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 2012

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: United Kingdom

Reporting Year: 2012

Laboratory name	Description	Contribution
Department for Environment, Food and Rural Affairs (Defra)	Competent Authority for Directive 2003/99	Co-ordination of report production
Department of Agriculture and Rural Development, (DARD) Northern Ireland	Competent Authority in Northern Ireland for Directive 2003/99	Co-ordination of information on zoonotic agents in animals, and feed
Health Protection Agency	The Health Protection Agency (HPA) is an independent body that protecte the health and well-being of everyone in England and Wales	Data on Zoonoses and zoonotic agents in humans, foodborne outbreaks, and antimicrobial resistance in humans and food isolates
National Public Health Service for Wales, Communicable Disease Surveillance Centre (Zoonoses Surveillance Unit)	National Public Service for Wales, Communicable Service for Wales. It protects the population from infection by surveillance and independent advice, outbreak investigation and applied research	Data on zoonotic agents in humans in England and Wales
Animal Health and Veterinary Laboratories Agency (VLA)	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, collation of data from Scottish Agricultural College, 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

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Laboratory name	Description	Contribution
Scottish Agriculture College	Under contract provides surveillance information on range of animal diseases to the Scottish Executive Environment and Rural Affairs Department	Data on zoonotic agents in animals in Scotland
Scottish Government	Devolved Administration for Scotland	Overview
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 HPS	Health Protection Scotland established by Scottish Executive to strengthen and coordinate health protection in Scotland. HPS was formed on 11 November 2004	Data on zoonotic agents in humans in Scotland
Health Protection Agency, Communicable Disease Surveillance Centre, 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 Assembly Government, Dept for Environment Planning and Countryside	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 2012 .

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

List of Contents

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

Cattle data for Great Britain is sourced from the British Cattle Movement Services' (BCMS) Cattle Tracing System (CTS). Information is sourced from the Animal and Public Health Information System (APHIS) for the cattle population in Northern Ireland. It is mandatory that every bovine animal is given a passport and an ear tag and that owners report every movement of these animals onto and off their premises. This is done to enable all cattle in the UK to be traceable for disease control purposes. CTS/APHIS records births, deaths and all movements of cattle as well as breed types and gender.

The Rapid Analysis and Detection of Animal Related Risk (RADAR) system of surveillance information management captures and processes CTS data so that population statistics can be derived and analysed for the cattle population in Great Britain.

Counts of the number of premises for sheep and goats are from the annual Sheep and Goat Inventory – this is a census of keepers in Great Britain. Population numbers and all data from Northern Ireland is from the annual June surveys of agriculture.

Information on the remaining categories is sourced from the June Survey of Agriculture in each of England, Wales, Scotland and Northern Ireland.

Figures on slaughterings are collected via surveys in each of England and Wales, Scotland and Northern Ireland.

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.
The total number of cattle and calves in the UK decreased by 0.39% from 9.3 million in 2011 to 9.9 million in 2012. The total number of pigs fell by 0.9% to 48 million. On 1st June 2012, there were 32.2 million sheep in the UK, and a reduction of 1.8% on the June 2011 figure. The total number of all poultry decreased by 1.5% between 2011 and 2012 to just over 160 million.

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

Cattle data:
For cattle data, the breed is recorded on an animal's passport, RADAR categorises the animal to a purpose (beef or dairy or dual purpose). Around 2% of all female cattle do not have an assigned breed purpose or are of dual breed. These cattle have been allocated to either dairy or beef at holding level based on the other cattle on the holding. Where there are no other cattle on the holding, they are allocated on the basis of the national split between dairy and beef in that age band. The Cattle Tracing System (CTS) database does not capture data at ‘herd’ level, so no data is available for herd numbers in Great Britain. Calves are defined as animals less than or equal to 12 months of age

Holdings are defined as agricultural holdings assigned a unique identification number on the database. The number of holdings is a snapshot of premises which had animals present on the 1st June 2012. These agricultural premises include markets, holding centres and abattoirs.

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)	meat production animals	16770		446356		1625446			
	dairy cows and heifers	4152		97965		350816			
	calves (under 1 year)	19081		5353		483856			
Deer	farmed - in total	32		1276		3064			
Ducks	- in total	22				108873			
Gallus gallus (fowl)	breeding flocks for egg production line - in total	188							
	breeding flocks for meat production line - in total	1285							
	breeding flocks, unspecified - in total					1641094		493	
	laying hens	4154		295323		3645947		1631	
	broilers	37950		102916143		13459392		1472	
	- in total			103211466		18746433			
Geese	- in total	17				4090			
Goats	- in total	515		74		3133			

Table Susceptible animal populations

		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*
Pigs	breeding animals	480				43268			
	fattening pigs	339		1618130		250375			
	breeding animals - unspecified - sows and gilts	470				42604			
	- in total	547		1618130		426924			
Sheep	animals under 1 year (lambs)	8093				989956			
	animals over 1 year	8722				978916			
	- in total	8722		423891		1968872			
Solipeds, domestic	horses - in total	2539		978		12007			
Turkeys	meat production flocks	3560						812	
	breeding flocks, unspecified - in total	273						85	
	- in total			1650651		268698			

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

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

Humans:
There has been an overall trend of reduction in reports of Salmonella infection in humans in the UK over recent years.

Food:
Several surveys were carried out in 2012 on various foods including fruits, nuts, seeds, spices and herds. Of the 627 samples tested in total, only one positive Salmonella spp was detected in spices.

Animals:
Reports of Salmonella in cattle, sheep and other animals decreased in 2011 compared to 2010, while reports in horses, increased. Under the Salmonella National Control Programmes in the chicken and turkey sectors, all Salmonella reduction targets (as designated in the EU legislation) were met for 2011.

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. Specifically recently, S. Enteritidis, has reduced from 39.98% of all Salmonella reports in 2009 to 26.83% in 2010.

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

A. Salmonella spp. in broiler meat and products thereof

Results of the investigation

A survey of cooked, ready-to-eat broiler meat products at retail was carried out during the year - of the 75 samples tested, one was positive for Salmonella.

B. Salmonella spp. in pig meat and products thereof

Results of the investigation

No surveys were carried out in 2011.

C. Salmonella spp. in bovine meat and products thereof

Results of the investigation

No surveys were carried out in 2011.

D. Salmonella spp. in turkey meat and products thereof

Results of the investigation

No surveys were carried out in 2011.

E. Salmonella spp. in eggs and egg products

Results of the investigation

No national surveys were carried out in 2010.

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
Fruits - pre-cut - ready-to-eat - at retail - Surveillance [1)]	PHE	Objective sampling	Not applicable	food sample	Unknown	Single	25g	306	0	0	0
Fruits - products - dried - at retail - Surveillance	PHE	Objective sampling	Not applicable	food sample	Imported from outside EU	Single	25g	175	0	0	0
Nuts and nut products - dried - at retail - Surveillance	PHE	Objective sampling	Not applicable	food sample	Imported from outside EU	Single	100g	63	0	0	0
Seeds, dried - at retail - Surveillance	PHE	Objective sampling	Not applicable	food sample	Imported from outside EU	Single	25g	44	0	0	0
Spices and herbs - dried - at retail - Surveillance [2)]	PHE	Objective sampling	Not applicable	food sample	Imported from outside EU	Single	100g	31	1	0	0
Spices and herbs - dried - at retail - Surveillance [3)]	PHE	Objective sampling	Not applicable	feed sample	Imported from outside EU	Single	100g	8	0	0	0

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Fruits - pre-cut - ready-to-eat - at retail - Surveillance [1)]	0	0
Fruits - products - dried - at retail - Surveillance	0	0
Nuts and nut products - dried - at retail - Surveillance	0	0
Seeds, dried - at retail - Surveillance	0	0
Spices and herbs - dried - at retail - Surveillance [2)]	0	1
Spices and herbs - dried - at retail - Surveillance [3)]	0	0

Table Salmonella in other food

Comments:

1) Grapes

2) Spices

3) Herbs

Footnote:

PHE = Public Health England (formerly the Health Protection Agency)

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

Other: 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 to three weeks during the production period.

In addition to the sampling above, Official Control Samples are collected from each 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 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 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 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 in the Control of Salmonella in poultry flocks, in rodent control on poultry farms and in 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. 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 2009 and 2010, this extended testing interval (at the discretion of the Competent Authority) and the reduced official sampling frequency have been applied in the UK in 2011. However, some UK breeding chicken companies have chosen to still sample at a two weekly frequency.

Recent actions taken to control the zoonoses

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. The “Scientific Opinion on monitoring and assessment of the public health risk of “Salmonella Typhimurium-like” strains”, published in autumn 2010 by EFSA (http://www.efsa.europa.eu/en/efsajournal/pub/1826.htm) concluded that “The public health risk posed by these emerging monophasic S. Typhimurium strains is therefore considered comparable to that of other S. Typhimurium strains which have caused widespread epidemics of infection over the past four decades”. Monophasic strains of S. Typhimurium have now been included in the legislation as regulated Salmonella spp. within the breeding chicken Salmonella National Control Programme as of 1st January 2010.

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 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 2011, a total of 1382 adult breeding flocks were subject to at least one Official Control Sample during the year (1107 in Great Britain and 275 in Northern Ireland). One one small niche broiler parent flock in Great Britain was found to be positive for S. Typhimurium DT40 (a type that is normally associated with wild birds). No UK breeding flocks tested positive for Salmonella Enteritidis or monophasic Salmonella Typhimurium 1,4,[5],12:i:- strains from NCP sampling during 2011.

A further 15 adult breeding flocks tested positive for other Salmonella spp. during the year. These included 7 adult flocks with S. Mbandaka, 6 with S. Senftenberg, 1 with S. Dublin and 1 with S. Kentucky. Of these, one flock was in Great Britain (positive for S. Mbandaka) and the remaining 14 were flocks in Northern Ireland.

Using the number of flocks in production in the UK that were subject to at least one official test during 2011 as the denominator figure, this gives an estimated prevalence of 1/1382 or 0.07% flocks testing positive for the regulated Salmonella serovars during 2011. In total, 1.16% of adult flocks were positive for Salmonella spp. (16/1382). In Northern Ireland 5.1% of adult flocks were positive for Salmonella spp. (14/275). In Great Britain, 0.18% adult flocks were positive for Salmonella spp. (2 /1107).

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

Overall, for both the layer breeder and broiler breeder sectors, every year, since the start of the current programme under Regulation (EC) No. 2160/2003 in 2007, the UK results have been significantly below the EU target of 1% (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 (EC) No. 646/2007 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 (EC) No. 646/2007 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 (EC) No. 646/2007 sets a target for the UK broiler sector to ensure that no more than 1% of broiler flocks remain positive for Salmonella of greatest human health significance by the end of 2011. The EU target is based on the 2 most common serovars in human cases which are S. Enteritidis and S. Typhimurium.

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.

Recent actions taken to control the zoonoses

Regulation (EU) No. 517/2011 specifies that monophasic strains of Salmonella with the antigenic formula S. 1,4,[5],12:i:- should be treated as a regulated/target Salmonella ssp. within the requirements of the Salmonella National Control Programme and counted as S. Typhimurium for the purposes of assessing achievement of the reduction target. This requirement has been applied to the broiler programme in the UK in 2011

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, 156 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 (119 in Great Britain and 37 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 39,648 flocks tested according to the requirements of the Salmonella NCP during 2011 - 33,116 in Great Britain and 6,532 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, 534 broiler flocks of Gallus gallus were positive for Salmonella spp. in 2011. Of these, 516 were flocks in Great Britain and 18 were flocks in Northern Ireland. Three broiler flocks were positive for S. Typhimurium and one flock was positive for monophasic Salmonella 4,5,12:i:-. No broiler flocks were positive for S. Enteritidis.

Additionally, 530 flocks were positive for other non-regulated Salmonella spp. In Great Britain, 513 broiler flocks of Gallus gallus, originating from 211 separate holdings, were positive for non-regulated Salmonella serovars. One flock was positive for both S. Senftenberg and S. 3,19:-:- (likely to be a non-fully typable variant of S. Senftenberg). Including all of these incidents, one hundred and sixty (160) flocks were found to be positive for S. Montevideo, one hundred and thirty (130) for S. Kedougou, fifty-six (56) for S. Mbandaka, forty-seven (47) for S. Livingstone, forty-six (46) for S. Ohio, thirty-eight (38) for S. Senftenberg, five (5) for S. Thompson, three (3) for S. Poona, two (2) for S. Havana, two (2) for S. Infantis, two (2) for S. Kottbus, two (2) for S. Orion, one (1) for S. Agama, one (1) for S. Kentucky (not a multi-drug resistant strain), one (1) for S. Orion var. 15+ (Binza), one (1) for S. Schwarzengrund, and seventeen (17)

for untypable Salmonella strains, comprising: four (4) S. 3,19:-:-, four (4) S. 6,7:-:-, three (3) S. 6,7:z10:-, two (2) S. O Rough:g,s,t:-, one (1) S. 3,10:y:-, one (1) S. 6,7:k:-, one (1) S. 6,7:l,w:- and one (1) S. O Rough:-:-.

A further 17 flocks were positive for other Salmonella serovars in Northern Ireland: 8 S. Senftenerg, 5 S. Goldcoast, 2 S. Mbandaka, 2 S. Tennessee.

Using the number of flocks in production in the UK during 2011 as the denominator figure, this gives an estimated prevalence of 4/39,648 or 0.01% for the target Salmonella serovars for the UK in 2011 which is well below the reduction target specified in the legislation of 1% or less flocks remainnig positive by the end of 2011. These results indicate a reduction on the 2010 prevalence and 2009 prevalence which was 0.02% (7/33500) and 0.043% (12/27780) respectively for the target Salmonella serovars. The prevalence of Salmonella spp. for the UK for 2011 was 537/39,648 or 1.35% (a reduction on the 2010 result of 525/33500 or 1.57% but a slight increase on the 1.31% or 364/27780 in 2009).

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

In 2010, five hundred and twenty five (525) broiler flocks of Gallus gallus, originating from 207 unique holdings, were positive for any Salmonella serovar. All positive flocks detected during 2010 originated on holdings in Great Britain – there were no positive flocks detected on Northern Ireland. Seven broiler flocks were detected positive for Salmonella Typhimurium. In addition, three flocks were positive for monophasic Salmonella 1,4,[5],12:i:-. No (0) broiler flocks were positive for S. Enteritidis. One flock was positive for S. Virchow PT4 but none were positive for S. Hadar or S. Infantis. 514 broiler flocks were positive for other Salmonella serovars - the most common were S. Kedougou (135 flocks), S. Ohio (95 flocks) and S. Livingstone (79 flocks).

In total, 160 routine annual official sampling visits were carried out to broiler premises in the UK by the Competent Authority during 2010. There were approximately 33,611 flocks in production in the UK during 2010 (derived from the monthly returns from private and Government testing laboratories) which gives an estimated prevalence of 7/33611 or 0.02% for the target Salmonella serovars, S. Enteritidis and S. Typhimurium, for the UK in 2010. and 525/33611 or 1.56% for all Salmonella spp.

In 2009, ten broiler flocks were positive for S. Enteritidis and two broiler flocks were positive for S. Typhimurium (ST) giving an estimated prevalence for the regulated serovars of 0.04% (12/27780). Two flocks were positive for S. Virchow but none were positive for S. Hadar or S. Infantis. An additional 350 broiler flocks were positive for other non-regulated Salmonella serovars (1.31% or 364/27780 for all Salmonella spp).

There was no official statutory Salmonella Control Programme in broilers in the UK in 2008. Monitoring for Salmonella in broilers was carried out on a voluntary basis by the food business operator. This was also performed by operators who are members of some farm assurance schemes. For 2008 and preceding years, the Salmonella monitoring results for broilers were based on the total number of incidents (and therefore are not comparable with the monitoring results derived from implementation of the Salmonella National Control Programme, which are flock based results). There were in total 74 incidents of Salmonella detected in broilers reported during 2008. Of these, S. Typhimurium was isolated twice and S. Enteritidis once.

Additional information

S. Kedougou was the most frequently reported serovar in broilers in 2009 and 2010 and the second most

frequently reported serovar in 2011; it has accounted for roughly a quarter of all Salmonella-positive flocks each year since the start of the NCP. S. Kedougou is a feed-related serovar which can be found in oil seed meal ingredients and as a coloniser of the pellet cooling system in feed mills.

Reports of S. Montevideo in broilers have increased substantially since the start of the NCP, from 15 reports (4.12% of all Salmonella reports) in 2009 to 160 reports (29.8% of all Salmonella reports) in 2011. There have been no parallel increases of this serovar in flocks of laying chickens or in either breeding or fattening turkeys, so this increase appears to be specific to broiler chickens. However, there have been increases in reports of this serovar in cattle and sheep as well as in feeds, including poultry feed. S. Montevideo originates largely from soya bean meal so this increase may be feed-related. Sheep or cattle as a source have not been investigated.

There were 2 reports of S. Infantis from broilers in 2011, which is the first time this serovar has been detected in the broiler NCP. As per S. Montevideo, there has been no significant comparable increase among laying chickens or turkeys, but the increase in reports of S. Infantis does correlate with a rise in reports of this serovar in feed (including poultry feed) and dairy cattle in 2011. S. Infantis has been associated with brewers yeast so this increase may also be feed-related.

The common trends across species for both of these serovars could also suggest either a common source, such as feed, and/or persistence within poultry integrations.

The other predominant serovars identified are also most likely to be associated with contamination of feed (e.g. S. Ohio and S. Mbandaka) or hatchery equipment (e.g. S. Senftenberg and S. Livingstone).

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.

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.

Recent actions taken to control the zoonoses

Regulation (EU) No. 517/2011 specifies that monophasic strains of Salmonella with the antigenic formula S. 1,4,[5],12:i:- should be treated as a regulated/target Salmonella ssp. within the requirements of the Salmonella National Control Programme and counted as S. Typhimurium for the purposes of assessing achievement of the reduction target.

The “Scientific Opinion on monitoring and assessment of the public health risk of “Salmonella Typhimurium-like” strains”, published in autumn 2010 by EFSA (http://www.efsa.europa.eu/en/efsajournal/pub/1826.htm) concluded that “The public health risk posed by these emerging monophasic S. Typhimurium strains is therefore considered comparable to that of other S. Typhimurium strains which have caused widespread epidemics of infection over the past four decades”.

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

There were a total of 4195 adult flocks of laying hens included under the requirements of the Salmonella NCP in the UK in 2011 (3865 in Great Britain and 330 in Northern Ireland). This includes all premises where there were more than 350 hens in production during the year. In total, 1485 routine annual official sampling visits were carried out during the year.

Five adult flocks of laying hens, originating from two separate holdings, were positive for S. Enteritidis. One of these flocks had S. Enteritidis phage type (PT) 4, one flock had S. Enteritidis PT1 & UNTY (not typable by phage-typing), one flock had S. Enteritidis UNTY & RDNC (reacts with typing phages but does not conform to a recognised lysis pattern), one flock had S. Enteritidis PT7 & UNTY, and one flock had S. Enteritidis PT4, RDNC & UNTY. Two adult flocks of laying hens, originating from 2 separate holdings, were positive for S. Typhimurium. One of these flocks had S. Typhimurium DT8 and the other one had S. Typhimurium DT135. No (0) adult flocks were positive for S. 1,4,[5],12:i:- during the year.

In total, 24 adult flocks of laying hens, originating from 23 unique holdings, were positive for Salmonella spp: including all incidents of each serovar, 4 flocks were found to be positive for S. Kedougou, 3 for S. Livingstone, 2 for S. Infantis, 2 for S. Derby, 2 for S. Dublin, 2 for S. Mbandaka, 2 for S. Virchow, 1 for S. Dakota, 1 for S. Indiana, 1 for S. Ohio, 1 for S. Ordonez, 1 for S. Oslo, 1 for S. Schwarzengrund, 1 for S.

Senftenberg, and 1 for S. 4,12:d:-. Of these, one flock tested positive for both S. Livingstone and S. 4,12:d:-.

For the UK, the estimated prevalence of the target serovars S. Enteritidis, S. Typhimurium and/or S. 1,4,[5],12:i:- in adult laying flocks under the NCP for 2011 is 0.17% (7/4195) which is well below the definitive target of 2%. The estimated prevalence of Salmonella positive adult laying flocks, under the requirements of the NCP, for all Salmonella spp. is 0.74% (31/4195).

No (0) immature (in-rear) flocks of laying hens were detected positive for regulated serovars (S. Enteritidis and/or S. Typhimurium, including monophasic strains) in the UK in 2011. In Great Britain, 15 in-rear flocks of laying hens, on a total of 12 separate holdings, were found positive for Salmonella spp.: 10 flocks were positive for S. Senftenberg, 2 for S. Newport, 1 for S. Derby, 1 for S. Haifa and 1 for S. 3,19:-:-. In Northern Ireland, 1 in-rear flock was positive for S. Infantis.

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

There has been a significant reduction in prevalence compared to the prevalence in previous years: a prevalence of 0.25% for the regulated serovars and 1.10% for all Salmonella spp. in 2010, 0.36% for the regulated serovars and 1.7% for all Salmonella spp. in 2009 and approximately 1% for the regulated serovars and 1.2% for all Salmonella spp. in 2008. The considerable reduction in Salmonella prevalence since the EU baseline survey of 2004/05, while not directly comparable to the NCP monitoring results due to different sampling methods and denominator data, does indicate that substantial progress continues to be made in controlling Salmonella in the layer sector. Results for 2008, 2009, 2010 and 2011 were all well below the definitive target of 2%.

There were a total of 4368 flocks in production in the UK in 2010 and in total 1566 routine annual official sampling visits were carried out during the year. Overall, six adult flocks were confirmed positive for Salmonella Enteritidis, three were confirmed positive for S. Typhimurium and two for monophasic Salmonella Typhimurium strains. Two flocks were detected positive with S. Infantis. A further 35 adult laying flocks tested positive for other Salmonella serovars during the year. The most commonly isolated serovar was S. Enteritidis (12.5%) followed by S. Agona (10.4%) and S. Derby and S. Livingstone (both 8.3%).

