocytogenes - L. monocytogenes, unspecified

	Value
FBO Code	2013/148
Number of outbreaks	1
Number of human cases	3
Number of hospitalisations	3
Number of deaths	1
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Crab meat
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Mobile retailer or market/street vendor
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic
Contributory factors	Inadequate chilling
Mixed Outbreaks (Other Agent)	
Additional information	LISTERIA MONOCYTOGENES fAFLP I.72. Nature of evidence: detection in food vehicle and descriptive epidemiological evidence. Other contributory factors: cross contamination

Table Foodborne Outbreaks: detailed data for Parasites

Please use CTRL for multiple selection fields

Cryptosporidium - Hominis

	Value
FBO Code	2013/57
Number of outbreaks	1
Number of human cases	39
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Tap water, including well water
More food vehicle information	Municiple public water
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Disseminated cases
Place of origin of problem	Water distribution system
Origin of food vehicle	Unknown
Contributory factors	Other contributory factor
Mixed Outbreaks (Other Agent)	Crytosporidium parvum
Additional information	Nature of evidence: detection in food vehicle, descriptive epidemiological evidence, analytical epidemiological evidence (case-control study).

Table Foodborne Outbreaks: detailed data for Salmonella

Please use CTRL for multiple selection fields

S. Enteritidis - PT 56

	Value
FBO Code	2013/41
Number of outbreaks	1
Number of human cases	21
Number of hospitalisations	2
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: cohort study

S. Typhimurium - Not typeable

	Value
FBO Code	2013/96
Number of outbreaks	1
Number of human cases	66
Number of hospitalisations	12
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	Ham and gammon
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Disseminated cases
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Other contributory factors: cross contamination

S. Typhimurium - DT 193

	Value
FBO Code	2013/69
Number of outbreaks	1
Number of human cases	29
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	Hog roast
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Household
Place of origin of problem	Household
Origin of food vehicle	Domestic
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	Setting: domestic kitchen. Other contributory factors: cross contamination

S. Heidelberg

	Value
FBO Code	2013/126
Number of outbreaks	1
Number of human cases	58
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Herbs and spices
More food vehicle information	Green chilli, dried curry leaves, ginger and coconut.
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: analytical epidemiological evidence - (cohort study) as well as detection of agent in food vehicle

S. Agona

	Value
FBO Code	2013/16
Number of outbreaks	1
Number of human cases	413
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Other foods
More food vehicle information	Fresh curry leaves and herds used uncooked in coconut chutney.
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Others
Place of origin of problem	Others
Origin of food vehicle	Imported from outside EU
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	Other contributory factors: inadequate heat treatment

S. Enteritidis - PT 56

	Value
FBO Code	2013/54
Number of outbreaks	1
Number of human cases	13
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Sweet and sour chicken balls
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Take-away or fast-food outlet
Place of origin of problem	Take-away or fast-food outlet
Origin of food vehicle	Unknown
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	
Additional information	Other contributory factors: inadequate heat treatment, cross contamination, other.

S. Typhimurium - DT 193

	Value
FBO Code	2013/128
Number of outbreaks	1
Number of human cases	16
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	Hog joint
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Others
Place of origin of problem	Others
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

S. Typhimurium - DT 120

	Value
FBO Code	2013/18
Number of outbreaks	1
Number of human cases	114
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	Hog roast
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	School or kindergarten
Place of origin of problem	School or kindergarten
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: cohort study

S. Goldcoast

	Value
FBO Code	2013/105
Number of outbreaks	1
Number of human cases	43
Number of hospitalisations	10
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Cooked whelks
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Others
Place of origin of problem	Others
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: descriptive epidemiological, analytical epidemiological (case-control study) as well as detection in food vehicle

Table Foodborne Outbreaks: detailed data for Unknown agent

Please use CTRL for multiple selection fields

Unknown

	Value
FBO Code	2013/13
Number of outbreaks	1
Number of human cases	14
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Raw oysters
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT NOROVIRUS