There were a total of 4466 flocks in production in the UK in 2009 and in total, 1504 routine annual official sampling visits were carried out during the year. In total, 12 flocks were positive for S. Enteritidis and four were positive for S. Typhimuirum. Sixty adult chicken laying flocks, originating from 54 unique holdings, were positive for Salmonella serovars other than the regulated Salmonellas. The most commonly isolated serovar was S. Enteritidis (15.79%) followed by S. Senftenburg (10.5%) and S. Agona (9.2%).

2008 was the first year of implementation of the Salmonella NCP in laying flocks in the UK. In total during the year, 47 flocks were positive for S. Enteritidis and 4 flocks were positive for S. Typhimurium. Overall, fifteen adult flocks were positive for Salmonella serovars other than the regulated Salmonella serovars designated in the legislation. The most commonly isolated serovar was S. Enteritidis (73.1%) followed by S. Typhimuirum (6.0%).

There was no official statutory UK Salmonella Control Programme in the laying chicken sector in the few years leading up to implementation of the current programme. However, the majority of egg producers in the UK have voluntarily operated to an industry code of practice for a number of years. In addition, enhanced surveillance for Salmonella occurred during 2007 in preparation for the start of the National Control Programme in 2008. For 2007 and preceeding years, the Salmonella monitoring results were based on the total number of incidents reported (and therefore are not comparable with the monitoring results derived from implementation of the Salmonella National Control Programme, which are flock based

results).

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), the Scottish Agricultural College (SAC) 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.

All figures for Northern Ireland are based on the total number of isolations of Salmonella. Figures from Great Britain are based on the total number of incidents recorded. An incident comprises the first isolation and all subsequent isolations of the same serovar or serovar and phage/ definitive type combination of a particular Salmonella from an animal, group of animals or their environment on a single premises within a 30 day period.

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 712 incidents of Salmonella in cattle reported in 2011, compared with 887 in 2010, a decrease of 19.7%. The decreasing trend in incidents of Salmonella Typhimurium continued, with 57 in 2010 and 52 in 2011, a fall of 8.8%. Salmonella Dublin remained the most common serovar isolated from cattle (65% of incidents) and the next most common were S. Mbandaka (12.9% of incidents), S. Typhimurium (7.3% of incidents), S. 4,[5],12:i:- (4.4%) and S. Montevideo (3.5% of incidents). There were six reported incidents of S. Enteritidis (0.8%) in 2011 (compared to four in 2010). Salmonella Apapa was recorded in cattle for the first time in this species. A number of single incidents involved serovars not seen in cattle recently: S. Coeln and S. Concord were last recorded in 2006; S Senftenberg in 2005; and S Typhimurium U289 in 1994.

Northern Ireland:
There were a total of 103 reports of isolation of Salmonella from cattle in Northern Ireland in 2011. The majority of these were S. Dublin (99). There was also one S. Typhimurium, one S. Naestved, one S. Kottbus and one Salmonella spp. unspecified isolated during the year. There were no monophasic Salmonella 4,[5],12:i:- reports in 2011.

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

Overall, there were 1073 reports of Salmonella in cattle in the UK in 2010. Of these 887 were incidents recorded in Great Britain and 186 were reports from Northern Ireland. S. Dublin remained the most common serovar with 767 reports. There was also a significant increase in reports of S. Mbandaka (102 reports). There were 59 reports of S. Typhimurium (of which over half were DT104 or DT193), which represents a reduction compared with 2009. There were also 38 reports of Salmonella 4,[5],12:i:- (the majority DT193) compared with 18 reports in 2009. In addition, there were four reports of S. Enteritidis (two of PT13a, one PT14b and one PT8) compared with three in the preceding year. There was two reported incidents of S. Infantis, but no reports of S. Hadar or S. Virchow.

In 2009, the number of reports of Salmonella from cattle increased compared to 2008 (895 compared to 865), mostly reflecting in a 30% rise of S. Dublin reports (524 recorded incidents) and also a more than doubling in the number of reports of S. Mbandaka (62 incidents) in Great Britain. There were 857 reports of Salmonellosis in cattle in the UK in 2007, 750 in 2006, 989 in 2005 and 1218 reports in 2004. Overall, Salmonella Dublin has been the most common serovar isolated from cattle in the UK since the late 1990s.

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, the number of submissions from cattle reported to the VIDA database in 2011 was 59,001, which was a decrease of 4% compared with 2010 (101,768 submissions) and also a decrease on previous years (99,032 submissions during 2009 and 95,894 submissions during 2008).

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.

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), the Scottish Agricultural College (SAC) 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.
In addition, the Zoonoses National Control Programme for Salmonella (ZNCP) for pigs is a voluntary industry operated Salmonella monitoring programme carried out by means of meat juice ELISA testing at slaughter. Results from this programme are not reported in this report.

Frequency of the sampling

Fattening herds at slaughterhouse (herd based approach)

Voluntary sampling - industry Zoonoses National Control Programme for Salmonella (ZNCP)

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.

All figures for Northern Ireland are based on the total number of isolations of Salmonella. Figures from Great Britain are based on the total number of incidents recorded. An incident comprises the first isolation and all subsequent isolations of the same serovar or serovar and phage/ definitive type combination of a particular Salmonella from an animal, group of animals or their environment on a single premises within a 30 day period.

Multiplying herds

As for breeding herds

Fattening herds at farm

As for breeding herds

Fattening herds at slaughterhouse (herd based approach)

Not included in this report

Diagnostic/analytical methods used

Breeding herds

various

Multiplying herds

various

Fattening herds at farm

various

Fattening herds at slaughterhouse (herd based approach)

meat juice ELISA

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

The British Pig Executive's Zoonoses National Control Programme for pigs (ZNCP) aims to control and reduce the risk of Salmonella in pig meat to the consumer by targeting action at every stage of the meat production chain. Under this programme, assured herds receive four-monthly reports containing their rolling annual meat juice ELISA results and producers are encouraged to aim for <10% of results in the positive or weak-positive categories. Nationally 43% of 59,742 results issued to assured units in 2011 were in these bands, a level essentially unchanged since 2008. Irrespective of scores, all producers must maintain a Salmonella Action Plan and be able to show progress at annual reviews. Those with persistently high levels of positives are invited to request an investigatory visit from the AHVLA.

Northern Ireland has a similar programme operating in all slaughter plants. Funding of the monitoring is initially through the industry with government support.

Currently, approximately 90% of pigs in the UK are produced under an assurance scheme that includes the Zoonosis National Control Programme for Salmonella in pigs (ZNCP).

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. For 2011, as in previous years, the majority (> 90%) of Salmonella reports in pigs were from samples taken for clinical diagnostic purposes and came from pigs on farms. The results of the voluntary industry ZNCP scheme are not reported in this report

Great Britain:
There were 182 incidents of Salmonella in 2011, which is comparable to recent years. Salmonella

Typhimurium remained the most commonly found serovar, associated with 77 incidents in the year. This is however a reduction on the 99 S. Typhimurium incidents reported in 2010 and maintains the general decline in incidence of this serovar seen over the past decade. 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 40 incidents in 2010 (22.0 % of the total), up from eleven in 2009 and 30 in 2010. Another monophasic Salmonella, 4,12;i:- was confirmed in a further 20 incidents. The majority of incidents of these two strains involved the Phage Type DT193. Salmonella Derby was the fourth most common serovar in 2011 (13 incidents), and has consistently accounted for between 4% and 8% of incidents annually, over the last five years. Several other serovars accounted for small numbers of incidents each, including S. Bovismorbificans (6 incidents), S. Kedougou (a feed associated serovar, 4 incidents), S. London (4 incidents) and S. Reading (3 incidents). Salmonella Panama was identified in four incidents in 2011 but prior to this, there have been only five single incidents in the previous ten years. A serovar newly reported in pigs this year was S. Bareilly.

Northern Ireland:
There were a total of 34 reports of isolation of Salmonella from pigs in Northern Ireland in 2011. The most common serovars were S. Typhimurium (13 isolations) and S. Derby (9 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 (EC) No. 584/2008 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 (EC) No. 584/2008 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 on 10% of holdings with at least 250 adult breeding turkeys between 30 and 45 weeks of age and on all holdings with elite, great grandparent and grandparent breeding turkeys.

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 (EC) No. 584/2008 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 remain positive for Salmonella of human health significance by the end of 2012. The EU target is based on the 2 most common serovars in human cases which are S.Enteritidis and S. Typhimurium.

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

A total of 17 routine annual official sampling visits were carried out to breeding turkey premises and a total of 63 routine official sampling visits were carried out to fattening turkey premises in the UK during the year to fulfil the requirements of the legislation. In addition, risk based sampling visits were carried out to all fattening turkey premises where a flock was detected positive for a regulated serovar during the year.

There were 356 breeding turkey flocks and an estimated 3078 eligible fattening turkey flocks tested according to the requirements of the UK Salmonella National Control Programme for Turkeys in 2011. The population figure estimates for the sector were obtained from industry-held records, information held in the Great Britain Poultry Register and from the monthly returns on tests conducted under the NCP legislation submitted by approved private laboratories.

In total, twenty nine breeding flocks and 478 fattening turkey flocks were positive for any Salmonella serovar.

Breeding flocks:
No breeding flocks were detected positive for S. Enteritidis, S. Typhimurium, S. 1,4,[5],12:i:-, S. Hadar, S. Infantis or S. Virchow during the year. Twenty-nine (29) turkey breeding flocks were positive for Salmonella serovars other than S. Enteritidis and S. Typhimurium. Fifteen flocks tested positive for S.

Senftenberg, seven flocks tested positive for S. Kottbus, three flocks tested positive for S. Derby, two flocks tested positive for S. Montevideo, one flock tested positive for S. Bardo and one flock tested positive for S. Mbandaka.

Using the number of flocks in production in the UK during 2011 as the denominator figure, the estimated prevalence of the target serovars S. Enteritidis and/or S. Typhimurium (including monophasic strains) in turkey breeding flocks was 0.0% (0/356) which is well below the target of 1%, to be achieved by 31st December 2012. The prevalence for all Salmonella serovars was 8.1% (29/356). All positive flocks were from Great Britain - there were no positive breeding turkey flocks in Northern Ireland in 2011.

Fattening turkey flocks:
Two (2) fattening turkey flocks were detected positive for Salmonella Typhimurium during 2011, and five (5) flocks were positive for monophasic strains of S. Typhimurium S. 4,12:i:- (x4) and S. 4,5,12:i:- (x1). One (1) fattening flock in Great Britain was detected positive for S. Virchow. No fattening flocks were detected positive for S. Enteritidis, S. Hadar or S. Infantis. Using the number of flocks in production in the UK during 2011 as the denominator figure, the estimated prevalence of the target serovars S. Enteritidis and/or S. Typhimurium in fattening turkey flocks 0.22% (7/3,078) which is well below the target of 1%, to be achieved by 31st December 2012.

The prevalence for all Salmonella serovars was 15.7% (483/3,078). There were 476 turkey fattening flocks that were detected positive for Salmonella serovars other than S. Enteritidis and S. Typhimurium in the United Kingdom during 2011: 471 in Great Britain and 5 in Northern Ireland. In total, 287 flocks tested positive for S. Derby, 83 for S. Kedougou, 44 for S. Kottbus, 40 for S. Newport, 20 for S. Indiana, 2 for S. Kentucky, 1 for S. Panama, 1 for S. Virchow and 13 for untypable Salmonella strains. Of the 471 positive flocks in Great Britain, 15 tested positive for two serovars, therefore the total number of isolates exceeds the number of positive flocks. 1 flock tested positive for both S. Indiana and S. Kottbus, 3 flocks tested positive for both S. Derby and S. Kedougou, 5 flocks tested positive for both S. Derby and S. Indiana, 5 flocks tested positive for both S. Derby and S. O Rough:f,g:- and 1 flock tested positive for both S. Derby and S. O Rough:g,m,s:- .

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

In 2010, the first year of implementation of the Salmonella NCP in turkeys, there were seven breeding flocks, originating from three separate holdings and 475 fattening turkey flocks, originating from 92 separate holdings respectively, detected positive for any Salmonella serovar. No breeding flocks were detected positive for S. Enteritidis, S. Typhimurium, S. Hadar, S. Infantis or S. Virchow during the year. Four fattening turkey flocks were detected positive for Salmonella Typhimurium during 2010. No fattening flocks were detected positive for S. Enteritidis, S. Hadar, S. Infantis or S. Virchow.

There were an estimated 249 breeding turkey flocks and an estimated 3078 eligible fattening turkey flocks tested according to the requirements of the UK Salmonella National Control Programme for Turkeys in 2010. Using the number of flocks in production in the UK during 2010 as the denominator figure, the estimated prevalence of the target serovars S. Enteritidis and/or S. Typhimurium in turkey breeding flocks was 0.0% (0/249) and in turkey fattening flocks was 0.13% (4/3,078). The prevalence for all Salmonella serovars in breeding turkeys was 2.8% (7/249) and in fattening turkeys was 15.4% (475/3,078).

The number of breeding flocks positive for Salmonella spp. in 2011 (29 flocks) was significantly higher than the number positive in 2010 (7 breeding flocks). The 2 most commonly detected serovars in breeding turkeys in 2011 - S. Senftenberg and S. Kottbus - had not been reported from breeding flocks in 2010. The number of flocks positive for S. Derby was similar in both years (4 flocks in 2010 versus 3 flocks in 2011). There were no flocks positive for the target serovars in either 2010 or 2011.

The number of positive fattening flocks in 2011 (483 flocks) was similar to the number in 2010 (475 flocks). S. Derby was the most prevalent serovar in both years, even though the number of positive flocks was lower in 2011 (287 flocks) compared to 2010 (330 flocks). S. Kedougou, S. Kottbus and S. Newport were the second, third and fourth most prevalent serovars in both years, respectively. In 2011, only 2 fattening turkey flocks tested positive for S. Typhimurium, compared to 4 flocks in 2010, but there were 5 reports of monophasic Salmonella Typhimurium strains isolated during the year - this strain had not been isolated from UK turkeys before 2011.

There was no official statutory Salmonella Control Programme in turkeys in the UK before 2010. Monitoring for Salmonella in turkeys was carried out on a voluntary basis by the food business operator, especially by operators who were members of some farm assurance schemes. For 2009 and preceding years, the Salmonella monitoring results for turkeys were based on the total number of incidents (and therefore are not comparable with the monitoring results derived from implementation of the Salmonella National Control Programme, which are flock based results). There were 73 reports of Salmonella in turkeys in Great Britain in 2009 (in Northern Ireland, there were no reports of isolations of Salmonella from turkeys in 2009). This was an increase of 28% compared to 2008, where 57 reports of Salmonella incidents/isolations were received. There was only one report of S. Typhimurium and no reports of S. Enteritidis during 2009. The most commonly isolated serovars were S. Kedougou (39.4%) and S. Derby (23.9%). There were 113 reported incidents of Salmonella in turkeys in 2007, 183 in 2006, 279 in 2005 and 243 in 2004.

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

Apart from S. Typhimurium, the other most common serovars reported in turkeys in the UK are not commonly reported in human disease laboratory confirmed cases.

G. 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

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

Type of specimen taken

Animals at farm

Other: 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.

All figures for Northern Ireland based on total number of isolations of Salmonella. Figures from Great Britain based on total number of incidents. An 'incident' comprises the first isolation and all subsequent isolations of the same serotype or serotype and phage/ definitive type combination of a particular Salmonella from an animal, group of animals or their environment on a single premises within a 30 day period.

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 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.

Great Britain:
There were a total of 27 Salmonella incidents in ducks during 2011, which represents a 65.4% decrease relative to 2010 (78 reports) and 91.1% decrease relative to 2009 (303 reports). Of the 27 reports, 24 occurred as a result of voluntary surveillance activity, two arose from on-farm investigations and, and one from the submission of samples for diagnostic purposes. Twenty-two of the incidents arose from samples collected at the farm while the remaining five were from samples collected at hatcheries.

S. Typhimurium was the most common serovar among ducks in 2011, responsible for 48.1% of all Salmonella incidents. However there was a 23.5% reduction in the absolute number of reports of this serovar (13 incidents) compared with 2010 (17 incidents) in Great Britain. Reports of this serovar had been increasing between 2007 and 2010. S. Indiana was the most common serovar in ducks and geese between 2007 and 2010, responsible for over a third of incidents in each of those years. However, there were only three incidents of this serovar in ducks in 2011, so,although it was still the second most common serovar in 2011, it was responsible for only 11.1% of Salmonella incidents reported during the year. There was a single incident of S. Enteritidis PT9b in 2011 but no reports of monophasic strains of S. Typhimurium from ducks.

The decline in Salmonella incidents in ducks that has been observed since 2009 is likely to have resulted from changes in monitoring on commercial holdings.

Northern Ireland:
There were no reports of Salmonella isolation from ducks during 2011 (compared to two reported in 2010)

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

In total there were 83 recorded incidents of Salmonella in ducks in the UK in 2010 - a reduction of 73%

compared with 2009. This is possibly due to a decrease in monitoring on commercial holdings. However, reports of S. Typhimurium more than doubled between 2009 and 2010, two thirds of which occurred during the final quarter of the year. Ten of the reports were of DT8, four were DT30, two were U302 and one was UNTY. This increase in reports of S. Typhimurium in part reflects trace-back investigations following an outbreak of human illness due to S. Typhimurium DT8 associated with the consumption of duck eggs, and also increased monitoring and investigations within the duck industry. There was also a single incident of Salmonella 4,5,12:i:-, but no reports of S. Enteritidis, compared with one incident in 2009.

There were 301 reports of Salmonella recorded in ducks during 2009. These were all incidents recorded in Great Britain. Reports were 7% higher than in 2008 (277), which may reflect the 25% increase of S. Indiana incidents in this species. The number of reports of S. Orion increased by 22% in 2009 (61 reports, 20% of total duck reports) compared with 2008 (50 reports, 18% of total duck reports). This was probably due to the changes in reporting of S. Binza and S. Thomasville which are now reported using the Kaufmann-White scheme nomenclature. There was one incident of S. Enteritidis and 8 incidents of S. Typhimurium recorded in ducks during the year.

The number of reports of Salmonella in ducks fell by 22.4% in 2008 compared with 2007 (277 incidents in 2008; 357 in 2007). The most commonly reported serotype was S. Indiana (34.4% of all duck incidents). There was one incident of S. Enteritidis in ducks (PT9b) and 4 incidents of S. Typhimurium.

There were 405 reports of Salmonella in ducks in 2006. The number of reports of Salmonella in ducks and geese fell by 6% in 2006, compared with 2005. This decrease in reports may perhaps be related to the changes in the reporting of hatchery isolations since the start of 2006. The most commonly isolated serovar from ducks in 2006, 2005 and 2004 was also S. Indiana.

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.

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 (in press))

H. 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 plan 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, the Scottish Agricultural College (SAC) 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

Other: 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.

All figures for Northern Ireland based on total number of isolations of Salmonella. Figures from Great Britain based on total number of incidents. An incident comprises the first isolation and all subsequent isolations of the same serovar or serovar and phage/ definitive type combination of a particular Salmonella from an animal, group of animals or their environment on a single premises within a 30 day period.

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 national Salmonella 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 were no reports of Salmonella in geese in 2011.

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, with four incidents in 2010, two in 2009 and one report in both 2008 and 2007.

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 - at farm - Control and eradication programmes [1)]	1285	NRL	Census	Official and industry sampling		Domestic	yes	Flock	1285	12	0
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes [2)]	188	NRL	Census	Official and industry sampling		Domestic	yes	Flock	188	0	0
Gallus gallus (fowl) - breeding flocks, unspecified - during rearing period - at farm - Control and eradication programmes [3)]		NRL	Census	Industry sampling		Domestic	no	Flock	unknown	3	0

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

Comments:

[1)] Sample type as per requirements of Regulation (EC) No. 200/2010 - animal sample (faeces) or environmental sample (bootswabs) depending on

Table Salmonella in breeding flocks of Gallus gallus

Comments:

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 2012 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 2012, 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:-
Partridges - at farm - Clinical investigations	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	15	0	3	0
Pheasants - at farm - Clinical investigations	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	19	0	4	3
Pigeons - Clinical investigations	NRL	Suspect sampling	Industry sampling	animal sample	Domestic	Animal	unknown	21	0	19	0
Quails - at farm - Clinical investigations	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	0	2	0

	Salmonella spp., unspecified
Partridges - at farm - Clinical investigations	12
Pheasants - at farm - Clinical investigations	12
Pigeons - Clinical investigations	2
Quails - at farm - Clinical investigations	0

Footnote:

NRL = National Reference Laboratory.

In other birds, which includes wild birds, pigeons and game birds, diagnoses are made from clinical diagnostic material submitted to government veterinary laboratories AHVLA/ SAC/ AFBI. All data for the UK for 2012 reported as isolations. Previously, data from Great Britain (England, Scotland and Wales) were based on total number of incidents. (An "incident" comprises the first isolation and all subsequent isolations of the same serovar or serovar and phage/definitive type combination of a particular Salmonella from an animal, group of animals or their environment on a single premise within a 30 day period). There may be more than one diagnosis in the same incident. Therefore, data for previous years is not fully comparable.

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

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:-
Solipeds, domestic - horses - at farm - Monitoring	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	42	4	20	6
Cattle (bovine animals) - at farm - Clinical investigations	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	709	3	33	35
Other animals - Clinical investigations [1)]	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	23	0	1	0
Other animals - wild - Clinical investigations [2)]	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	9	6	0	1
Pigs - at farm - Clinical investigations	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	193	0	94	66
Sheep - at farm - Clinical investigations	NRL	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	108	0	4	0

	Salmonella spp., unspecified
Solipeds, domestic - horses - at farm - Monitoring	12
Cattle (bovine animals) - at farm - Clinical investigations	638
Other animals - Clinical investigations [1)]	22
Other animals - wild - Clinical investigations [2)]	2
Pigs - at farm - Clinical investigations	33
Sheep - at farm - Clinical investigations	104

Table Salmonella in other animals

Comments:

[1)] Other mammals: deer (1), rabbit (1) in Great Britain. Unspecified animal species in Northern Ireland (21)

[2)] Wild mammals: hedgehog (6), porpoise (2), seal (1)

Footnote:

NRL = National Reference Laboratory.

All figures for the UK for cattle, sheep, horses, pigs and other animals are total number of isolations of Salmonella. This differs from previous years where data for Great Britain (England, Scotland and Wales) were the total number of incidents reported during the year. (An "incident" comprised the first isolation and all subsequent isolations of the same serovar or serovar and phage/definitive type combination of a particular Salmonella from an animal, group of animals or their environment on a single premise within a 30 day period).

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

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 - during rearing period - Control and eradication programmes [1)]		NRL	Census	Industry sampling		Domestic	no	Flock	unknown	21	0
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes [2)]	4042	NRL	Census	Official and industry sampling		Domestic	yes	Flock	4042	34	1
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes [3)]	37946	NRL	Objective sampling	Official sampling	environmental sample > boot swabs	Domestic	no	Flock	155	12	0
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes [4)]	37946	NRL	Census	Official and industry sampling	environmental sample > boot swabs	Domestic	yes	Flock	37946	674	0
Turkeys - breeding flocks, unspecified - during rearing period - at farm - Control and eradication programmes [5)]		NRL	Census	Industry sampling		Domestic	no	Flock	unknown	3	0
Turkeys - breeding flocks, unspecified - adult - at farm - Control and eradication programmes [6)]	273	NRL	Census	Official and industry sampling		Domestic	yes	Flock	273	5	0
Turkeys - fattening flocks - before slaughter - at farm - Control and eradication programmes	3558	NRL	Census	Official and industry sampling	environmental sample > boot swabs	Domestic	yes	Flock	3558	554	0
Ducks - at farm - Monitoring [7)]		NRL	Unspecified	Not applicable		Domestic	no	Flock	unknown	169	4
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes [8)]	4042	NRL	Objective sampling	Official sampling		Domestic	no	Flock	1371	8	0

Table Salmonella in other poultry

	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Gallus gallus (fowl) - laying hens - during rearing period - Control and eradication programmes [1)]	0	0	21
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes [2)]	2	0	31
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes [3)]	0	0	12
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes [4)]	3	1	670
Turkeys - breeding flocks, unspecified - during rearing period - at farm - Control and eradication programmes [5)]	0	0	3
Turkeys - breeding flocks, unspecified - adult - at farm - Control and eradication programmes [6)]	0	0	5
Turkeys - fattening flocks - before slaughter - at farm - Control and eradication programmes	1	1	552
Ducks - at farm - Monitoring [7)]	10	1	154
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes [8)]	0	0	8

Comments:

[1)] Total number of existing flocks and number of flocks tested not known. Samples tested include animal sample (faeces, dead chicks) or environmental sample (bootswabs, hatcher tray liners).

[2)] Sample type as per requirements of Regulation (EU) No. 517/2011 - animal sample (faeces) or environmental sample (bootswabs) and dust sample depending on production system

Table Salmonella in other poultry

Comments:

[3] Routine official sampling according to the requirements of Regulation (EU) No. 200/2012. There were 338 registered premises in Northern Ireland and 1134 registered premises in Great Britain with more than 2000 birds present in 2012. Routine official sampling is carried out on premises with more than 5000 birds present.

[4] For Great Britain, the number of existing flocks and number of flocks tested is derived from the number of Salmonella Control Programme samples submitted to private and government veterinary laboratories for testing of all eligible broiler flocks 3 weeks prior to slaughter.

[5] Total number of existing flocks and number of flocks tested not known. Great-grandparent, grandparent and parent flocks - egg and meat production lines. animal sample (faeces, dead poults, egg shells, meconium) or environmental sample (bootswabs, hatcher tray liners).

[6] Sample type as per requirements of Regulation (EC) No. 584/2008 - environmental sample (bootswabs and dust) or environmental samples at the hatchery.

[7] Total number of existing flocks and number of flocks tested not known. Samples tested included animal samples and environmental samples.

[8] Routine annual official sampling according to the requirements of Regulation (EC) No. 517/2011 - carried out on premises with more than 1000 birds present. Sample type animal sample (faeces) or environmental sample (bootswabs) and dust sample depending on production system.

Footnote:

NRL = Salmonella National Reference Laboratory.

"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. In the case of housed poultry this includes all birds sharing the same airspace.

The table records the results of the testing of adult and immature laying flocks 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 adult laying flocks according to Regulation (EU) No. 517/2011.

The table records the results of the testing of broiler flocks before slaughter 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 broiler flocks according to Regulation (EU) No. 200/2012. The number of existing flocks and number of flocks tested is derived from the samples submitted to private and Government veterinary laboratories to fulfil the requirements of the NCP for testing of all eligible broiler flocks 3 weeks prior to slaughter. Some flocks may test positive for more than one Salmonella serovar - these flocks are recorded as positive once only in the total number of units positive.

The table records the results of the testing of adult turkey breeding and fattening flocks 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 turkey flocks according to Regulation (EC) No. 584/2008. The number of existing flocks and number of flocks tested is derived from the samples submitted to private and Government veterinary laboratories to and from population data held by the turkey industry. Some flocks may test positive for more than one Salmonella serovar - these flocks are recorded as positive once only in the total number of units positive.

Most isolates from poultry species not currently subject to a Salmonella National Control Programme are derived from voluntary industry monitoring for Salmonella. All figures for these species for 2012 are recorded as number of isolations detected during the year. In previous years the data recorded in Great Britain were total number of incidents. (An "incident" comprised the first isolation and all subsequent isolations of the same serovar or serovar and phage/ definitive type combination of a particular Salmonella from an animal, group of animals or their environment on a single premise within a 30 day period). Figures recorded for these species in Northern Ireland have always been recorded as the total number of isolations. Therefore, the data reported for 2012 is not directly comparable with previous years' data.

Table Salmonella in other poultry

For voluntary industry monitoring, the number of units tested are not known because testing laboratories do not report negative results unless as part of an official control programme or survey.

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.

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

There were 32 isolations of regulated Salmonella serovars in 2011 compared to 19 isolations in 2010. There were 2 reports of S. Enteritidis, 19 reports of S. Infantis, 6 reports of S. Typhimurium, 4 reports of S. Virchow and 1 report of monophasic S. Typhimurium during 2011. Contamination of imported brewer's yeast with S. Infantis and other serovars was subject to investigation during the year.

There were increases in the isolations in 2011 compared with 2010 from the following feedingstuffs: barley, brewer's yeast, compost, cooked pulses, linseed, maize, meat and tallow, mill environment, mixed oil seeds and rendering plant material, sunflower and 'other' (not specified).

There were decreases in the isolations in 2011 compared with 2010 from the following feedingstuffs: rape, soya and unspecified material.

Isolations from fishmeal and palm kernel remained the same in 2011 compared with 2010.

The most commonly reported serovar from feedingstuffs during 2011 was S. Senftenberg with 56 reports, which was an increase on the number of reports of this serovar compared with 2010 (38 reports). The majority of reports of S. Senftenberg were from sunflower (11 reports), compound feeds (9 reports) and

cooked pulses (5 reports). S. Montevideo was the second most commonly reported serovar from feedingstuffs with 30 reports during 2011 compared with four during 2010; these were mostly from meat and tallow (11 reports) and sunflower (7 reports).

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.

2.1.6 Salmonella serovars and phagetype distribution

The methods of collecting, isolating and testing of the Salmonella isolates are described in the chapters above respectively for each animal species, foodstuffs and humans. The serotype and phagetype distributions can be used to investigate the sources of the Salmonella infections in humans. Findings of same serovars and phagetypes in human cases and in foodstuffs or animals may indicate that the food category or animal species in question serves as a source of human infections. However as information is not available from all potential sources of infections, conclusions have to be drawn with caution.

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates serotyped			709				193		1072				
Number of isolates per serovar													
Not typeable			14				2		17				
S. 1,4,[5],12:i:-			10				4		1				
S. 4,12:-:-			1				0		0				
S. 4,12:i:-			6				27		1				
S. 4,5,12:i:-			19				35		1				
S. 9,12:-:-			3				0		0				

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates serotyped			709				193		1072				
Number of isolates per serovar													
S. Agama			8				0		3				
S. Agona			0				0		6				
S. Ajiobo			1				0		0				
S. Anatum			13				0		3				
S. Bardo			0				0		0				
S. Bovismorbificans			0				6		0				
S. Braenderup			0				0		2				
S. Brandenburg			0				0		1				
S. Bredeney			0				0		0				
S. Butantan			3				0		0				
S. Coeln			1				0		1				

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates serotyped			709				193		1072				
Number of isolates per serovar													
S. Derby			0				8		1				
S. Dublin			497				0		7				
S. Durham			3				0		1				
S. Enteritidis			3				0		5				
S. Gallinarum biovar Pullorum			0				0		1				
S. Give			0				0		2				
S. Give var. 15+			0				0		1				
S. Goldcoast			0				1		2				
S. Hadar			0				0		0				
S. Havana			0				0		2				
S. Hessarek			0				0		0				

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates serotyped			709				193		1072				
Number of isolates per serovar													
S. Hindmarsh			0				0		0				
S. IIIb 61:-:1,5			0				0		0				
S. IIIb 61:-:1,5,7			0				0		0				
S. IIIb 61:k:1,5,(7)			1				0		0				
S. Indiana			0				0		9				
S. Infantis			0				1		2				
S. Kedougou			1				4		95				
S. Kentucky			1				0		0				
S. Kottbus			2				1		1				
S. Litchfield			0				0		0				
S. Livingstone			0				0		53				

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates serotyped			709				193		1072				
Number of isolates per serovar													
S. London			0				3		0				
S. Mbandaka			56				0		228				
S. Meleagridis			0				0		1				
S. Monschaui			0				0		0				
S. Montevideo			17				0		298				
S. Muenster			5				0		0				
S. Nagoya			0				0		0				
S. Newport			5				1		3				
S. Ohio			0				0		72				
S. Orion			0				0		5				
S. Orion var. 15			0				0		6				

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates serotyped			709				193		1072				
Number of isolates per serovar													
S. Orion var. 15,34			0				0		1				
S. Oslo			0				0		0				
S. Panama			0				5		0				
S. Paratyphi B			0				0		3				
S. Poona			0				0		1				
S. Regent			0				0		1				
S. Rissen			0				0		1				
S. Saintpaul			1				1		0				
S. Schwarzengrund			0				0		5				
S. Senftenberg			0				0		199				
S. Stourbridge			0				0		0				

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates serotyped			709				193		1072				
Number of isolates per serovar													
S. Tennessee			0				0		5				
S. Thompson			0				0		1				
S. Typhimurium			33				94		8				
S. Virchow			0				0		0				
S. enterica subsp. arizonae			0				0		0				
S. enterica subsp. enterica, rough			5				0		16				
Salmonella spp., unspecified			0				0		0				

Table Salmonella serovars in animals

Serovar / Sources of isolates	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds, farmed				Deer	
	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped						21				36			
Number of isolates per serovar													
Not typeable						0				0			
S. 1,4,[5],12:i:-						0				0			
S. 4,12:-:-						0				0			
S. 4,12:i:-						0				0			
S. 4,5,12:i:-						0				3			
S. 9,12:-:-						0				0			
S. Agama						0				0			
S. Agona						0				0			
S. Ajiobo						0				0			
S. Anatum						0				0			
S. Bardo						0				0			

Table Salmonella serovars in animals

Serovar / Sources of isolates	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds, farmed				Deer	
	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped						21				36			
Number of isolates per serovar													
S. Bovismorbificans						0				0			
S. Braenderup						0				0			
S. Brandenburg						0				0			
S. Bredeney						0				0			
S. Butantan						0				0			
S. Coeln						0				0			
S. Derby						0				0			
S. Dublin						0				0			
S. Durham						0				0			
S. Enteritidis						0				0			
S. Gallinarum biovar Pullorum						0				2			

Table Salmonella serovars in animals

Serovar / Sources of isolates	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds, farmed				Deer	
	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped						21				36			
Number of isolates per serovar													
S. Give						0				0			
S. Give var. 15+						0				0			
S. Goldcoast						0				0			
S. Hadar						0				0			
S. Havana						0				0			
S. Hessarek						0				1			
S. Hindmarsh						0				0			
S. IIIb 61:-:1,5						0				0			
S. IIIb 61:-:1,5,7						0				0			
S. IIIb 61:k:1,5,(7)						0				0			
S. Indiana						0				0			

Table Salmonella serovars in animals

Serovar / Sources of isolates	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds, farmed				Deer	
	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped						21				36			
Number of isolates per serovar													
S. Infantis						0				0			
S. Kedougou						1				0			
S. Kentucky						0				0			
S. Kottbus						0				1			
S. Litchfield						0				0			
S. Livingstone						0				0			
S. London						0				0			
S. Mbandaka						0				2			
S. Meleagridis						0				0			
S. Monschaui						0				0			
S. Montevideo						0				0			

Table Salmonella serovars in animals

Serovar / Sources of isolates	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds, farmed				Deer	
	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped						21				36			
Number of isolates per serovar													
S. Muenster						0				0			
S. Nagoya						0				0			
S. Newport						0				1			
S. Ohio						0				0			
S. Orion						0				3			
S. Orion var. 15						0				12			
S. Orion var. 15,34						0				0			
S. Oslo						0				0			
S. Panama						0				0			
S. Paratyphi B						0				0			
S. Poona						0				0			

Table Salmonella serovars in animals

Serovar / Sources of isolates	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds, farmed				Deer	
	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped						21				36			
Number of isolates per serovar													
S. Regent						0				0			
S. Rissen						0				0			
S. Saintpaul						0				0			
S. Schwarzengrund						0				0			
S. Senftenberg						1				2			
S. Stourbridge						0				0			
S. Tennessee						0				0			
S. Thompson						0				0			
S. Typhimurium						19				9			
S. Virchow						0				0			
S. enterica subsp. arizonae						0				0			

Table Salmonella serovars in animals

Serovar / Sources of isolates	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds, farmed				Deer	
	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped						21				36			
Number of isolates per serovar													
S. enterica subsp. enterica, rough						0				0			
Salmonella spp., unspecified						0				0			

Serovar / Sources of isolates	Deer		Ducks				Other animals - unspecified				Other animals - wild		
	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical
Number of isolates in the laboratory													
Number of isolates serotyped	1			169					1				9
Number of isolates per serovar													
Not typeable	0			2					0				0
S. 1,4,[5],12:i:-	0			0									
S. 4,12:-:-	0			0					0				2
S. 4,12:i:-	0			1					0				1

Table Salmonella serovars in animals

Serovar / Sources of isolates	Deer		Ducks				Other animals - unspecified				Other animals - wild		
	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical
Number of isolates in the laboratory													
Number of isolates serotyped	1			169					1				9
Number of isolates per serovar													
S. 4,5,12:i:-	0			0					0				0
S. 9,12:-:-	0			0									
S. Agama	0			0					0				0
S. Agona	0			0					0				0
S. Ajiobo	0			0					0				0
S. Anatum	0			0					0				0
S. Bardo	0			0					0				0
S. Bovismorbificans	0			11					0				0
S. Braenderup	0			0					0				0
S. Brandenburg	0			0					0				0
S. Bredeney	0			5					0				0

Table Salmonella serovars in animals

Serovar / Sources of isolates	Deer		Ducks				Other animals - unspecified				Other animals - wild		
	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical
Number of isolates in the laboratory													
Number of isolates serotyped	1			169					1				9
Number of isolates per serovar													
S. Butantan	0			0					0				0
S. Coeln	0			0					0				0
S. Derby	0			0					0				0
S. Dublin	0			1					0				0
S. Durham	0			0					0				0
S. Enteritidis	0			4					0				6
S. Gallinarum biovar Pullorum	0			0					0				0
S. Give	0			13					0				0
S. Give var. 15+	0			3					0				0
S. Goldcoast	0			0					0				0
S. Hadar	0			6					0				0

Table Salmonella serovars in animals

Serovar	Deer		Ducks				Other animals - unspecified				Other animals - wild		
Sources of isolates	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical
Number of isolates in the laboratory													
Number of isolates serotyped	1			169					1				9
Number of isolates per serovar													
S. Havana	0			0					0				0
S. Hessarek	0			0					0				0
S. Hindmarsh	0			1					0				0
S. IIIb 61:-:1,5	0			0					0				0
S. IIIb 61:-:1,5,7	0			0					0				0
S. IIIb 61:k:1,5,(7)	0			0					0				0
S. Indiana	0			59					0				0
S. Infantis	0			0					0				0
S. Kedougou	0			0					0				0
S. Kentucky	0			0					0				0
S. Kottbus	0			0					0				0

Table Salmonella serovars in animals

Serovar / Sources of isolates	Deer		Ducks				Other animals - unspecified				Other animals - wild		
	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical
Number of isolates in the laboratory													
Number of isolates serotyped	1			169					1				9
Number of isolates per serovar													
S. Litchfield	0			0					0				0
S. Livingstone	0			0					0				0
S. London	0			0					0				0
S. Mbandaka	0			13					0				0
S. Meleagridis	0			0					0				0
S. Monschaui	0			3					1				0
S. Montevideo	0			0					0				0
S. Muenster	0			0					0				0
S. Nagoya	0			0					0				0
S. Newport	1			0					0				0
S. Ohio	0			0					0				0

Table Salmonella serovars in animals

Serovar / Sources of isolates	Deer		Ducks				Other animals - unspecified				Other animals - wild		
	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical
Number of isolates in the laboratory													
Number of isolates serotyped	1			169					1				9
Number of isolates per serovar													
S. Orion	0			22					0				0
S. Orion var. 15	0			12					0				0
S. Orion var. 15,34	0			0					0				0
S. Oslo	0			0					0				0
S. Panama	0			0					0				0
S. Paratyphi B	0			0					0				0
S. Poona	0			0					0				0
S. Regent	0			0					0				0
S. Rissen	0			0					0				0
S. Saintpaul	0			0					0				0
S. Schwarzengrund	0			0					0				0

Table Salmonella serovars in animals

Serovar / Sources of isolates	Deer		Ducks				Other animals - unspecified				Other animals - wild		
	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical
Number of isolates in the laboratory													
Number of isolates serotyped	1			169					1				9
Number of isolates per serovar													
S. Senftenberg	0			3					0				0
S. Stourbridge	0			0					0				0
S. Tennessee	0			0					0				0
S. Thompson	0			0					0				0
S. Typhimurium	0			10					0				0
S. Virchow	0			0					0				0
S. enterica subsp. arizonae	0			0					0				0
S. enterica subsp. enterica, rough	0			0					0				0
Salmonella spp., unspecified	0			0					0				0

Table Salmonella serovars in animals

Serovar	Other animals - wild	Sheep				Solipeds, domestic				Turkeys			
Sources of isolates	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory													
Number of isolates serotyped				108				42		793			
Number of isolates per serovar													
Not typeable				0				0		7			
S. 1,4,[5],12:i:-				0						0			
S. 4,12:-:-				0				0		0			
S. 4,12:i:-				0				5		1			
S. 4,5,12:i:-				0				1		1			
S. 9,12:-:-				0				0		0			
S. Agama				0				1		1			
S. Agona				0				0		5			
S. Ajiobo				1				0		0			
S. Anatum				0				5		0			
S. Bardo				0				0		6			

Table Salmonella serovars in animals

Serovar	Other animals - wild	Sheep				Solipeds, domestic				Turkeys			
Sources of isolates	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory													
Number of isolates serotyped				108				42		793			
Number of isolates per serovar													
S. Bovismorbificans				0				0		1			
S. Braenderup				0				0		0			
S. Brandenburg				0				0		0			
S. Bredeney				0				0		0			
S. Butantan				0				0		0			
S. Coeln				0				0		0			
S. Derby				1				0		504			
S. Dublin				13				1		0			
S. Durham				0				0		0			
S. Enteritidis				0				4		0			
S. Gallinarum biovar Pullorum				0				0		0			

Table Salmonella serovars in animals

Serovar	Other animals - wild	Sheep				Solipeds, domestic				Turkeys			
Sources of isolates	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory													
Number of isolates serotyped				108				42		793			
Number of isolates per serovar													
S. Give				0				0		0			
S. Give var. 15+				0				0		0			
S. Goldcoast				0				0		0			
S. Hadar				0				0		0			
S. Havana				0				0		0			
S. Hessarek				0				0		0			
S. Hindmarsh				0				0		0			
S. IIIb 61:-:1,5				11				0		0			
S. IIIb 61:-:1,5,7				24				0		0			
S. IIIb 61:k:1,5,(7)				31				0		0			
S. Indiana				0				0		50			

Table Salmonella serovars in animals

Serovar	Other animals - wild	Sheep				Solipeds, domestic				Turkeys			
Sources of isolates	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory													
Number of isolates serotyped				108				42		793			
Number of isolates per serovar													
S. Infantis				0				0		0			
S. Kedougou				1				0		53			
S. Kentucky				0				0		0			
S. Kottbus				0				0		27			
S. Litchfield				0				0		2			
S. Livingstone				0				0		0			
S. London				0				0		0			
S. Mbandaka				0				0		55			
S. Meleagridis				0				0		0			
S. Monschaui				0				0		0			
S. Montevideo				4				0		2			

Table Salmonella serovars in animals

Serovar	Other animals - wild	Sheep				Solipeds, domestic				Turkeys			
Sources of isolates	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory													
Number of isolates serotyped				108				42		793			
Number of isolates per serovar													
S. Muenster				0				0		0			
S. Nagoya				0				1		0			
S. Newport				0				2		51			
S. Ohio				0				0		1			
S. Orion				0				0		0			
S. Orion var. 15				0				0		4			
S. Orion var. 15,34				0				0		0			
S. Oslo				0				1		0			
S. Panama				0				0		0			
S. Paratyphi B				0				0		0			
S. Poona				0				0		0			

Table Salmonella serovars in animals

Serovar	Other animals - wild	Sheep				Solipeds, domestic				Turkeys			
Sources of isolates	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory													
Number of isolates serotyped				108				42		793			
Number of isolates per serovar													
S. Regent				0				0		0			
S. Rissen				0				0		0			
S. Saintpaul				0				0		0			
S. Schwarzengrund				0				0		0			
S. Senftenberg				0				0		18			
S. Stourbridge				0				1		0			
S. Tennessee				0				0		0			
S. Thompson				0				0		0			
S. Typhimurium				4				20		0			
S. Virchow				0				0		1			
S. enterica subsp. arizonae				9				0		0			

Table Salmonella serovars in animals

Serovar	Other animals - wild	Sheep				Solipeds, domestic				Turkeys			
Sources of isolates	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory													
Number of isolates serotyped				108				42		793			
Number of isolates per serovar													
S. enterica subsp. enterica, rough				1				0		3			
Salmonella spp., unspecified				8				0		0			

Footnote:

In the table "Birds - wild - game birds" includes pheasants, partridges, quail and guinea fowl.