Unknown

	Value
FBO Code	2013/106
Number of outbreaks	1
Number of human cases	235
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Cereal products including rice and seeds/pulses (nuts, almonds)
More food vehicle information	Boiled rice
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT CLOSTRIDIUM PERFRINGENS Nature of evidence: cohort study

Unknown

	Value
FBO Code	2013/64
Number of outbreaks	1
Number of human cases	30
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Other foods
More food vehicle information	Home made chutney using various herds and spices
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT CLOSTRIDIUM PERFRINGENS Nature of evidence: cohort study. Other contributory factors: cross contamination, other

Unknown

	Value
FBO Code	2013/62
Number of outbreaks	1
Number of human cases	7
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken liver pate
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT CAMPYLOBACTER

Unknown

	Value
FBO Code	2013/2
Number of outbreaks	1
Number of human cases	11
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Raw oysters
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT NOROVIRUS

Unknown

	Value
FBO Code	2013/39
Number of outbreaks	1
Number of human cases	26
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	Roast beef
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	
Additional information	Other contributory factors: cross contamination

Unknown

	Value
FBO Code	2013/95
Number of outbreaks	1
Number of human cases	13
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	Pork, ham, bacon
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT NOROVIRUS

Unknown

	Value
FBO Code	2013/92
Number of outbreaks	1
Number of human cases	11
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Mussels
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic
Contributory factors	Other contributory factor
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT DIARRHETIC SHELLFISH POISONING

Unknown

	Value
FBO Code	2013/36
Number of outbreaks	1
Number of human cases	7
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Sheep meat and products thereof
More food vehicle information	Roast lamb
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT CLOSTRIDIUM PERFRINGENS Other contributory factors: inadequate chilling, storage time/ temperature abuse

Unknown

	Value
FBO Code	2013/12
Number of outbreaks	1
Number of human cases	13
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Raw oysters
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT NOROVIRUS

Unknown

	Value
FBO Code	2013/82
Number of outbreaks	1
Number of human cases	35
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Mussels
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT DIARRHETIC SHELLFISH POISONING

Unknown

	Value
FBO Code	2013/147
Number of outbreaks	1
Number of human cases	87
Number of hospitalisations	2
Number of deaths	1
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	Chicken biryani
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Others
Place of origin of problem	Others
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT CLOSTRIDIUM PERFRINGENS Nature of evidence: cohort study. Other contributory factors: storage time/ temperature abuse

Unknown

	Value
FBO Code	2013/78
Number of outbreaks	1
Number of human cases	8
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Sheep meat and products thereof
More food vehicle information	Lamb
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Other contributory factor
Mixed Outbreaks (Other Agent)	
Additional information	SUSPECT CLOSTRIDIUM PERFRINGENS

Table Foodborne Outbreaks: detailed data for Viruses

Please use CTRL for multiple selection fields

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2013/25
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Raw oysters
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Household
Place of origin of problem	Household
Origin of food vehicle	Domestic
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	Other contributory factors: analytical epidemiological evidence (cohort study)

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2013/84
Number of outbreaks	1
Number of human cases	117
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Raw oysters
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	School or kindergarten
Place of origin of problem	School or kindergarten
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2013/107
Number of outbreaks	1
Number of human cases	70
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Buffet meals
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	
Additional information	NOROVIRUS GENOTYPE 2.

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2013/116
Number of outbreaks	1
Number of human cases	54
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Raw oysters
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Others
Place of origin of problem	Others
Origin of food vehicle	Domestic
Contributory factors	Other contributory factor
Mixed Outbreaks (Other Agent)	
Additional information	Nature of evidence: analytical epidemiological evidence (cohort study)

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2013/11
Number of outbreaks	1
Number of human cases	41
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Buffet meals
More food vehicle information	Cold food buffet
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	NOROVIRUS GENOTYPE 2

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2013/1
Number of outbreaks	1
Number of human cases	32
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Buffet meals
More food vehicle information	Buffet of sandwhiches, quiche and sausage rolls
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Household
Place of origin of problem	Household
Origin of food vehicle	Unknown
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2013/22
Number of outbreaks	1
Number of human cases	4
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	Raw oysters
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	