In cattle, sheep, pigs, horses and other birds including wild birds and non-NCP poultry species, diagnoses are made from clinical diagnostic material submitted to government veterinary laboratories AHVLA/ SAC/ AFBI. All data from the UK is reported as isolates. In previous years, data from Great Britain (England, Scotland and Wales) were based on total number of incidents and there may have been more than one diagnosis in the same incident. Therefore data for GB for previous years is not directly comparable with the 2012 data reported.

Data on serovars detected in chickens (Gallus gallus) and turkeys are derived from Salmonella testing carried out under the requirements of the Salmonella National Control Programmes (Regulation (EC) No. 2160/2003) in breeding chickens, layers, broilers and turkeys. There can be multiple serovars isolated from individual positive flocks. In addition, for Gallus gallus, isolates detected through voluntary monitoring carried out by the UK poultry industry and derived from non-NCP samples such as hatchery fluff, meconium, egg shell samples and additional voluntary samples taken in immature layer chicken flocks (dust samples) are included in the column 'Monitoring'. The data is number of isolations of Salmonella (ie is not flock level data).
The number of isolates in the laboratory is not specifically recorded and therefore not included in the table.

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Compound feedingstuffs for poultry (non specified)		Compound feedingstuffs, not specified (Compound Ruminant feed)		Feed material of cereal grain origin (maize and mixed cereals)		Feed material of land animal origin		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped	4		12		14		2		15		19		21
Number of isolates per serovar													
Salmonella spp., unspecified	0		0		0		0				0		0
S. 3,19:-:-	1		0		0		0				0		0
S. 4,12:b:-													1
S. 4,12:d:-											1		
S. 4,12:i:-	0		1		0		0				1		0
S. 4,5,12:i:-									0				
S. 6,7:-:-	0		0		0		0		1		0		1

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Compound feedingstuffs for poultry (non specified)		Compound feedingstuffs, not specified (Compound Ruminant feed)		Feed material of cereal grain origin (maize and mixed cereals)		Feed material of land animal origin		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped	4		12		14		2		15		19		21
Number of isolates per serovar													
S. 6,7:z10:-													1
S. Agama													
S. Ago													
S. Agona	0		0		0		0				1		0
S. Anatum	0		0		0		1				2		0
S. Anatum var. 15	0		0		0		0				1		0
S. Bovismorbificans													

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Compound feedingstuffs for poultry (non specified)		Compound feedingstuffs, not specified (Compound Ruminant feed)		Feed material of cereal grain origin (maize and mixed cereals)		Feed material of land animal origin		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped	4		12		14		2		15		19		21
Number of isolates per serovar													
S. Cerro	0		0		0		0				1		0
S. Derby	0		1		0		0		1		0		1
S. Ealing													
S. Havana	0		0		1		0				4		0
S. IIIa 6,7:z4,z23:-	0		0		0		0				1		0
S. Idikan	0		0		1		0				0		1
S. Indiana													

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Compound feedingstuffs for poultry (non specified)		Compound feedingstuffs, not specified (Compound Ruminant feed)		Feed material of cereal grain origin (maize and mixed cereals)		Feed material of land animal origin		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped	4		12		14		2		15		19		21
Number of isolates per serovar													
S. Infantis									1				
S. Isangi	0				1		0				0		0
S. Kedougou	0		2		0		0				0		0
S. Kentucky	0		0		1		0				0		0
S. Kingston													
S. Lexington var. 15													
S. Livingstone	0		0		0		1		1		0		2

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Compound feedingstuffs for poultry (non specified)		Compound feedingstuffs, not specified (Compound Ruminant feed)		Feed material of cereal grain origin (maize and mixed cereals)		Feed material of land animal origin		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped	4		12		14		2		15		19		21
Number of isolates per serovar													
S. Mbandaka	1		1		1		0				0		0
S. Minnesota	0		1		0		0				0		0
S. Montevideo	1		1		1		0		5		1		1
S. Newport	0		2		0		0				0		0
S. Nottingham	1		0		1		0				0		0
S. Ohio													
S. Orion													

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Compound feedingstuffs for poultry (non specified)		Compound feedingstuffs, not specified (Compound Ruminant feed)		Feed material of cereal grain origin (maize and mixed cereals)		Feed material of land animal origin		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped	4		12		14		2		15		19		21
Number of isolates per serovar													
S. Orion var. 15	0		0		6		0				0		0
S. Orion var. 15,34	0		0		0		0		1		1		0
S. Oslo									1				
S. Rissen	0		1		0		0				0		3
S. Roodepoort	0		0		0		0				2		0
S. Ruiru	0		0		0		0				1		0
S. Senftenberg	0		0		1		0		3		2		5

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Compound feedingstuffs for poultry (non specified)		Compound feedingstuffs, not specified (Compound Ruminant feed)		Feed material of cereal grain origin (maize and mixed cereals)		Feed material of land animal origin		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
Number of isolates in the laboratory													
Number of isolates serotyped	4		12		14		2		15		19		21
Number of isolates per serovar													
S. Stanley													
S. Stanleyville													
S. Szentes													
S. Telelkebir													
S. Tennessee	0		2		0		0		1		0		4
S. Typhimurium													
S. enterica subsp. enterica, rough	0		0		0		0				0		1

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)	Feed material of oil seed or fruit origin - soya (bean) derived		Feed material of oil seed or fruit origin - sunflower seed derived		Other feed material - miscellaneous	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory							
Number of isolates serotyped		36		16		117	
Number of isolates per serovar							
Salmonella spp., unspecified						0	
S. 3,19:-:-						0	
S. 4,12:b:-							
S. 4,12:d:-						4	
S. 4,12:i:-						0	
S. 4,5,12:i:-						2	
S. 6,7:-:-				1		0	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)	Feed material of oil seed or fruit origin - soya (bean) derived		Feed material of oil seed or fruit origin - sunflower seed derived		Other feed material - miscellaneous	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory							
Number of isolates serotyped		36		16		117	
Number of isolates per serovar							
S. 6,7:z10:-							
S. Agama						2	
S. Ago						1	
S. Agona		3		2		1	
S. Anatum						2	
S. Anatum var. 15						0	
S. Bovismorbificans						1	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)	Feed material of oil seed or fruit origin - soya (bean) derived		Feed material of oil seed or fruit origin - sunflower seed derived		Other feed material - miscellaneous	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory							
Number of isolates serotyped		36		16		117	
Number of isolates per serovar							
S. Cerro						0	
S. Derby						1	
S. Ealing		1					
S. Havana		1				2	
S. IIIa 6,7:z4,z23:-						0	
S. Idikan						0	
S. Indiana						1	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)	Feed material of oil seed or fruit origin - soya (bean) derived		Feed material of oil seed or fruit origin - sunflower seed derived		Other feed material - miscellaneous	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory							
Number of isolates serotyped		36		16		117	
Number of isolates per serovar							
S. Infantis		2				1	
S. Isangi						0	
S. Kedougou						12	
S. Kentucky		1				1	
S. Kingston		1					
S. Lexington var. 15		1					
S. Livingstone		2				5	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)	Feed material of oil seed or fruit origin - soya (bean) derived		Feed material of oil seed or fruit origin - sunflower seed derived		Other feed material - miscellaneous	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory							
Number of isolates serotyped		36		16		117	
Number of isolates per serovar							
S. Mbandaka		8				29	
S. Minnesota		1				1	
S. Montevideo		1		4		20	
S. Newport						0	
S. Nottingham						2	
S. Ohio				1			
S. Orion						7	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)	Feed material of oil seed or fruit origin - soya (bean) derived		Feed material of oil seed or fruit origin - sunflower seed derived		Other feed material - miscellaneous	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory							
Number of isolates serotyped		36		16		117	
Number of isolates per serovar							
S. Orion var. 15						1	
S. Orion var. 15,34		1				0	
S. Oslo						0	
S. Rissen		4				3	
S. Roodepoort						0	
S. Ruiru						0	
S. Senftenberg		6		7		9	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - other oil seeds derived (palm kernel derived, linseed derived and other mixed oil seeds)	Feed material of oil seed or fruit origin - soya (bean) derived		Feed material of oil seed or fruit origin - sunflower seed derived		Other feed material - miscellaneous	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory							
Number of isolates serotyped		36		16		117	
Number of isolates per serovar							
S. Stanley						2	
S. Stanleyville						1	
S. Szentes				1			
S. Telelkebir						1	
S. Tennessee		2				3	
S. Typhimurium		1					
S. enterica subsp. enterica, rough						2	

Table Salmonella serovars in feed

Table Salmonella Enteritidis phagetypes in animals

Phagetype	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates phagetyped	0	0	3	0	0	0	0	0	5	0	0	0	0
Number of isolates per phagetype													
PT 11			0						1				
PT 15a			0						0				
PT 2			2						0				
PT 4			0						4				
PT 8			1						0				
PT 9b			0						0				

Table Salmonella Enteritidis phagetypes in animals

Phagetype	Other poultry			Ducks (Ducks & Geese)				Other animals - wild				Solipeds, domestic	
Sources of isolates	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates phagetyped	0	0	0		4	0				6			
Number of isolates per phagetype													
PT 11					0					6			
PT 15a					0					0			
PT 2					0					0			
PT 4					0					0			
PT 8					0					0			
PT 9b					4					0			

Table Salmonella Enteritidis phagetypes in animals

Phagetype	Solipeds, domestic	
Sources of isolates	Clinical	Surveillance
Number of isolates in the laboratory		
Number of isolates phagetyped	4	
Number of isolates per phagetype		
PT 11	3	
PT 15a	1	
PT 2	0	
PT 4	0	
PT 8	0	
PT 9b	0	

Footnote:

The reporting system in Great Britain for animal species not subject to a Salmonella National Control Programme is based on incidents and not isolations of Salmonella. However, data reported for 2012 is number of isolates and therefore is not fully comparable to previous years' data.
For species subject to a Control Programme, the reporting system is based on flocks. Therefore, the number of isolates in the laboratory is not specifically recorded.

In some cases, phage-typing was not carried out in Northern Ireland.

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates phagetyped	0	0	31	0	0	0	92	0	8	0	0	0	0
Number of isolates per phagetype													
DT 1			0				0		2				
DT 101			0				0		0				
DT 104			18				6		0				
DT 104b			3				7		0				
DT 107			0				0		0				
DT 12			0				0		1				
DT 120			2				9		0				
DT 126			0				0		0				
DT 193			1				27		2				
DT 2			0				0		0				
DT 30			0				0		0				

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program
Number of isolates in the laboratory													
Number of isolates phagetyped	0	0	31	0	0	0	92	0	8	0	0	0	0
Number of isolates per phagetype													
DT 40			1				0		0				
DT 41			0				0		0				
DT 66a			0				0		0				
DT 8			0				0		1				
DT 80									0				
DT 99			1				0		2				
Not typeable			3				14		0				
U 288			1				22		0				
U 302			1				6		0				
U 310			0				0		0				
U 323			0				1		0				

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds				Ducks (Ducks & Geese)	
Sources of isolates	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates phagetyped	0	0	0			19				9			10
Number of isolates per phagetype													
DT 1						0				0			0
DT 101						0				0			0
DT 104						0				0			0
DT 104b						0				0			0
DT 107						0				0			0
DT 12						0				0			0
DT 120						0				0			0
DT 126						0				0			0
DT 193						0				0			0
DT 2						13				0			0
DT 30						0				0			0

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Other poultry			Birds (other - pigeons and wild birds)				Birds - wild - game birds				Ducks (Ducks & Geese)	
Sources of isolates	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates phagetyped	0	0	0			19				9			10
Number of isolates per phagetype													
DT 40						0				0			0
DT 41						0				0			0
DT 66a						0				0			0
DT 8						0				7			10
DT 80						0				1			
DT 99						4				0			0
Not typeable						2				1			0
U 288						0				0			0
U 302						0				0			0
U 310						0				0			0
U 323						0				0			0

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Ducks (Ducks & Geese)		Sheep				Solipeds, domestic			
Sources of isolates	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory										
Number of isolates phagetyped	0				4				20	
Number of isolates per phagetype										
DT 1					0				2	
DT 101					0				1	
DT 104					2				1	
DT 104b					1				0	
DT 107					0				1	
DT 12					0				1	
DT 120					0				0	
DT 126					0				2	
DT 193					0				0	
DT 2					0				1	
DT 30					0				1	

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Ducks (Ducks & Geese)		Sheep				Solipeds, domestic			
Sources of isolates	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory										
Number of isolates phagetyped	0				4				20	
Number of isolates per phagetype										
DT 40					0				0	
DT 41					0				1	
DT 66a					0				1	
DT 8					0				4	
DT 80										
DT 99					0				0	
Not typeable					0				1	
U 288					0				0	
U 302					1				1	
U 310					0				2	
U 323					0				0	

Table Salmonella Typhimurium phagetypes in animals

Footnote:

The reporting system in Great Britain for animal species not subject to a Salmonella National Control Programme is based on incidents and not isolations of Salmonella. However, data reported for 2012 is number of isolates and therefore is not fully comparable to previous years' data.
For species subject to a Control Programme, the reporting system is based on flocks. Therefore, the number of isolates in the laboratory is not specifically recorded.

In some cases, phage-typing was not carried out in Northern Ireland.

Table S. 1,4,[5],12:i:- phagetypes in Animals

Phagetype	Cattle (bovine animals)				Pigs				Gallus gallus (fowl)				Other poultry
Sources of isolates	Monitoring	Clinical	Control program	Surveillance	Monitoring	Clinical	Control program	Surveillance	Monitoring	Clinical	Control program	Surveillance	Monitoring
Number of isolates in the laboratory													
Number of isolates phagetyped	0	25	0	0	0	62	0	0	0	0	3	0	0
Number of isolates per phagetype													
DT 104		1				0					0		
DT 104b		0				1					0		
DT 120		0				2					1		
DT 193		19				55					2		
DT 8		0				0					0		
Not typeable		1				2					0		
U 311		0				2					0		
U 323		4				0					0		

Table S. 1,4,[5],12:i:- phagetypes in Animals

Phagetype	Other poultry			Birds - wild - game birds				Ducks (Ducks & Geese)				Other animals - wild	
Sources of isolates	Clinical	Control program	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance	Control program	Monitoring
Number of isolates in the laboratory													
Number of isolates phagetyped	0	0	0			3			1	0			
Number of isolates per phagetype													
DT 104						0			0				
DT 104b						0			0				
DT 120						0			0				
DT 193						2			0				
DT 8						1			0				
Not typeable						0			1				
U 311						0			0				
U 323						0			0				

Table S. 1,4,[5],12:i:- phagetypes in Animals

Phagetype	Other animals - wild		Solipeds, domestic			
Sources of isolates	Clinical	Surveillance	Control program	Monitoring	Clinical	Surveillance
Number of isolates in the laboratory						
Number of isolates phagetyped	1				6	
Number of isolates per phagetype						
DT 104	0				0	
DT 104b	0				0	
DT 120	0				0	
DT 193	1				6	
DT 8	0				0	
Not typeable	0				0	
U 311	0				0	
U 323	0				0	

Footnote:

The reporting system in Great Britain for animal species not subject to a Salmonella National Control Programme is based on incidents and not isolations of Salmonella. However, data reported for 2012 is number of isolates and therefore is not fully comparable to previous years' data.
For species subject to a Control Programme, the reporting system is based on flocks. Therefore, the number of isolates in the laboratory is not specifically recorded.

In some cases, phage-typing was not carried out in Northern Ireland.

2.1.7 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 2011 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 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 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) and in some other situations, then AHVLA breakpoints were used. 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 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 Aninal 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 2011, 714 Salmonella isolates were tested for antimicrobial susceptibility from cattle and 84% were fully sensitive. Twelve 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, 39 isolates were available for testing and 21% were fully sensitive, a slight increase on the figure of 19% recorded for 2010. These fully susceptible S. Typhimurium isolates in cattle belonged to a range of different phage types. 64% of S. Typhimurium isolates were resistant to more than 4 antimicrobials. There were 17 S. Typhimurium DT104 or DT104B isolates tested from cattle and 16 had the typical ACSSuT pattern of penta-resistance frequently associated with DT104 (with or without additional resistances); a single isolate of DT104 was detected from cattle with ampicillin and sulphonamide resistance. Considering all Typhimurium isolates from cattle, resistance to nalidixic acid was detected in 15% of isolates. Resistance to cefotaxime or ceftazidime was not detected in Salmonella isolates from cattle. Monophasic Salmonella, with the antigenic structure 4,5,12:i:- was detected in cattle and isolates were typically resistant to ampicillin, streptomycin, sulphonamides and tetracyclines.

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

The generally high level of resistance of Salmonella Typhimurium isolates is partly a reflection of the numbers of DT104 and its variants DT 104B and U302, which are commonly resistant to five or more antimicrobials. However, in 2009 to 2011 an increase in the proportion of fully-susceptible S. Typhimurium isolates was noted. In previous years over much of the past decade, a proportion of S. Typhimurium DT104 isolates from cattle have usually shown resistance to trimethoprim/ sulphonamides; resistance to trimethoprim/ sulphonamides was not detected over the period 2007 - 2010 in S. Typhimurium DT104 isolates from cattle, though was detected in two such isolates in 2011. In England and Wales in 2011, 714 Salmonella isolates were tested for antimicrobial susceptibility from cattle and 84% were fully sensitive;

this can be compared to figures of 975 Salmonella isolates with 81% fully sensitive in 2010. 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

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]. Almost 90% of incidents are recorded as the result of examining clinical samples.

Type of specimen taken

Voluntary sampling, usually taken for diagnostic purposes, and reported as above.

Methods of sampling (description of sampling techniques)

Voluntary private sampling.

Procedures for the selection of isolates for antimicrobial testing

One isolate 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 pigs in Great Britain are tested to determine their antimicrobial susceptibility at either AHVLA Weybridge or AHVLA Lasswade. Testing in Northern Ireland is carried out by AFBI.

The British Society for Antimicrobial Chemotherapy (BSAC) standardised disc diffusion method was used to test Salmonella isolates obtained under the Zoonoses Order from England and Wales, mainly using BSAC breakpoints, though where these were unavailable (for example for some veterinary antimicrobials) and in some other situations, then VLA breakpoints were used. 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 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 VLA veterinary breakpoint was used (tetracyclines, ampicillin, nalidixic acid, sulphonamides, resistant < or equal to 13mm).

Results of the investigation

In England and Wales in 2011, 569 Salmonella isolates were tested from pigs. 24% of these isolates were fully sensitive, an increase compared to 2010 when 18% were fully sensitive. The proportion of S. Typhimurium isolates contributing to the total number of Salmonella isolates tested influences the fully susceptible figure because this serotype commonly shows antimicrobial resistance. In 2011, the next most prevalent serotype in pigs after Typhimurium was the monophasic Salmonella 4,5,12:i:- which 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. There were no isolates of S. Enteritidis recovered from pigs. Considering S. Typhimurium in pigs, 244 isolates were available for testing in 2011 and 16% were fully sensitive, an increase on the figure observed in 2010, when 3% were fully sensitive. 53% of S.Typhimurium isolates showed resistance to more than 4 antimicrobials in 2011, compared to 70% in 2010. Five S. Typhimurium DT 104b isolates were examined from pigs (there were no DT104 isolates recovered from pigs) and each had a different pattern of resistance. Resistance to ciprofloxacin was observed in a single isolate of S. Typhimurium; this isolate was phage type U288. Ciprofloxacin resistance was not observed in Salmonella isolates of other serotypes from pigs in 2010 or 2011. In 2008 resistance to third generation cephalosporins was detected in a single isolate of S. Kedougou from pigs, which was also resistant to trimethoprim/ sulphonamides, sulphonamides and ampicillin. In 2009, 2% of Salmonella isolates were resistant to cefotaxime; these isolates belonged to the monophasic Salmonella serotypes 4,12:i:-, 4,5,12:i:- and to Bovismorbificans and all isolates recovered were epidemiologically linked to a single index case premises. No resistance to third generation cephalsoporins was detected in Salmonella isolates from pigs in 2010; in 2011 four Salmonella Derby isolates resistant to ceftazidime and cefotaxime were recovered and these were epidemiologically linked to a single index case premises.

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. A very low prevalence of resistance to ciprofloxacin was detected in Salmonella Typhimurium isolates from pigs. Resistance to ceftazidime and cefotaxime was detected in Salmonella Derby.

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 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 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

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

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.

Salmonella isolates recovered from laying hens, broilers and turkeys under the National Control Plan in England and Wales were tested by the broth microdilution (MIC) method, in accordance with EFSA's recommendations and using EUCAST epidemiological cut-off values as described in SANCO/431/2007. In Northern Ireland CLSI was 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

Salmonella isolates recovered from laying hens, broilers and turkeys under the National Control Plan were tested by the broth microdilution (MIC) method, using the epidemiological cut-off values to discriminate between resistant and susceptible isolates recommended by EFSA and described in Decision 2007/407/EC.

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 Plans for broilers, laying hens and turkeys in England and Wales in 2011, 170 Salmonella isolates were tested from broilers, 51 from layers and 145 from turkeys.

In broilers, 52% 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 a single isolate of S. Typhimurium, which was resistant to ampicillin, streptomycin, sulphonamides and tetracyclines. Considering all Salmonella serotypes the most prevalent serotype was S. Montevideo which slightly superseded S. Kedougou. A single isolate of Salmonella Montevideo from broilers was resistant to cefotaxime. Nine Salmonella isolates (5%) were resistant to ciprofloxacin and these comprised mainly Salmonella Senftenberg (7), with single isolates of Mbandaka and Kedougou. A single isolate of monophasic Salmonella 4,5,12:i:- was tested from broilers and showed typical ampicillin, streptomycin, sulphonamide and tetracycline (ASSuT) resistance.

In layers, 67% of the Salmonella isolates were fully sensitive. Considering S. Enteritidis three isolates were tested and each of these was fully sensitive. There were 9 isolates of S. Typhimurium tested from layers and of these, 7 were fully sensitive. The remaining two S. Typhimurium isolates were resistant to four or more antimicrobials. A single Salmonella Ordonez isolate from layers was resistant to cefotaxime, with an MIC just above the epidemiological cut-off value of 1mg/l. However, it was susceptible to cefoxitin and did not show synergy with clavulanate in further tests and was therefore considered not to be an ESBL or an AmpC enzyme producer. There were no Salmonella isolates recovered from layers in 2011 which were resistant to ciprofloxacin or nalidixic acid. Three isolates of monophasic Salmonella 4,5,12:i:- or 4,12:i:- were examined from layers and these all showed the typical ASSuT pattern of resistance.

In turkeys, 27% of isolates (n=145) were fully sensitive. There were no S. Enteritidis isolates recovered from turkeys. A single isolate of S. Typhimurium was resistant to ampicillin, chloramphenicol, streptomycin, sulphonamides, tetracyclines, nalidixic acid and ciprofloxacin. No resistance was detected to the third generation cephalosporin cefotaxime in Salmonella isolates from turkeys. Resistance to ciprofloxacin was detected in 7 isolates (5%), belonging to serotypes Newport (5), Senftenberg (1), and Typhimurium (1). All of these isolates were also resistant to nalidixic acid. Four isolates of monophasic Salmonella 4,12:i:- were examined from turkeys and all showed the typical ASSuT pattern of resistance; a single isolate of monophasic Salmonella 4,5,12:i:- was resistant to ampicillin, streptomycin and sulphonamides. There were 40 isolates of Salmonella Derby from turkeys and 36 (90%) were resistant to streptomycin, sulphonamides and tetracyclines with three additionally resistant to ampicillin and one susceptible isolate. There were 30 isolates of Salmonella Kedougou, all of which were resistant to sulphonamides and tetracyclines; seven isolates showed additional resistance to streptomycin and two isolates to trimethoprim.

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

During 2011, no resistance to cefotaxime was detected in Salmonella isolates from turkeys. Resistance to cefotaxime was detected in single isolates of Salmonella Montevideo from broilers and S. Ordonez from layers. Resistance to ciprofloxacin was detected in 2011 in Salmonella isolates from turkeys and broilers, though not from layers. This represents a change from the situation in 2008, when ciprofloxacin resistance was not detected in Salmonella isolates from chickens and from 2010, when no resistance to cefotaxime was detected in Salmonella isolates from chickens (Gallus gallus) or turkeys.

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 2011.

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Results of the investigation

No results to report in 2011.

F. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Results of the investigation

No results to report in 2011.

Table Antimicrobial susceptibility testing of S. Livingstone in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Livingstone	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	3	1										2					1								
Aminoglycosides - Streptomycin	32	3	1														2				1					
Amphenicols - Chloramphenicol	16	3	0													1	2									
Cephalosporins - Cefotaxime	0.5	3	0							1	2															
Fluoroquinolones - Ciprofloxacin	0.06	3	0				2		1																	
Penicillins - Ampicillin	4	3	0											3												
Quinolones - Nalidixic acid	16	3	0													3										
Tetracyclines - Tetracycline	8	3	1											1	1					1						
Trimethoprim	2	3	0										3													
Cephalosporins - Ceftazidim	2	3	0									2	1													
Sulfonamides - Sulfamethoxazole	256	3	0														1	2								

S. Livingstone	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Livingstone in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Livingstone	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Anatum in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Anatum	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0									1														
Aminoglycosides - Streptomycin	32	1	0														1									
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0								1															
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0											1												
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Anatum	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Anatum in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Anatum	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Bardo in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Bardo	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	2	0									1	1													
Aminoglycosides - Streptomycin	32	2	2																		2					
Amphenicols - Chloramphenicol	16	2	0															2								
Cephalosporins - Cefotaxime	0.5	2	0										2													
Fluoroquinolones - Ciprofloxacin	0.06	2	1							1		1														
Penicillins - Ampicillin	4	2	2																2							
Quinolones - Nalidixic acid	16	2	1														1			1						
Tetracyclines - Tetracycline	8	2	1													1				1						
Trimethoprim	2	2	0										2													
Cephalosporins - Ceftazidim	2	2	0										1		1											
Sulfonamides - Sulfamethoxazole	256	2	1																1						1	

S. Bardo	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Bardo in Turkeys - quantitative data [Dilution method]

S. Bardo	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Newport in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Newport	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0														1									
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0								1															
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0												1											
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Newport	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Newport in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Newport	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Kottbus in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Kottbus	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	10	0										10													
Aminoglycosides - Streptomycin	32	10	0														3	7								
Amphenicols - Chloramphenicol	16	10	0													10										
Cephalosporins - Cefotaxime	0.5	10	0							8	1		1													
Fluoroquinolones - Ciprofloxacin	0.06	10	0				9		1																	
Penicillins - Ampicillin	4	10	2											8					2							
Quinolones - Nalidixic acid	16	10	0													10										
Tetracyclines - Tetracycline	8	10	2											3	5					2						
Trimethoprim	2	10	0										10													
Cephalosporins - Ceftazidim	2	10	0									10														
Sulfonamides - Sulfamethoxazole	256	10	0															10								

S. Kottbus	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Kottbus in Turkeys - quantitative data [Dilution method]

S. Kottbus	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. 4,5,12:i:- in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. 4,5,12:i:-	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	1																		1					
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	1																1							
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	1																	1						
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	1																						1	

S. 4,5,12:i:-	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. 4,5,12:i:- in Turkeys - quantitative data [Dilution method]

S. 4,5,12:i:-	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Senftenberg in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Senftenberg	Turkeys																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	3	0										3												
Aminoglycosides - Streptomycin	32	3	0														2		1						
Amphenicols - Chloramphenicol	16	3	0														3								
Cephalosporins - Cefotaxime	0.5	3	0								3														
Fluoroquinolones - Ciprofloxacin	0.06	3	2				1					1	1												
Penicillins - Ampicillin	4	3	0											3											
Quinolones - Nalidixic acid	16	3	2														1			2					
Tetracyclines - Tetracycline	8	3	1												2					1					
Trimethoprim	2	3	1										2						1						
Cephalosporins - Ceftazidim	2	3	0									1	2												
Sulfonamides - Sulfamethoxazole	256	3	1															2						1	

S. Senftenberg	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Senftenberg in Turkeys - quantitative data [Dilution method]

S. Senftenberg	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Orion var. 15 in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Orion var. 15	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0											1												
Aminoglycosides - Streptomycin	32	1	0															1								
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																			
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Orion var. 15	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Orion var. 15 in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Orion var. 15	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Goldcoast in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Goldcoast	Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0									1													
Aminoglycosides - Streptomycin	32	1	1																	1					
Amphenicols - Chloramphenicol	16	1	0											1											
Cephalosporins - Cefotaxime	0.5	1	0							1															
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																		
Penicillins - Ampicillin	4	1	0										1												
Quinolones - Nalidixic acid	16	1	0													1									
Tetracyclines - Tetracycline	8	1	0											1											
Trimethoprim	2	1	0										1												
Sulfonamides - Sulfamethoxazole	256	1	0																1						

S. Goldcoast	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64

Table Antimicrobial susceptibility testing of S. Goldcoast in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Goldcoast	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Kedougou in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Kedougou	Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	22	0									1	20	1											
Aminoglycosides - Streptomycin	32	22	0													1	20	1							
Amphenicols - Chloramphenicol	16	22	0												1		17	4							
Cephalosporins - Cefotaxime	0.5	22	0							16	5	1													
Fluoroquinolones - Ciprofloxacin	0.06	22	0				1		20	1															
Penicillins - Ampicillin	4	22	0											17	5										
Quinolones - Nalidixic acid	16	22	0													22									
Tetracyclines - Tetracycline	8	22	14											1	7					14					
Trimethoprim	2	22	18										4						18						
Cephalosporins - Ceftazidim	2	22	0									17	5												
Sulfonamides - Sulfamethoxazole	256	22	18														1	2	1					18	

S. Kedougou	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Kedougou in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Kedougou	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Montevideo in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Montevideo	Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	54	2										30	22					2							
Aminoglycosides - Streptomycin	32	54	4														36	11	3		4					
Amphenicols - Chloramphenicol	16	54	0													7	37	10								
Cephalosporins - Cefotaxime	0.5	54	0							36	10	7	1													
Fluoroquinolones - Ciprofloxacin	0.06	54	0				35		11	8																
Penicillins - Ampicillin	4	54	1											43	1	9			1							
Quinolones - Nalidixic acid	16	54	0													44	9	1								
Tetracyclines - Tetracycline	8	54	3											11	31	8	1			3						
Trimethoprim	2	54	0										53	1												
Cephalosporins - Ceftazidim	2	54	0									46	8													
Sulfonamides - Sulfamethoxazole	256	54	3														11	36	4						3	

S. Montevideo	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Montevideo in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Montevideo	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Ohio in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Ohio	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	12	2										10						2							
Aminoglycosides - Streptomycin	32	12	1													1	8	1	1		1					
Amphenicols - Chloramphenicol	16	12	0													1	11									
Cephalosporins - Cefotaxime	0.5	12	0							1	11															
Fluoroquinolones - Ciprofloxacin	0.06	12	0				4		8																	
Penicillins - Ampicillin	4	12	0											12												
Quinolones - Nalidixic acid	16	12	0													12										
Tetracyclines - Tetracycline	8	12	9												3					9						
Trimethoprim	2	12	1										11						1							
Cephalosporins - Ceftazidim	2	12	0									5	7													
Sulfonamides - Sulfamethoxazole	256	12	3														4	4	1						3	

S. Ohio	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Ohio in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Ohio	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Typhimurium in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0									1														
Aminoglycosides - Streptomycin	32	1	0													1										
Amphenicols - Chloramphenicol	16	1	0												1											
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																			
Penicillins - Ampicillin	4	1	0										1													
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0											1												
Trimethoprim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Typhimurium	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64

Table Antimicrobial susceptibility testing of S. Typhimurium in Turkeys - quantitative data [Dilution method]

S. Typhimurium	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Havana in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Havana	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	2	0										2													
Aminoglycosides - Streptomycin	32	2	1														1				1					
Amphenicols - Chloramphenicol	16	2	0															2								
Cephalosporins - Cefotaxime	0.5	2	0									2														
Fluoroquinolones - Ciprofloxacin	0.06	2	0						1	1																
Penicillins - Ampicillin	4	2	1												1				1							
Quinolones - Nalidixic acid	16	2	0													1	1									
Tetracyclines - Tetracycline	8	2	1												1					1						
Trimethoprim	2	2	0										2													
Cephalosporins - Ceftazidim	2	2	0										1	1												
Sulfonamides - Sulfamethoxazole	256	2	1														1								1	

S. Havana	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Havana in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Havana	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Mbandaka in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	5	0										4	1												
Aminoglycosides - Streptomycin	32	5	0														5									
Amphenicols - Chloramphenicol	16	5	0														5									
Cephalosporins - Cefotaxime	0.5	5	0								5															
Fluoroquinolones - Ciprofloxacin	0.06	5	0				4		1																	
Penicillins - Ampicillin	4	5	0											5												
Quinolones - Nalidixic acid	16	5	0													5										
Tetracyclines - Tetracycline	8	5	0												5											
Trimethoprim	2	5	0										5													
Cephalosporins - Ceftazidim	2	5	0									1	4													
Sulfonamides - Sulfamethoxazole	256	5	0															3	2							

S. Mbandaka	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Mbandaka in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Mbandaka	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Indiana in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Indiana	Gallus gallus (fowl) - laying hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0									1													
Aminoglycosides - Streptomycin	32	1	0														1								
Amphenicols - Chloramphenicol	16	1	0														1								
Cephalosporins - Cefotaxime	0.5	1	0								1														
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																
Penicillins - Ampicillin	4	1	1																1						
Quinolones - Nalidixic acid	16	1	0													1									
Tetracyclines - Tetracycline	8	1	1																	1					
Trimethoprim	2	1	0										1												
Cephalosporins - Ceftazidim	2	1	0									1													
Sulfonamides - Sulfamethoxazole	256	1	1																					1	

S. Indiana	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Indiana in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Indiana	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Newport in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Newport	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	15	0									7	8													
Aminoglycosides - Streptomycin	32	15	13														2				13					
Amphenicols - Chloramphenicol	16	15	1													2	1	11	1							
Cephalosporins - Cefotaxime	0.5	15	0							2		11	2													
Fluoroquinolones - Ciprofloxacin	0.06	15	8				2		5			6	1	1												
Penicillins - Ampicillin	4	15	13											2					13							
Quinolones - Nalidixic acid	16	15	8													3	4			8						
Tetracyclines - Tetracycline	8	15	5											1	8	1				5						
Trimethoprim	2	15	5										9	1					5							
Cephalosporins - Ceftazidim	2	15	0									4	10	1												
Sulfonamides - Sulfamethoxazole	256	15	10														2	2	1						10	

S. Newport	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Newport in Turkeys - quantitative data [Dilution method]

S. Newport	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Agona in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	3	0										3													
Aminoglycosides - Streptomycin	32	3	0														1	2								
Amphenicols - Chloramphenicol	16	3	0														2	1								
Cephalosporins - Cefotaxime	0.5	3	0								1	2														
Fluoroquinolones - Ciprofloxacin	0.06	3	0						1	2																
Penicillins - Ampicillin	4	3	0											1	1	1										
Quinolones - Nalidixic acid	16	3	0													1	2									
Tetracyclines - Tetracycline	8	3	0												1	2										
Trimethoprim	2	3	0										3													
Cephalosporins - Ceftazidim	2	3	0										3													
Sulfonamides - Sulfamethoxazole	256	3	0														1	2								

S. Agona	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Agona in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Agona	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. 4,12:i:- in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. 4,12:i:-	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	1																		1					
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0												1											
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	1																	1						
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	1																						1	

S. 4,12:i:-	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. 4,12:i:- in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. 4,12:i:-	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Senftenberg in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Senftenberg	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	19	0									13	5	1												
Aminoglycosides - Streptomycin	32	19	1												4	5	5	3	1		1					
Amphenicols - Chloramphenicol	16	19	5												10	1	1	2	5							
Cephalosporins - Cefotaxime	0.5	19	0							11	2	3	3													
Fluoroquinolones - Ciprofloxacin	0.06	19	1				12		3	3				1												
Penicillins - Ampicillin	4	19	2										9	1	3	4	1		1							
Quinolones - Nalidixic acid	16	19	1													13	5			1						
Tetracyclines - Tetracycline	8	19	5											4	4	5	1		2	3						
Trimethoprim	2	19	0										15	4												
Cephalosporins - Ceftazidim	2	8	0									1	4	3												
Sulfonamides - Sulfamethoxazole	256	19	3														5	5	5	1			1		2	

S. Senftenberg	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Senftenberg in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Senftenberg	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of Salmonella spp., unspecified in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

Salmonella spp., unspecified	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	1																		1					
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0								1															
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	1																	1						
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	1																						1	

Salmonella spp., unspecified	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of Salmonella spp., unspecified in Turkeys - quantitative data [Dilution method]

Salmonella spp., unspecified	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Schwarzengrund in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Schwarzengrund	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0														1									
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																			
Penicillins - Ampicillin	4	1	0												1											
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Schwarzengrund	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Schwarzengrund in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Schwarzengrund	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Infantis in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	2	0									1		1												
Aminoglycosides - Streptomycin	32	2	0														1		1							
Amphenicols - Chloramphenicol	16	2	0														2									
Cephalosporins - Cefotaxime	0.5	2	0								2															
Fluoroquinolones - Ciprofloxacin	0.06	2	0						2																	
Penicillins - Ampicillin	4	2	0												2											
Quinolones - Nalidixic acid	16	2	0													2										
Tetracyclines - Tetracycline	8	2	0												2											
Trimethoprim	2	2	0										2													
Cephalosporins - Ceftazidim	2	2	0										2													
Sulfonamides - Sulfamethoxazole	256	2	0																1		1					

S. Infantis	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Infantis in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Infantis	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Meleagridis in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Meleagridis	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0														1									
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0								1															
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Meleagridis	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Meleagridis in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Meleagridis	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. 6,7:-:- in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. 6,7:-:-	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	2	0										1	1												
Aminoglycosides - Streptomycin	32	2	0															2								
Amphenicols - Chloramphenicol	16	2	0													1	1									
Cephalosporins - Cefotaxime	0.5	2	0								2															
Fluoroquinolones - Ciprofloxacin	0.06	2	0				1		1																	
Penicillins - Ampicillin	4	2	0											1	1											
Quinolones - Nalidixic acid	16	2	0													2										
Tetracyclines - Tetracycline	8	2	0												2											
Trimethoprim	2	2	0										2													
Cephalosporins - Ceftazidim	2	2	0									1	1													
Sulfonamides - Sulfamethoxazole	256	2	0															1	1							

S. 6,7:-:-	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. 6,7:-:- in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. 6,7:-:-	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Durham in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Durham	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0															1								
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Durham	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Durham in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Durham	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Give in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Give	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0														1									
Amphenicols - Chloramphenicol	16	1	0													1										
Cephalosporins - Cefotaxime	0.5	1	0								1															
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0											1												
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Give	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Give in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Give	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Mbandaka in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Turkeys																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	10	0									2	8												
Aminoglycosides - Streptomycin	32	10	0														8	2							
Amphenicols - Chloramphenicol	16	10	0													1	9								
Cephalosporins - Cefotaxime	0.5	10	0							3	6	1													
Fluoroquinolones - Ciprofloxacin	0.06	10	0				9		1																
Penicillins - Ampicillin	4	10	8											2					8						
Quinolones - Nalidixic acid	16	10	0													10									
Tetracyclines - Tetracycline	8	10	8											2						8					
Trimethoprim	2	10	8										2						8						
Cephalosporins - Ceftazidim	2	10	0									1	9												
Sulfonamides - Sulfamethoxazole	256	10	8															2						8	

S. Mbandaka	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Mbandaka in Turkeys - quantitative data [Dilution method]

S. Mbandaka	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Indiana in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Indiana	Turkeys																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	16	1									3	12						1							
Aminoglycosides - Streptomycin	32	16	15															1			15					
Amphenicols - Chloramphenicol	16	16	0												2	11	3									
Cephalosporins - Cefotaxime	0.5	16	0							15		1														
Fluoroquinolones - Ciprofloxacin	0.06	16	0				1		15																	
Penicillins - Ampicillin	4	16	15											1					15							
Quinolones - Nalidixic acid	16	16	0													16										
Tetracyclines - Tetracycline	8	16	14												1		1	11		3						
Trimethoprim	2	16	0										14	2												
Cephalosporins - Ceftazidim	2	16	0									14	1	1												
Sulfonamides - Sulfamethoxazole	256	16	15															1							15	

S. Indiana	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Indiana in Turkeys - quantitative data [Dilution method]

S. Indiana	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Newport in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Newport	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0														1									
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0												1											
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Newport	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Newport in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Newport	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Agona in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0															1								
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0								1															
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																			
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Agona	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Agona in Turkeys - quantitative data [Dilution method]

S. Agona	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Orion in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Orion	Gallus gallus (fowl) - laying hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0											1											
Aminoglycosides - Streptomycin	32	1	0															1							
Amphenicols - Chloramphenicol	16	1	0													1									
Cephalosporins - Cefotaxime	0.5	1	0							1															
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																		
Penicillins - Ampicillin	4	1	0											1											
Quinolones - Nalidixic acid	16	1	0													1									
Tetracyclines - Tetracycline	8	1	0											1											
Trimethoprim	2	1	0										1												
Cephalosporins - Ceftazidim	2	1	0										1												
Sulfonamides - Sulfamethoxazole	256	1	0														1								

S. Orion	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Orion in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Orion	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. 6,7:z10:- in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. 6,7:z10:-	Turkeys																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	2	0									1	1												
Aminoglycosides - Streptomycin	32	2	0																2						
Amphenicols - Chloramphenicol	16	2	0														2								
Cephalosporins - Cefotaxime	0.5	2	0								2														
Fluoroquinolones - Ciprofloxacin	0.06	2	0				2																		
Penicillins - Ampicillin	4	2	0											2											
Quinolones - Nalidixic acid	16	2	0													2									
Tetracyclines - Tetracycline	8	2	2																	2					
Trimethoprim	2	2	2																2						
Cephalosporins - Ceftazidim	2	2	0										2												
Sulfonamides - Sulfamethoxazole	256	2	2																					2	

S. 6,7:z10:-	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. 6,7:z10:- in Turkeys - quantitative data [Dilution method]

S. 6,7:z10:-	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Derby in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	48	0									2	42	3	1											
Aminoglycosides - Streptomycin	32	48	48																		48					
Amphenicols - Chloramphenicol	16	48	0														48									
Cephalosporins - Cefotaxime	0.5	48	0							4	44															
Fluoroquinolones - Ciprofloxacin	0.06	48	0				5		42	1																
Penicillins - Ampicillin	4	48	3											30	15				3							
Quinolones - Nalidixic acid	16	48	0													48										
Tetracyclines - Tetracycline	8	48	48																	48						
Trimethoprim	2	48	1										46	1			1									
Cephalosporins - Ceftazidim	2	48	0									1	46	1												
Sulfonamides - Sulfamethoxazole	256	48	48																						48	

S. Derby	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Derby in Turkeys - quantitative data [Dilution method]

S. Derby	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Rissen in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Rissen	Gallus gallus (fowl) - laying hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0									1													
Aminoglycosides - Streptomycin	32	1	0												1										
Amphenicols - Chloramphenicol	16	1	0												1										
Cephalosporins - Cefotaxime	0.5	1	0								1														
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																		
Penicillins - Ampicillin	4	1	0											1											
Quinolones - Nalidixic acid	16	1	0													1									
Tetracyclines - Tetracycline	8	1	0											1											
Trimethoprim	2	1	0										1												
Sulfonamides - Sulfamethoxazole	256	1	0														1								

S. Rissen	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64

Table Antimicrobial susceptibility testing of S. Rissen in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Rissen	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Agama in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agama	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0														1									
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0											1												
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	0																1							

S. Agama	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Agama in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Agama	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Kedougou in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Kedougou	Gallus gallus (fowl) - laying hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	2	0										2												
Aminoglycosides - Streptomycin	32	2	0														2								
Amphenicols - Chloramphenicol	16	2	0														2								
Cephalosporins - Cefotaxime	0.5	2	0							1	1														
Fluoroquinolones - Ciprofloxacin	0.06	2	0						2																
Penicillins - Ampicillin	4	2	0											2											
Quinolones - Nalidixic acid	16	2	0													2									
Tetracyclines - Tetracycline	8	2	2																	2					
Trimethoprim	2	2	2																2						
Cephalosporins - Ceftazidim	2	2	0									2													
Sulfonamides - Sulfamethoxazole	256	2	2																					2	

S. Kedougou	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Kedougou in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Kedougou	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. 3,15:-:- in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. 3,15:-:-	Turkeys																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0									1													
Aminoglycosides - Streptomycin	32	1	1																		1					
Amphenicols - Chloramphenicol	16	1	0															1								
Cephalosporins - Cefotaxime	0.5	1	0									1														
Fluoroquinolones - Ciprofloxacin	0.06	1	1										1													
Penicillins - Ampicillin	4	1	0												1											
Quinolones - Nalidixic acid	16	1	1																	1						
Tetracyclines - Tetracycline	8	1	1																	1						
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	1																						1	

S. 3,15:-:-	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. 3,15:-:- in Turkeys - quantitative data [Dilution method]

S. 3,15:-:-	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Dublin in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Dublin	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	3	0									2	1													
Aminoglycosides - Streptomycin	32	3	0												1		1	1								
Amphenicols - Chloramphenicol	16	3	0												1	2										
Cephalosporins - Cefotaxime	0.5	3	0							2	1															
Fluoroquinolones - Ciprofloxacin	0.06	3	0				3																			
Penicillins - Ampicillin	4	3	0										1	2												
Quinolones - Nalidixic acid	16	3	0													3										
Tetracyclines - Tetracycline	8	3	0											2	1											
Trimethoprim	2	3	0										3													
Cephalosporins - Ceftazidim	2	2	0									2														
Sulfonamides - Sulfamethoxazole	256	3	0														1	2								

S. Dublin	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Dublin in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Dublin	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Java in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Java	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	1																		1					
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	1																1							
Cephalosporins - Ceftazidim	2	1	0										1													
Sulfonamides - Sulfamethoxazole	256	1	1																						1	

S. Java	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Java in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Java	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Enteritidis in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	7	0									3	4													
Aminoglycosides - Streptomycin	32	7	0												5	2										
Amphenicols - Chloramphenicol	16	7	0													2	5									
Cephalosporins - Cefotaxime	0.5	7	0							2	5															
Fluoroquinolones - Ciprofloxacin	0.06	7	0						6	1																
Penicillins - Ampicillin	4	7	0												7											
Quinolones - Nalidixic acid	16	7	0													7										
Tetracyclines - Tetracycline	8	7	0												7											
Trimethoprim	2	7	0										7													
Cephalosporins - Ceftazidim	2	7	0									7														
Sulfonamides - Sulfamethoxazole	256	7	0															2	5							

S. Enteritidis	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Enteritidis in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Enteritidis	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Mbandaka in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	45	4									3	30	6	2			1	3							
Aminoglycosides - Streptomycin	32	45	6												1		28	8	2	1	5					
Amphenicols - Chloramphenicol	16	45	0												4		38	3								
Cephalosporins - Cefotaxime	0.5	45	0							10	33	2														
Fluoroquinolones - Ciprofloxacin	0.06	45	1				31		13			1														
Penicillins - Ampicillin	4	45	2										4	30	8	1			2							
Quinolones - Nalidixic acid	16	45	1													44				1						
Tetracyclines - Tetracycline	8	45	9											9	26	1				9						
Trimethoprim	2	45	3										42				1		2							
Cephalosporins - Ceftazidim	2	41	0										40	1												
Sulfonamides - Sulfamethoxazole	256	45	6														6	26	7						6	

S. Mbandaka	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Mbandaka in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Mbandaka	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Indiana in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Indiana	Gallus gallus (fowl) - broilers																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	2	0										2													
Aminoglycosides - Streptomycin	32	2	0														1	1								
Amphenicols - Chloramphenicol	16	2	0														2									
Cephalosporins - Cefotaxime	0.5	2	0							2																
Fluoroquinolones - Ciprofloxacin	0.06	2	2									2														
Penicillins - Ampicillin	4	2	2																2							
Quinolones - Nalidixic acid	16	2	2																	2						
Tetracyclines - Tetracycline	8	2	0												2											
Trimethoprim	2	2	0										2													
Cephalosporins - Ceftazidim	2	2	0									1	1													
Sulfonamides - Sulfamethoxazole	256	2	0															2								

S. Indiana	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Indiana in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Indiana	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Bovismorbificans in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Bovismorbificans	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0										1													
Aminoglycosides - Streptomycin	32	1	0															1								
Amphenicols - Chloramphenicol	16	1	0													1										
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0												1											
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Bovismorbificans	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Bovismorbificans in Turkeys - quantitative data [Dilution method]

S. Bovismorbificans	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Agona in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0											1											
Aminoglycosides - Streptomycin	32	1	0															1							
Amphenicols - Chloramphenicol	16	1	0															1							
Cephalosporins - Cefotaxime	0.5	1	0									1													
Fluoroquinolones - Ciprofloxacin	0.06	1	0							1															
Penicillins - Ampicillin	4	1	0													1									
Quinolones - Nalidixic acid	16	1	0														1								
Tetracyclines - Tetracycline	8	1	0													1									
Trimethoprim	2	1	0												1										
Cephalosporins - Ceftazidim	2	1	0											1											
Sulfonamides - Sulfamethoxazole	256	1	0															1							

S. Agona	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Agona in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Agona	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Orion in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Orion	Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	2	0									1		1											
Aminoglycosides - Streptomycin	32	2	0															1	1						
Amphenicols - Chloramphenicol	16	2	0												1			1							
Cephalosporins - Cefotaxime	0.5	2	0							1		1													
Fluoroquinolones - Ciprofloxacin	0.06	2	0				1			1															
Penicillins - Ampicillin	4	2	1										1						1						
Quinolones - Nalidixic acid	16	2	0													1	1								
Tetracyclines - Tetracycline	8	2	1													1				1					
Trimethoprim	2	2	0										2												
Cephalosporins - Ceftazidim	2	1	0											1											
Sulfonamides - Sulfamethoxazole	256	2	1															1						1	

S. Orion	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Orion in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. Orion	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. 6,7:z10:- in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. 6,7:z10:-	Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	1																1							
Aminoglycosides - Streptomycin	32	1	1																	1						
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																			
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0											1												
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	1																						1	

S. 6,7:z10:-	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. 6,7:z10:- in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

S. 6,7:z10:-	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Senftenberg in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Senftenberg	Gallus gallus (fowl) - laying hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	24	0									1	19	4											
Aminoglycosides - Streptomycin	32	24	0													2	10	11	1						
Amphenicols - Chloramphenicol	16	24	0												1	1	22								
Cephalosporins - Cefotaxime	0.5	24	0							2	14	8													
Fluoroquinolones - Ciprofloxacin	0.06	24	1				12		10	1		1													
Penicillins - Ampicillin	4	24	1											11	11	1			1						
Quinolones - Nalidixic acid	16	24	1													21	2			1					
Tetracyclines - Tetracycline	8	24	4											3	16	1				4					
Trimethoprim	2	24	0										22	1	1										
Cephalosporins - Ceftazidim	2	23	0									18	5												
Sulfonamides - Sulfamethoxazole	256	24	0														1	9	14						

S. Senftenberg	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Senftenberg in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Senftenberg	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Orion var. 15 in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Orion var. 15	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	3	0										3													
Aminoglycosides - Streptomycin	32	3	0															3								
Amphenicols - Chloramphenicol	16	3	0													1		2								
Cephalosporins - Cefotaxime	0.5	3	0							1		2														
Fluoroquinolones - Ciprofloxacin	0.06	3	2				1						2													
Penicillins - Ampicillin	4	3	0											1	2											
Quinolones - Nalidixic acid	16	3	2													1				2						
Tetracyclines - Tetracycline	8	3	0											1		2										
Trimethoprim	2	3	0										3													
Cephalosporins - Ceftazidim	2	3	0										3													
Sulfonamides - Sulfamethoxazole	256	3	0															3								

S. Orion var. 15	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Orion var. 15 in Turkeys - quantitative data [Dilution method]

S. Orion var. 15	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Agama in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agama	Turkeys																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0									1														
Aminoglycosides - Streptomycin	32	1	0														1									
Amphenicols - Chloramphenicol	16	1	0														1									
Cephalosporins - Cefotaxime	0.5	1	0							1																
Fluoroquinolones - Ciprofloxacin	0.06	1	0						1																	
Penicillins - Ampicillin	4	1	0											1												
Quinolones - Nalidixic acid	16	1	0													1										
Tetracyclines - Tetracycline	8	1	0											1												
Trimethoprim	2	1	0										1													
Cephalosporins - Ceftazidim	2	1	0									1														
Sulfonamides - Sulfamethoxazole	256	1	0															1								

S. Agama	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Agama in Turkeys - quantitative data [Dilution method]

S. Agama	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Kedougou in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Kedougou	Turkeys																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	25	0									15	8	2											
Aminoglycosides - Streptomycin	32	25	8														10	5	2		8					
Amphenicols - Chloramphenicol	16	25	0													4	18	3								
Cephalosporins - Cefotaxime	0.5	25	0							16	9															
Fluoroquinolones - Ciprofloxacin	0.06	25	0				15		10																	
Penicillins - Ampicillin	4	25	1											17	7				1							
Quinolones - Nalidixic acid	16	25	0													25										
Tetracyclines - Tetracycline	8	25	24												1					24						
Trimethoprim	2	25	6										19						6							
Cephalosporins - Ceftazidim	2	25	0									25														
Sulfonamides - Sulfamethoxazole	256	25	24														1								24	

S. Kedougou	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Kedougou in Turkeys - quantitative data [Dilution method]

S. Kedougou	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Montevideo in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Montevideo	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	3	0										3													
Aminoglycosides - Streptomycin	32	3	0														3									
Amphenicols - Chloramphenicol	16	3	0													1	2									
Cephalosporins - Cefotaxime	0.5	3	0							3																
Fluoroquinolones - Ciprofloxacin	0.06	3	0						3																	
Penicillins - Ampicillin	4	3	0											1	2											
Quinolones - Nalidixic acid	16	3	0													3										
Tetracyclines - Tetracycline	8	3	0												3											
Trimethoprim	2	3	0										3													
Cephalosporins - Ceftazidim	2	3	0									3														
Sulfonamides - Sulfamethoxazole	256	3	0															3								

S. Montevideo	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Montevideo in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Montevideo	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Ohio in Turkeys - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Ohio	Turkeys																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	unknown																								
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	1	0											1											
Aminoglycosides - Streptomycin	32	1	0															1							
Amphenicols - Chloramphenicol	16	1	0														1								
Cephalosporins - Cefotaxime	0.5	1	0								1														
Fluoroquinolones - Ciprofloxacin	0.06	1	0				1																		
Penicillins - Ampicillin	4	1	0											1											
Quinolones - Nalidixic acid	16	1	0													1									
Tetracyclines - Tetracycline	8	1	1																	1					
Trimethoprim	2	1	1																1						
Cephalosporins - Ceftazidim	2	1	0										1												
Sulfonamides - Sulfamethoxazole	256	1	1																					1	

S. Ohio	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Ohio in Turkeys - quantitative data [Dilution method]

S. Ohio	Turkeys	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Typhimurium in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Gallus gallus (fowl) - laying hens																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	unknown																									
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	>4096	1024	2048
Aminoglycosides - Gentamicin	2	7	0										7													
Aminoglycosides - Streptomycin	32	7	0														3	4								
Amphenicols - Chloramphenicol	16	7	0													1	6									
Cephalosporins - Cefotaxime	0.5	7	0							4	2	1														
Fluoroquinolones - Ciprofloxacin	0.06	7	0				1		6																	
Penicillins - Ampicillin	4	7	0											5	2											
Quinolones - Nalidixic acid	16	7	0													7										
Tetracyclines - Tetracycline	8	7	0												7											
Trimethoprim	2	7	0										7													
Cephalosporins - Ceftazidim	2	7	0									7														
Sulfonamides - Sulfamethoxazole	256	7	0														4	2	1							

S. Typhimurium	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128

Table Antimicrobial susceptibility testing of S. Typhimurium in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Typhimurium	Gallus gallus (fowl) - laying hens	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory	unknown	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol	2	64
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.015	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Cephalosporins - Ceftazidim	0.25	16
Sulfonamides - Sulfamethoxazole	8	1024

Table Cut-off values for antibiotic resistance testing of Salmonella in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		32	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.5	
Fluoroquinolones	Ciprofloxacin		0.06	
Penicillins	Ampicillin		4	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

Table Cut-off values for antibiotic resistance testing of Salmonella in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		32	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.5	
Fluoroquinolones	Ciprofloxacin		0.06	
Penicillins	Ampicillin		4	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

Table Cut-off values for antibiotic resistance testing of Salmonella in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		32	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.5	
Fluoroquinolones	Ciprofloxacin		0.06	
Penicillins	Ampicillin		4	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

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:
A single food survey was carried out in 2012 on pre-cut, ready to eat fruit (grapes). In total, 69 samples were tested, with no positives detected. Since 2009, the number of foodborne Campylobacter outbreaks in the UK has increased and in both 2010 and 2011, the number of outbreaks attributed to Campylobacter exceeded the number attributable to Salmonella. However, in 2012, there were fewer reported foodborne outbreaks - seven in total reported as confirmed due to Campylobacter. Six of the seven outbreaks were associated with consumption of poultry meat products (liver pâté/parfait) and one outbreak was associted with consumption of lamb.

Animals:
No surveys were carried out in 2012. Clinical diagnostic samples from animals in the UK, submitted to the Animal Health and Veterinary Laboratories Agency, the Scottish Agricultural College and the Agri-food and Biosciences Institute in 2012, were predominantly Campylobacter fetopathy cases. 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 6.3% (of a total 1340 investigated incidents) of all diagnoses of fetopathy. This is a lower proportion than seen in previous years where Campylobacter accounted for 14.4% (2011) and 21.3% (2010) of all diagnoses of fetopathy made following investigations during those years.

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). The research programme will also includes work to explore consumers' acceptability of interventions, including issues relating to cost, which will inform decisions on what is appropriate for the UK consumer and how best to communicate the Campylobacter control programme to the public. The findings of the first wave of research, Citizens' Forums on Campylobacter, were published in 2010 (http://www.food.gov.uk/science/socsci/ssres/foodsafetyss/citforumcampy).

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 surveys were carried out in 2012

Table Campylobacter in other food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni
Fruits - pre-cut - ready-to-eat - at retail - Surveillance [1)]	PHE	Objective sampling	Not applicable	food sample	Unknown	Single	25g	69	0	0	0

	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Fruits - pre-cut - ready-to-eat - at retail - Surveillance [1)]	0	0	0

Comments:

[1)] Grapes

Footnote:

PHE = Public Health England (previously the Health Protection Agency)

2.2.4 Campylobacter in animals

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
Birds - Clinical investigations [1)]	SAC	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	0	0	0
Cats - pet animals - Clinical investigations	SAC	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	22	1	3	0
Cattle (bovine animals) - at farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	55	2	2	0
Dogs - pet animals - Clinical investigations	SAC	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	215	5	38	0
Gallus gallus (fowl) - unspecified - at farm (monitoring or clinical investigations)	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	3	1	1	0
Pigs - unspecified - at farm (monitoring or clinical investigations)	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	3	3	0	0
Sheep - at farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	145	6	11	0
Solipeds, domestic - horses - Clinical investigations	SAC	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	0	2	0
Zoo animals, all - at zoo - Clinical investigations [2)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	0	0	0

	C. upsaliensis	Thermophilic Campylobacter spp., unspecified	C. fetus	C. hyointestinalis	C. mucosalis	C. sputorum	Campylobacter spp., unspecified
Birds - Clinical investigations [1)]	0	0	0	0	0	0	1

Table Campylobacter in animals

	C. upsaliensis	Thermophilic Campylobacter spp., unspecified	C. fetus	C. hyointestinalis	C. mucosalis	C. sputorum	Campylobacter spp., unspecified
Cats - pet animals - Clinical investigations	8	0	0	0	0	0	10
Cattle (bovine animals) - at farm - Clinical investigations	0	0	27	4	1	9	10
Dogs - pet animals - Clinical investigations	0	0	0	0	0	2	170
Gallus gallus (fowl) - unspecified - at farm (monitoring or clinical investigations)	0	1	0	0	0	0	0
Pigs - unspecified - at farm (monitoring or clinical investigations)	0	0	0	0	0	0	0
Sheep - at farm - Clinical investigations	0	0	94	1	1	3	29
Solipeds, domestic - horses - Clinical investigations	0	0	0	0	0	0	0
Zoo animals, all - at zoo - Clinical investigations [2)]	0	0	0	0	0	0	1

Comments:

[1)] Rhea (1)

[2)] Rhinoceros (1)

Footnote:

The table includes data on diagnoses made from clinical diagnostic material submitted to government veterinary laboratories (AHVLA/AFBI/SAC). The total units tested are not known for the UK as a whole because the laboratories do not routinely report negative results, unless part of an official control programme or survey.

AHVLA = Animal Health and Veterinary Laboratories Agency in Great Britain
AFBI = Agri-food and Biosciences Institute in Northern Ireland.
The Scottish Agricultural College (SAC) supplies data on recorded incidents in Scotland to the AHVLA for inclusion in the Veterinary Investigation Diagnostic Analysis (VIDA) system.

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

.

Results of the investigation

No surveys were carried out in 2011.

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

Results of the investigation

No surveys were carried out in 2011

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

Results of the investigation

No surveys were carried out in 2011.

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

Results of the investigation

No surveys were carried out in 2011.

E. Antimicrobial resistance in Campylobacter jejuni and coli in pigs

Results of the investigation

There were no surveys carried out in 2011.

F. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Laboratory used for detection for resistance

Cut-off values used in testing

Results of the investigation

No surveys were carried out in 2012.

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Fluoroquinolones	Ciprofloxacin		1	
Macrolides	Erythromycin		16	
Tetracyclines	Tetracycline		2	

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Fluoroquinolones	Ciprofloxacin		1	
Macrolides	Erythromycin		16	
Tetracyclines	Tetracycline		2	

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Fluoroquinolones	Ciprofloxacin		1	
Macrolides	Erythromycin		16	
Tetracyclines	Tetracycline		2	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		1	
	Streptomycin		2	
Fluoroquinolones	Ciprofloxacin		1	
Macrolides	Erythromycin		4	
Tetracyclines	Tetracycline		2	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		1	
	Streptomycin		2	
Fluoroquinolones	Ciprofloxacin		1	
Macrolides	Erythromycin		4	
Tetracyclines	Tetracycline		2	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		1	
	Streptomycin		2	
Fluoroquinolones	Ciprofloxacin		1	
Macrolides	Erythromycin		4	
Tetracyclines	Tetracycline		2	

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

Human Data
There were 183 cases in the UK in 2012, an increase of 11.6% when compared with 2011. Nineteen of the cases were pregnancy-associated.

Food:
Results of surveys carried out in 2012 are given in the tables. Listeria spp were detected in 10 of the samples tested during the year.

Animals:
During 2012, there were 220 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, the Scottish Agricultural

College and the Agri-food and Biosciences Institute. Of the total, 175 incidents were recorded in Great Britain and 45 in Northern Ireland. This included 66 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 139 incidents where listeriosis was diagnosed, as the cause of meningitis, septicaemia or abortions.

During 2011, listeriosis was diagnosed in 164 incidents in animals in the UK. Of these, 146 occurred in Great Britain compared to 220 in 2010. 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 percentage of foetopathy cases in sheep and goats due to infection with Listeria spp as a percentage of all diagnoses remained lower than 5% at 1.6% out of a total 1340 incidents of diagnosed fetopathy investigated during the year (2012) compared to 3.4% (2011) and 2.5% (2010).

The data reported in the table for prevalence in animals summarises confirmed clinical diagnoses of listeriosis from specimens submitted to AHVLA, SAC and AFBI laboratories during 2012. 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 2011 where Listeria monocytogenes was isolated from the faeces of two pet corvids (crows), which belonged to a woman who had been hospitalised with encephalitic listeriosis. Extensive investigations by environmental health officers had not identified a likely food-source for the human infection. The pet crows were considered a possible source as they were kept inside the house and permitted to fly around, out of their enclosure, on occasion. Definitive identification of the human and crow isolates revealed the involvement of an identical serotype, Listeria monocytogenes serotype 1/2a. L. monocytogenes is widely distributed in the environment, and also in the intestines of apparently healthy animals, including humans. Studies have identified a high prevalence of L. monocytogenes in some birds, particularly crows. Although the serotypes identified from both the human case and the crows were the same, it is not possible to definitively say that the crows were the source of the infection.

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 other foods

	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
Other processed food products and prepared dishes - sandwiches - at retail - Surveillance	PHE	Unspecified	Not applicable	food sample	Domestic	Single	25g	285	9	285	0
Fruits - pre-cut - ready-to-eat - at retail - Surveillance [1)]	PHE	Unspecified	Not applicable	food sample	Unknown	Single	25g	306	0	306	0
Fruits - products - dried - at retail - Surveillance	PHE	Unspecified	Not applicable	food sample	Imported from outside EU	Single	25g	175	0	175	0
Nuts and nut products - dried - at retail - Surveillance	PHE	Unspecified	Not applicable	food sample	Imported from outside EU	Single	100g	63	0	63	0
Other processed food products and prepared dishes - snacks other than chips and similar - at retail - Surveillance [2)]	PHE	Unspecified	Not applicable	food sample	Unknown	Single	25g	157	0	157	0
Spices and herbs - dried - at retail - Surveillance [3)]	PHE	Unspecified	Not applicable	food sample	Imported from outside EU	Single	100g	31	1	31	0
Spices and herbs - dried - at retail - Surveillance [4)]	PHE	Unspecified	Not applicable	food sample	Imported from outside EU	Single	100g	8	0	8	0

	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Other processed food products and prepared dishes - sandwiches - at retail - Surveillance	285	9	0
Fruits - pre-cut - ready-to-eat - at retail - Surveillance [1)]	306	0	0

Table Listeria monocytogenes in other foods

	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Fruits - products - dried - at retail - Surveillance	175	0	0
Nuts and nut products - dried - at retail - Surveillance	63	0	0
Other processed food products and prepared dishes - snacks other than chips and similar - at retail - Surveillance [2)]	157	0	0
Spices and herbs - dried - at retail - Surveillance [3)]	31	1	0
Spices and herbs - dried - at retail - Surveillance [4)]	8	0	0

Comments:

[1)] Grapes

[2)] Pies, pasties & Samosas

[3)] Spices

[4)] Herbs

Footnote:

PHE = Public Health England (previously the Health Protection 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
Alpacas - unspecified - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	1	0
Cattle (bovine animals) - at farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	66	44	22
Goats - at farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	7	6	1
Lamas - unspecified - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	1	0
Poultry, unspecified - at farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	4	2	2
Sheep - at farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	132	62	70
Solipeds, domestic - at farm - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	3	3	0
Squirrels - wild - unspecified - Clinical investigations	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	2	0
Zoo animals, all - at zoo - Clinical investigations [1)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	4	4	0

Comments:

[1)] Bongo (3)

Footnote:

The table includes data on diagnoses made from clinical diagnostic material submitted to Government veterinary laboratories (AHVLA/ AFBI/ SAC). The total units tested are not known for the UK as a whole because the laboratories do not routinely report negative results, unless part of an official control programme or survey.

Table Listeria in animals

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. The Scottish Agricultural College (SAC) supplies data on recorded incidents in Scotland to the AHVLA for inclusion in the Veterinary Investigation Diagnostic Analysis (VIDA) system.
AFBI = Agri-food and Biosciences Institute in Northern Ireland.

United Kingdom - 2012 Report on trends and sources of zoonoses

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 2012.

Animals:
During 2012, there were four outbreaks of human infection with VTEC O157 where animal-associated sources of human infection were suspected. All outbreaks were in England or Wales, there were no outbreaks of VTEC O157 infection linked to contact with farm animals reported in Scotland or in Northern Ireland.

Four outbreaks were linked to open farms and one to a large country park. 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. 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 2012, four foodborne outbreaks of VTEC O157 were reported - one linked to consumption of under -cooked burgers and one to consumption of minced beef products.

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.

Results of the investigation

In 2012, there were 1,217 laboratory confirmed cases of VTEC O157 reported in humans in the UK (795 in England and Wales, 188 in Scotland and 234 in Northern Ireland).

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 (formerly the Health Protection Agency (HPA))/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, HPA 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.

There were four confirmed animal-associated outbreaks of VTEC O157 in humans recorded during 2012.

No surveys were carried out for VTEC in cattle, sheep or pigs in the UK in 2012 - the last national survey in these species was conducted in 2003 in Great Britain, and results are in the report for 2004.

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

Control program/mechanisms

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.hse.gov.uk/pubns/ais23.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 2012. Prevention of the spread of E.coli in animals relies on good hygiene, such as keeping any bedding clean and dry.

The Health and Safety Executive website contains further information for visitors to farms which can be found at: www.hse.gov.uk/campaigns/farmsafe/ecoli.htm. 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

During 2012, there were four outbreaks of human infection with VTEC O157 where animal-associated sources of human infection were suspected. Three premises (one open farm, one open farm with a commercial dairy unit, one country park) were in England and one (an open farm) was in Wales: there were no outbreaks of VTEC O157 infection linked to contact with farm animals reported in Scotland or in Northern Ireland.

Investigations, including animals 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 comparision 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.

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

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.

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) - at farm - Monitoring	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	8	1	1
Cattle (bovine animals) - calves (under 1 year) - at farm - Monitoring	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	5	2	2
Sheep - at farm - Monitoring	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	26	2	2
Alpacas - unspecified - Surveillance (human disease outbreak investigation)	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	2	1	1
Dogs - pet animals - unspecified - Surveillance (human disease outbreak investigation)	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	3	0	0
Goats - at farm - Surveillance (human disease outbreak investigation)	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	15	2	2
Other animals - unspecified - Surveillance (human disease outbreak investigation) [1)]	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	3	1	1
Pet animals, all - unspecified - Surveillance (human disease outbreak investigation) [2)]	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	2	0	0
Pigs - at farm - Surveillance (human disease outbreak investigation)	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	20	4	4
Poultry, unspecified - at farm - Surveillance (human disease outbreak investigation)	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	1	0	0
Solipeds, domestic - unspecified - Surveillance (human disease outbreak investigation)	AHVLA	Suspect sampling	Not applicable	animal sample > faeces	Domestic	ISO 16654:2001	Animal	1g	6	1	1

Table VT E. coli in animals

	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Cattle (bovine animals) - at farm - Monitoring	0	0
Cattle (bovine animals) - calves (under 1 year) - at farm - Monitoring	0	0
Sheep - at farm - Monitoring	0	0
Alpacas - unspecified - Surveillance (human disease outbreak investigation)	0	0
Dogs - pet animals - unspecified - Surveillance (human disease outbreak investigation)	0	0
Goats - at farm - Surveillance (human disease outbreak investigation)	0	0
Other animals - unspecified - Surveillance (human disease outbreak investigation) [1)]	0	0
Pet animals, all - unspecified - Surveillance (human disease outbreak investigation) [2)]	0	0
Pigs - at farm - Surveillance (human disease outbreak investigation)	0	0
Poultry, unspecified - at farm - Surveillance (human disease outbreak investigation)	0	0
Solipeds, domestic - unspecified - Surveillance (human disease outbreak investigation)	0	0

Comments:

[1)] Water Buffalo (2), Guanaco (1)

[2)] Rabbit and guinea pig

Table VT E. coli in animals

Footnote:

The table includes data derived from VTEC O157 outbreak investigations undertaken where an animal-associated source is suspected. Outbreak settings include premises open to the general public including "open farms", zoos, country parks etc.

There were no surveys for VTEC in animals carried out in 2012.

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. However, Scotland was designated an OTF region in October 2009.

Great Britain (England, Scotland and Wales):
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. The provisional 2012 incidence rate for GB, based on new breakdowns with OTF status withdrawn (OTF-W), was broadly equivalent to the 2011 incidence rate at 4.7%.

The distribution of bovine TB incidents in 2012 in Great Britain continued to be 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.

Northern Ireland:
The control of bovine TB in cattle in NI 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%). Since then disease levels have reduced. However, during a fourteen month period from August 2011 to October 2012, a rise in both parameters was noted (annual herd incidence increased from 4.99% to 7.6%). In the period following this to February 2013, there has been a fall again (currently annual herd incidence is 7.1%). A number of reasons are considered to influence the continued incidence of the disease in cattle. These include, inter alia, test sensitivity, the effects of a reservoir of the disease in wildlife and of the amount of movement of cattle, both inter-holding and intra-holding. Inter-holding movement is frequently through cattle markets and the amount of intra-holding movement is influenced by the high level of farm fragmentation.

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, approximately 3% of all active cases of TB in humans are due to m.bovis, predominantly in elderly UK born males.

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 2012, M. bovis infection was confirmed by culture of the organism from 16 sheep, 2 goats, 18 pigs, 35 alpacas, 3 llamas, 9 domestic cats, 1 domestic dog, 12 wild/park deer and 1 wild boar. Some of these isolations (e.g. pigs, camelids) represent incidents involving two or more infected animals from the same holding. In Northern Ireland in 2012, 240 badgers (found dead, including road traffic accidents) were tested and 36 were found positive for M. bovis.

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 this process continued in 2012. Revised routine TB herd testing intervals were adopted on 1st January 2012. As a result, 49% of English herds were on annual TB testing, 10 % on biennial testing and the remainder were routinely tested every 4 years (41%).

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 2012, 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 2012. 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.

Nevertheless, the development of cattle vaccines and oral badger vaccines continues and is a high research priority in Great Britain but we cannot say with any certainty when these vaccines might be ready to deploy.

The first injectable badger vaccine, BadgerBCG, was licensed in March 2010 and is available for use on prescription. BadgerBCG is currently being used in a Government-funded Badger Vaccine Deployment Project in Gloucestershire.

Other preventive measures than vaccination in place

None at present in NI.

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

Great Britain (England, Wales and Scotland):
Approximately 88500 herds in Great Britain had a tuberculin skin test in 2012. There was a provisional 7% increase in the total number of new TB breakdowns detected in Great Britain in 2012 (5170) compared with 2011 (4,830). Of these new TB breakdowns in 2012, 3430 led to withdrawal of OTF herd status (confirmed breakdowns), compared with 2,965 in 2011.

Taking into account the overall number of tuberculin skin tests performed in unrestricted herds (73655 in 2012, an increase from 62,464 in 2011), this equates to a total herd TB incidence of 7%, compared to 7.7% for the previous year. The estimated herd incidence of bovine TB breakdowns with OTF status withdrawn in 2012 was 4.7%, which is similar to that of 2011.

A total of 37,068 test reactors were identified in just under 8 million cattle tests performed in Great Britain during 2012. This equated to a TB test reactor detection rate of 4.6 for every 1,000 tests carried out on animals. A total of 1,784 cattle carcases with suspicious TB lesions (of which approximately 67% yielded M. bovis on culture) were detected at commercial slaughter of cattle in GB, thus supplementing active TB surveillance by skin testing and contributing to the overall identification of the 5170 new breakdowns mentioned above.

Overall, 45313 IFN-γ tests were carried out in 2012 in Great Britain and 2,292 positive animals identified for removal.

Northern Ireland:
Approximately 23,160 herds were tuberculin tested during 2012 (approx. 1.65 million cattle). The herd and animal incidence of TB has increased over the last year with the current levels running at 7.1% and 0.657%, respectively (previous 13-24 months, herd incidence = 6.51%, animal incidence = 0.522%). At the end of 2012, the 12-month moving average for TB reactors was 908 per month (compared to 679 in December 2011). The 12-month moving average for new TB herd breakdowns was 141 herds per month (cf. 116 in December 2011). At the end of December 2012, 5.5% of herds in Northern Ireland had OTF status withdrawn due to a bovine TB incident. This is an increase on the 5.2% of herds of OTF status withdrawn at the end of 2011.

Overall, 16,162 IFN-γ tests were carried out in Northern Ireland in 2012 and 446 γIFN positive but SICTT negative animals were removed.

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

Disease levels are measured differently between GB and Northern Ireland e.g. NI figures include unconfirmed and confirmed bTB breakdowns.
TB annual herd incidence in NI reached 4.99% at 31st August 2011 but it has increased significantly since then. The live animal surveillance disclosure trend was level for 4 years and then rose consistently for 14 consecutive months. The 2012 annual herd incidence was 7.32% compared with the 2011 figure of 6.00%. The increase in herd and animal incidence has been province wide.
Investigation into the cause(s) continues but given the prolonged rise, the variation across the region, and geographical differences, it is unlikely to be due to a single point source and may indicate local factors were an important driver. It is possible the cause is resolved leaving behind increased rate of spread due to weight of infection that developed. The live animal surveillance disclosure trend decreased over the 4 months to end February 2013.

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 at 50% of their market value up to a ceiling of £1,200 (i.e. the maximum compensation payable is £600). 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.

Results of the investigation

United Kingdom - Great Britain:
During 2012, M. bovis was cultured from 12 wild deer and from 2 farmed tuberculous deer carcasses detected at postmortem inspection (statutory notifications to AHVLA). Virtually all of the infected wild deer carcasses were found in counties of southwest England and southeast Wales where there is a high incidence of bovine TB.

United Kingdom - Northern Ireland
In 2012, lesions from 11 wild deer carcases and i farmed deer carcases were submitted for histopathological and bacteriological examination in relation to suspected TB. Following spoligotyping one of the wild was found to be M. bovis positive.

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	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Sheep [1)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	36	16	16	0	0
Goats [2)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	9	2	2	0	0
Pigs [3)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	196	20	18	0	2
Alpacas - at farm - Clinical investigations [4)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	342	35	35	0	0
Badgers - wild - Survey (Northern Ireland) [5)]	NRL	Objective sampling	Official sampling	animal sample > organ/tissue	Domestic	Animal	240	36	36	0	0
Cats - pet animals - Clinical investigations [6)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	63	13	9	0	4
Deer - Clinical investigations (wild and park deer) [7)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	29	12	12	0	0
Dogs - pet animals - Clinical investigations [8)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	4	1	1	0	0
Lamas - at farm - Clinical investigations [9)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	9	4	3	0	1
Wild boars [10)]	NRL	Suspect sampling	Official sampling	animal sample	Domestic	Animal	1	1	1	0	0

Comments:

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

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

[3)] Routine meat inspection at slaughterhouses

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

Table Tuberculosis in other animals

Comments:

Submission of tissue specimens by state veterinarians from TB test reactors, contacts and suspect clinical cases.

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

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

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

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

[9)] Clinical investigations - submission of tissue specimens by state and private veterinarians from suspect tuberculous animals disclosed at post mortem examination. Submission of tissue specimens by state veterinarians from TB test reactors, contacts and suspect clinical cases.

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

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	25776	25776	23918	2073	1695	17	.82	92.79	8.67	7.09
United Kingdom [1)]	66282	66282	43631	8846	5049	4	.05	65.83	20.27	11.57
Total : [2)]	92058	92058	67549	10919	6744	21	.19	73.38	16.16	9.98

Comments:

[1)] England and Wales only. Scotland is an officially TB free region of the UK since 2009 and is not included in the co-financed TB eradication programme for the UK.

[2)] N.A.

Footnote:

In the table "United Kingdom" refers to England and Wales only. 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 Scotland are included in the table for countries and regions that do not receive community co-financing for an eradication programme.

The figure for the total number of herds checked represents the number of holdings (CPHs) that have had a test and not the total number of tests that have been carried out on each holding throughout the year. This change in approach explains the decrease in the percentage of herd coverage for 2012 and 2011 compared to previous years.The figures for the number of positive herds includes all herds that had their Official TB Free (OTF) status withdrawn or suspended at the same time during 2012 due to a TB breakdown. The figure for the number of new positive herds indicates the total new TB breakdowns that were identified/began in 2012. 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 purposes of controlling outbreaks where the herd's Official TB Free status had been withdrawn.

Northern Ireland: Total number of herds based on the number of cattle herds presenting cattle for a TB herd test during the last 4 years. The data for the number of positive herds refers to herds with TB reactors.

Table Tuberculosis in farmed deer

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

Region	Total number of existing farmed deer		Free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	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			
Northern Ireland							no routine test			1	0
United Kingdom [1)]	380	30000			6	1.58	no routine test				2
Total : [2)]	380	30000	0	0	6	1.58	N.A.	0	0	1	2

Comments:

[1)] Great Britain

[2)] N.A.

Footnote:

In the table, the region designated as 'United Kingdom' refers to Great Britain (England, Scotland and Wales) and the data from Northern Ireland is reported separately. The total numbers of animals and herds are available for Great Britain only, obtained from the UK Agricultural census and are approximate. No population data is available for Northern Ireland. No routine TB testing of deer herds is carried out on farms in the UK and there is no data available on tuberculin tests in deer. Official post- mortem examination of all slaughtered animals is implemented.

There were 2 animals detected positive in bacteriological examination for Mycobacterium bovis. Lesions suspicious of TB were detected in 1 animal in Northern Ireland but Mycobacterium bovis infection was not confirmed.

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	1625446	1568191	1643511	1643511	10896	10896	12290	104.8	.66
United Kingdom [1)]	7026963	7026963	7798438	7798438	36660	36660	37592	110.98	.47
Total : [2)]	8652409	8595154	9441949	9441949	47556	47556	49882	109.85	.5

Comments:

[1)] England and Wales only. Scotland is an officially TB free region of the UK since 2009 and is not included in the co-financed TB eradication programme for the UK.

[2)] N.A.

Footnote:

In the table "United Kingdom" refers to England and Wales only. 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 Scotland are included in the table for countries and regions that do not receive community co-financing for an eradication programme.

Under the current reporting methods, it is not possible to distinguish the number of individual animals tested for TB during the year, so the figure for total number of animals tested included animals which may have been tested and counted more than once. Therefore, the animal coverage percentage may exceed 100% in certain regions of Great Britain. The figures for the number of animals tested individually and the number of positive animals include animals that were skin test reactors, inconclusive reactors on two occasions and gamma interferon blood test reactors, regardless of the post mortem and culture findings. The figure for the total number of animals slaughtered includes, in addition to the animals that were detected positive through skin testing or the gamma interferon test, also non- reactor cattle taken as a direct contacts to known infected animals in herds where the Official TB Free status was withdrawn.

Northern Ireland: Total number of animals based on 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 during the last 4 years. The number of animals tested is the actual number tested during the year.

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	25776	1568191			521	85854	904	103186	1739	145706			22612	1233455
United Kingdom [1)]	66283	7026963	2		3189				743				61683	
Total : [2)]	92059	8595154	2	0	3710	85854	904	103186	2482	145706	0	0	84295	1233455

Comments:

[1)] England and Wales only. Scotland is an officially TB free region of the UK since 2009 and is not included in the co-financed TB eradication programme for the UK.

[2)] N.A.

Footnote:

In the table "United Kingdom" refers to England and Wales only. 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 Scotland are included in the table for countries and regions that do not receive community co-financing for an eradication programme.

The figure for the number of herds that had Officially Free TB status suspended includes the total number of herds under TB- related movement restrictions (ie herds where Officially TB Free status was withdrawn or suspended due to detection of test reactors or for other reasons such as overdue TB tests). Because TB tests are not linked to official animal identifiers, it is not possible to report the number of animals with free or officially free status suspended or confirmed during 2012 for England and Wales. For this reason, it is also not possible to provide figures for the other columns on last check results.

Northern Ireland: Total number of animals under the programme based on the average number of cattle presented at TB herd tests during the last 4 years.

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)]	12982	1731070	12981	99.99	5	.04	risk based	221765	3967	34	6
Total : [2)]	12982	1731070	12981	99.99	5	.04	N.A.	221765	3967	34	6

Comments:

[1)] Interval between routine tuberculin tests: 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 2012, 2,201 OTF herds were routinely skin tested and a further 1,018 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.

Interval between routine tuberculin tests: 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 2012, 2,201 OTF herds were routinely skin tested and a further 1,018 OTF herds were exempted from routine testing as “low risk”

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 2012, there were no cases of brucellosis of cattle in Great Britain, which has retained its Officially Brucellosis Free Status. There continued to be 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 2012.

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 brucellosis are associated with infection in cattle.

Additional information

During 2012, a total of 1,706 dogs for export were tested for brucellosis; all were negative. Serology of 275 alpacas, 58 deer 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 and an increase in the number of human cases has been seen since 1998.

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

The entire country is 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 2012 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 2012, AHVLA Weybridge tested 42,124 bulk milk samples from 10,356 farms as part of the national surveillance programme. Routine monitoring of cattle abortions and premature calvings was carried out with 6,449 cases investigated during the year. A total of 13,069 animals were tested serologically with 0 animals detected as positive. Both were slaughtered but neither was confirmed on post mortem analysis.
Overall, there were no cases of brucellosis in cattle confirmed during 2012.

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 2012, surveillance for brucellosis was provided by the National Sheep and Goat Survey. 716 blood samples from 185 goat herds in Great Britain and 73 samples from 7 goat herds in Northern Ireland were tested, all with negative results.

In addition, in Great Britain, samples from 32 goat abortions were investigated. All were negative on test for brucellosis. No goat abortions were investigated in Northern Ireland 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 2012, 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 21,071 blood samples from 1,311 flocks were tested in Great Britain, all with negative results. In Northern Ireland, a total of 3,504 animals in 193 flocks were tested, all with negative results.

A total of 1,493 and 312 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 2011, 9,350 samples from pigs in Great Britain and 178 samples from pigs in Northern Ireland were tested as part of the artificial insemination or pre-export screening requirements. All pigs were negative.

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 some 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 > 30 iu is detected at this test, the sample is again tested by means of an SAT (EDTA) test and complement fixation test (CFT). Any animal giving an SAT test result of >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. In addition, monthly bulk milk samples, which are collected by the dairies, are tested at the Veterinary Sciences Division (Stormont) laboratory using an ELISA kit.

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.

The amount of compensation varies depending on whether the animal is a reactor or a contact. In the case of reactors, compensation is paid to a limit of 75% of the average market value subject to a ceiling based on market returns. In the case of contact animals, 100% of the value was paid with no upper limit until local legislation was changed from September 2012, from which time compensation has been payable to the same limit (75%) as reactor cattle. 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. If the amount of salvage received by DARD for the carcase exceeds the compensation payable under the above rules then the difference is paid to the herd keeper.

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. 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.

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 2012, 19,812 herds were checked. In total 23 herds were positive, (23 new herds positive) during the period. Overall 879,831 animals were tested individually and 64 animals were detected as positive. The annual herd incidence was 0.12% in December 2012 and the annual animal incidence was 0.007% in the same month compared to an annual herd incidence of 0.10% and an annual animal incidence of 0.026% for the same period in 2011. Two administrative regions in the country contributed the majority of the reactors during the period 2008 to 2012. During 2012, there was only one new confirmed Brucellosis herd

breakdown - this occurred in a previous disease hotspot area.

There were no confirmed breakdowns from March to the end of December 2012. In 2012, one brucellosis reactor was detected during pre-movement testing from 173,036 animal tests.

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.

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 occur which are 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	2768	0	0	0	0
Alpacas - at farm - Surveillance [2)]	NRL	Selective sampling	Industry sampling	animal sample > blood	Domestic	Animal	275	0	0	0	0
Deer - at farm - Surveillance [3)]	NRL	Selective sampling	Industry sampling	animal sample > blood	Domestic	Animal	58	0	0	0	0
Dogs - pet animals - Surveillance [4)]	NRL	Selective sampling	Industry sampling	animal sample > blood	Domestic	Animal	1706	0	0	0	0
Sheep - Surveillance [5)]	NRL	Selective sampling	Official and industry sampling	animal sample > blood	Domestic	Animal	6	0	0	0	0
Zoo animals, all - at zoo - Surveillance [6)]	NRL	Selective sampling	Official and industry sampling	animal sample > blood	Domestic	Animal	7	0	0	0	0

	Brucella spp., unspecified
Pigs [1)]	0
Alpacas - at farm - Surveillance [2)]	0
Deer - at farm - Surveillance [3)]	0
Dogs - pet animals - Surveillance [4)]	0
Sheep - Surveillance [5)]	0

Table Brucellosis in other animals

	Brucella spp., unspecified
Zoo animals, all - at zoo - Surveillance [6]	0

Comments:

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

[2] Import/export testing

[3] Import/export testing

[4] Import/export testing

[5] Import/export testing

[6] Import/export testing Oryx (4), Bongo (1), Seal (2)

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	25776	25776	22691	23	23	1	4.35	88.03	.1	.1
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 BR test where number of cattle exceeds 0 (19,812 herds had a herd test where cattle were presented compared to 20,080 in same period of 2011)

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	1625446	919770	938678	879831	64	64	277	102.06	.01
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 cattle 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	25776	919770	0	0	7	1539	15	919	333	12644			25399	904668
Total : [1)]	25776	919770	0	0	7	1539	15	919	333	12644	0	0	25399	904668

Comments:

[1)] N.A.

Footnote:

Total number of herds under the programme: number of cattle herds in which cattle were presented at a brucellosis herd test during the last 4 years.

Total number of animals under the programme: based on the average number of cattle presented at brucellosis herd tests over 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	75174	32313900	75174	100	0	0	1696	25364	0	172	0	2757	0	0
Total : [1)]	75174	32313900	75174	100	0	0	1696	25364	0	172	0	2757	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)]	79174	8129760	79174	100	0	0	865	13069	0	10356	42124	0	6449	0	0	50	0	2	0	0	0
Total : [2)]	79174	8129760	79174	100	0	0	865	13069	0	10356	42124	0	6449	0	0	50	0	2	0	0	0

Comments:

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

[2)] N.A.

Footnote:

In the table "United Kingdom" refers to data from Great Britain - England, Scotland, and Wales. Northern Ireland had a community co-financed programme in 2012.

The bulk milk testing strategy was revised from monthly to quarterly from the 1st April 2011

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 2012.

Animals: No surveys were conducted in animals in 2012. During the year, there were 50 cases of yersiniosis reported in the UK in animals (16 in Great Britain and 34 in Northern Ireland), in all cases from clinical diagnostic samples submitted by private veterinarians to the Animal Health and Veterinary Laboratories Agency, the Scottish Agricultural College 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 0.5% out of a total 1340 incidents of all diagnoses of fetopathy investigated during the year.

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

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.

The data reported in the table for prevalence in animals summarizes confirmed clinical diagnoses of yersiniosis from specimens submitted to AHVLA, SAC and AFBI laboratories during 2012. For Great Britain data, diagnoses use strict criteria and are recorded (once only per incident) using the Veterinary Investigation Diagnostic Analysis (VIDA) system.

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 farm

No national survey was carried out in 2012. The last survey of pigs was conducted in 2003 and reported in 2004.

Diagnostic/analytical methods used

Animals at farm

Culture

Animals at slaughter (herd based approach)

Culture

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)	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	16	14	0	2
Sheep	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	30	14	9	7
Deer	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	0	0	1
Other animals - unspecified - Clinical investigations [1)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	2	0	1	1
Squirrels (Red)	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic	Animal	unknown	1	1	0	0

	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified
Cattle (bovine animals)	0	0	14
Sheep	0	0	14
Deer	0	0	0
Other animals - unspecified - Clinical investigations [1)]	0	0	0
Squirrels (Red)	0	0	1

Comments:

[1)] Bat (1), Coucal (1)

Table Yersinia in animals

Footnote:

The table includes data on diagnoses made from clinical diagnostic material submitted to Government veterinary laboratories (AHVLA/ AFBI/ SAC). The total units tested are not known for the UK as a whole because the laboratories do not routinely report negative results, unless as part of an official control programme or survey.
For Great Britain, the total number of units positive for Yersinia spp. 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. The Scottish Agricultural College (SAC) supplies data on recorded incidents in Scotland to the 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. An on-going survey of foxes identified 2 cases of Trichinella in Northern Ireland, one in 2007 and one in 2009.

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 2012.

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 2012, muscle samples from 177,751 breeding sows and boars, 1,030,983 finishing pigs raised in contained housing and 336,570 raised with outdoor access at some period were examined for Trichinella. In addition, 8,764 horses, 1,478 farmed wild boar and 308 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, 420 samples were examined from January 2012 to December 2012. In addition, 90 badgers and 6 other wild animals were tested. All samples were negative for Trichinella.

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 2012.

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 8764 horses were tested at slaughter in 2012. 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 2012.

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

Fattening pigs raised under controlled housing conditions in integrated production system

Overall for the UK: 1,030,983 tested with no positive results.

Fattening pigs not raised under controlled housing conditions in integrated production system

Overall for the UK: 336,570 tested with no positive results.

For wild boar - farmed and feral:
Farmed wild boars - UK: 1478 tested, 0 positive
Feral wild boars - UK: 308 tested, 0 positive.

Breeding sows and boars

Overall for the UK: 177,751 tested with 0 positive (raised under controlled housing conditions; no tests were performed on sows and boars raised under non controlled housing conditions).

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.

An on-going survey of foxes has identified 2 cases of Trichinella in Northern Ireland, one in 2007 and one in 2009. There were no positive findings from foxes in 2012.

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 - at slaughterhouse - Surveillance [1)]	FSA	Selective sampling	Official sampling	animal sample > organ/tissue	Domestic	Animal	1030983	0	0	0
Pigs - fattening pigs - not raised under controlled housing conditions - at slaughterhouse - Surveillance [2)]	FSA	Selective sampling	Official sampling	animal sample > organ/tissue	Domestic	Animal	336570	0	0	0
Pigs - breeding animals - raised under controlled housing conditions - sows and boars - at slaughterhouse - Surveillance [3)]	FSA	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	177751	0	0	0
Pigs - breeding animals - not raised under controlled housing conditions - sows and boars - at slaughterhouse - Surveillance [4)]	FSA	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	0	0	0	0
Solipeds, domestic - horses - at slaughterhouse - Surveillance [5)]	FSA	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	8764	0	0	0
Badgers - wild - Monitoring [6)]	FSA	Convenience sampling	Official sampling	animal sample > organ/tissue	Domestic	Animal	90	0	0	0
Foxes - wild - unspecified - Monitoring [7)]	FSA	Convenience sampling	Official sampling	animal sample > organ/tissue	Domestic	Animal	420	0	0	0
Other animals - wild - Clinical investigations [8)]	FSA	Convenience sampling	Not applicable	animal sample > organ/tissue	Domestic	Animal	6	0	0	0
Wild boars - farmed - at slaughterhouse - Surveillance [9)]	FSA	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	1478	0	0	0
Wild boars - wild - at game handling establishment - Surveillance [10)]	FSA	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	308	0	0	0

Table Trichinella in animals

Comments:

1) Sampling stategy: pigs from export establishments and Competent Authority sampling. Official meat inspection and food business operator sampling. Sample size 1 gram

2) Sampling stategy: pigs from export establishments and Competent Authority sampling. Official meat inspection and food business operator sampling. Sample size 1 gram

3) Official meat inspection. Sample size 2 grams.

4) Official meat inspection. Sample size 2 grams

5) Official meat inspection. Sample size 5 grams

6) Tested at collection for post mortem examination for TB surveillance. Sample size 5 grams

7) Sample size 5 grams.

8) Research project using samples submitted for other purposes from other wild animals, cetaceans and pinnipeds. Sample size 5 grams.

9) Official meat inspection. Sample size 5 grams.

10) Official meat inspection. Sampling stage: approved game handling establishment/ hunted. Sample size 5 grams

Footnote:

Official Veterinarians, carrying out meat inspection on behalf of the Food Standards Agency (FSA), 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 2012: 2628647 cattle were subject to meat inspection and 2005 were affected with hydatid cysts (0.08%); 13931368 sheep subject to meat inspection during the year of which 35759 (0.26%) were affected with hydatid cysts.

There was one ovine case of hydatid disease reported from Northern Ireland during 2012. In 2011 there was also one case, however, prior to this the last recorded detection of hydatid disease in livestock in Northern Ireland was in 2006.

During 2011, 2,856,081 cattle were subject to meat inspection and 1402 were affected with hydatid cysts (0.05%). There were 14,450,396 sheep subject to meat inspection during the year of which 56,782 (0.40%) were affected with hydatid cysts. With the exception of one positive finding in a sheep in Northern Ireland, all positive findings were in slaughterhouses in Great Britain. In 2010, 1385/2,731,050 cattle (0.05%) and 56,817/14,127,582 sheep (0.40%) 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:

A. Echinococcus spp. general evaluation

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 2012, 217 faecal samples were collected in Great Britain and a further 176 were collected and tested in Northern Ireland. Of the total 393 foxes tested in the UK during the year, all tested negative for E.multilocularis and E. granulosus. In 2011, 355 faecal samples were collected in Great Britan and a further 150 were collected and tested in Northern Ireland - 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 granulosus:
The Welsh Government is running a 10 year disease awareness programme in Wales. This programme is based on awareness raising and emphasising the responsiblity of dog owners to deworm their dogs regularly with an appropriate treatment.

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.

Additional information

Approximately 30% of the 505 foxes tested in the UK in 2011 tested positive for Taenia spp.

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.

Results of the investigation

During 2012, seven confirmed cases of hydatid disease in humans were reported in the UK: six in England and Wales and one in Scotland. All cases had an exposure history that suggested they contracted the disease outside 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) - at slaughterhouse - Surveillance [1)]	FSA	Census	Official sampling	animal sample	Domestic	Animal	United Kingdom	2628647	2005	0	0
Sheep - at slaughterhouse - Surveillance [2)]	FSA	Census	Official sampling	animal sample	Domestic	Animal	United Kingdom	13931368	35759	0	0
Goats - at slaughterhouse - Surveillance [3)]	FSA	Census	Official sampling	animal sample	Domestic	Animal	United Kingdom	15116	310	0	0
Solipeds, domestic - horses - at slaughterhouse - Surveillance [4)]	FSA	Census	Official sampling	animal sample	Domestic	Animal	United Kingdom	9405	226	0	0
Foxes - wild - Survey - national survey	Defra	Objective sampling	Official sampling	animal sample > faeces	Domestic	Animal	United Kingdom	393	0	0	0

	Echinococcus spp., unspecified
Cattle (bovine animals) - at slaughterhouse - Surveillance [1)]	2005
Sheep - at slaughterhouse - Surveillance [2)]	35759
Goats - at slaughterhouse - Surveillance [3)]	310
Solipeds, domestic - horses - at slaughterhouse - Surveillance [4)]	226
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.

Routine visual meat inspection for hydatidosis (Echinococcus granulosus).

As part of an annual, continuous monitoring programme in wild definitive hosts to demonstrate disease freedom in the UK, Red Fox (Vulpes vulpes) carcasses are collected and faeces samples taken from these carcasses are tested for the presence of E.multilocularis and E. granulosus. In total in 2012, 217 foxes were tested in Great Britan by the Food and Environment Research Agency (FERA) and a further 176 were tested by the Agri-food and Biosciences Institute (AFBI) 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

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

Great Britain (England, Scotland and Wales):
Toxoplasma gondii was the implicated cause in 18.5% of incidents of fetopathy where a diagnosis was reached in sheep and goats in Great Britain in 2012 (n=1340). Toxoplasmosis dropped to the third most common cause of fetopathy in sheep in Great Britain during the year, following the incursion of Schmallenberg virus into the UK in 2012. In previous years, Toxoplasma abortion accounted for approximately one fifth of all all incidents of fetopathy in sheep and goats where a diagnosis was made, with 17.8% in 2011, 22.5% in 2010, 23.1% in 2009, and 22.9% in 2008.

During 2012, there were 247 diagnoses of abortion due to toxoplasmosis in sheep and one diagnosis in goats confirmed in GB. The 2012 figures are similar to previous years: 145 recoded diagnoses of fetopathy due to toxoplasmosis in sheep and one in goats in 2011, 215 recorded diagnoses of toxoplasmosis causing fetopathy in sheep and one in goats in 2010, 204 in 2009 and in one case in goats, and 201 in sheep with none in goats in 2008. These figures arising from clinical investigations are the number of incidents recorded from 2007 - 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 2012, 444 (51.3%) of 864 sheep sera received (from 213 separate submissions) tested positive for T. gondii. This compares to 285 (43.5%) positive sera from 655 samples (152 submissions) received in 2011. In goats, seven (15.9%) of 44 sera (14 separate submissions) tested positive. In pigs, one (0.6%) of 154 sera (from five separate submissions) tested positive. A single cat serum sample and a single horse serum sample tested negative. These findings provide a summary of the serological status of samples submitted for diagnosis, monitoring and screening purposes during 2009 to 2012 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:
In 2012, 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 2011 and 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.

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.

Results of the investigation

A total of 327 confirmed human cases of toxoplasmosis were reported in 2012. In England and Wales, 311 cases were reported, of which 228 were acute infection (73.3%), 12 had reactivated infection (3.9%) and the remaining 71 were undetermined(22.8%). In Scotland, cases reported only include those with recent or current infection and 16 were reported in 2012. There were no reported cases in Northern Ireland in 2012.

2.10.3 Toxoplasma in animals

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 - at farm - Clinical investigations [1)]	AHVLA	Suspect sampling	Not applicable	animal sample	Domestic	Classification not possible	Animal	unknown	247	247	0
Sheep - at farm - Monitoring [2)]	AHVLA	Convenience sampling	Not applicable	animal sample > blood	Domestic	Latex agglutination test (LAT)	Animal	864	444	444	0
Goats - at farm - Clinical investigations [3)]	AHVLA	Suspect sampling	Not applicable	animal sample	Domestic	Classification not possible	Animal	46	1	1	0
Goats - at farm - Monitoring [4)]	AHVLA	Convenience sampling	Not applicable	animal sample > blood	Domestic	Latex agglutination test (LAT)	Animal	44	7	7	0
Pigs - at farm - Monitoring [5)]	AHVLA	Convenience sampling	Not applicable	animal sample > blood	Domestic	Latex agglutination test (LAT)	Animal	154	1	1	0
Cattle (bovine animals) - at farm - Clinical investigations (Northern Ireland)	AFBI	Suspect sampling	Not applicable	animal sample > blood	Domestic	Latex agglutination test (LAT)	Animal	34	25	25	0
Sheep - at farm - Clinical investigations (Northern Ireland)	AFBI	Suspect sampling	Not applicable	animal sample > blood	Domestic	Latex agglutination test (LAT)	Animal	533	455	455	0

Comments:

[1)] Clinical incidents of Toxoplasma abortion. Sample type = abortion material

[2)] Serum samples submitted to regional laboratories. Does not constitute a structured survey. Great Britain only.

[3)] Clinical incidents of Toxoplasma abortion. Sample type = abortion material

[4)] Serum samples submitted to Regional Laboratories. Does not constitute a structured survey. Great Britain only.

Table Toxoplasma in animals

Comments:

[5)] Serum samples submitted to Regional Laboratories. Does not constitute a structured survey. Great Britain only.

Footnote:

The table includes data on diagnoses made from clinical diagnostic material submitted to Government veterinary laboratories (AHVLA/ AFBI/ SAC). The total units tested are not known for the UK as a whole because the laboratories do not routinely report negative results, unless part of an official control programme or survey.

Serological investigations for Toxoplasma gondii using the latext agglutination test (LAT) are undertaken by the AHVLA in England and Wales on serum samples submitted to Regional Laboratories. The findings provide a summary of the serological status of samples 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.

AHVLA = Animal Health and Veterinary Laboratories Agency in Great Britain. The Scottish Agricultural College (SAC) supplies data on recorded incidents in Scotland to the AHVLA for inclusion in the Veterinary Investigation Diagnostic Analysis (VIDA) system.
AFBI = Agri-food and Biosciences Institute in Northern Ireland.

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 was a single imported human case of classical rabies reported in 2012 in the UK in a patient from London who was bitten by a dog in South Asia.

Animals:
In 2012, four cats, two dogs and 47 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 2006-2012, with a total of 6128 bats tested. Reduced total numbers tested since 2010 reflect reduced testing of Pipistrelle spp. In 2012, a total of 572 wild bats were tested.

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 currently under review.

Additional information

Workers at animal rescue charities, workers at quarantine centers and bat handlers are advised to be immunized against rabies as a precaution.

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.

Results of the investigation

There was a single imported human case of classical rabies reported in 2012 in the UK in a patient from London who was bitten by a dog in South Asia.

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, histology, PCR etc.

Vaccination policy

Vaccination is now permitted in the United Kingdom in accordance with the Pet Travel Scheme, for those animals being exported, and those undergoing quarantine.

Additional information

The Pet Travel Scheme (PETS) is a system that allows pet dogs, cats and ferrets from certain countries to enter the UK without quarantine as long as they meet the rules of the scheme. It also means that people in the UK can take their dogs, cats and ferrets to other European Union countries, and return with them to the UK. They can also, having taken their pets to certain listed non-EU countries, bring them back to the UK without the need for quarantine. The purpose of these rules is to keep the UK free from rabies and certain other exotic diseases which could be introduced via the movement of pet animals. On the 1st January 2012, the Pet Travel Scheme regulations were harmonised with EU pet movement regulations.

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	AHVLA	Suspect sampling	Official sampling	animal sample > brain	Domestic	Animal		1	0	0	0
Bats - wild - Surveillance	NRL	Selective sampling	Official sampling	animal sample > brain	Domestic	Animal		572	0	0	0
Bats - zoo animal - at zoo - Surveillance	NRL	Selective sampling	Official sampling	animal sample > brain	Domestic	Animal		47	0	0	0
Cats - pet animals - Monitoring (at quarantine)	NRL	Selective sampling	Official sampling	animal sample > brain	Imported from outside EU	Animal		4	0	0	0
Dogs - pet animals - Monitoring (at quarantine)	NRL	Selective sampling	Official sampling	animal sample > brain	Imported from outside EU	Animal		1	0	0	0
Dogs - pet animals - Monitoring (not in quarantine)	NRL	Suspect sampling	Official sampling	animal sample > brain	Unknown	Animal		1	0	0	0

	EBLV-2	Lyssavirus (unspecified virus)
Bats - wild - Monitoring	0	0
Bats - wild - Surveillance	0	0
Bats - zoo animal - at zoo - Surveillance	0	0
Cats - pet animals - Monitoring (at quarantine)	0	0
Dogs - pet animals - Monitoring (at quarantine)	0	0

Table Rabies in animals

	EBLV-2	Lyssavirus (unspecified virus)
Dogs - pet animals - Monitoring (not in 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).

In 2012, a total of 127 cases of Q fever were reported in humans in the UK

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 GB livestock have been reported annually from 2008 - 2012. 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 contributing o 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. It 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 on Q fever infection risks during the lambing season are 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 (SAC) 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

Other: tissue samples/cotyledons and foetal fluid submitted for clinical diagnosis
Blood samples

Diagnostic/analytical methods used

Modified Ziehl Nielsen (MZN) staining, , ELISA, PCR, histology.

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. Submitted to Journal of Veterinary diagnostic Investigation (in press).

Vaccination policy

Vaccination for Q fever infection is not generally utilised in the UK.

Control program/mechanisms

The control program/strategies in place

Advice to farmers on preventing infection has recently been updated and risks from infection are highlighted annually by the Health Protection Agency (HPA) and Defra.

Control of Q fever is aimed primarily at the 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, HPA 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 www.hse.gov.uk).

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 AHVLA Regional Laboratories, SAC Disease Surveillance Centres and AFBI/DARD Veterinary Services during 2012.

Northern Ireland:
There were no reported cases of detection of Q fever in livestock in Northern Ireland in 2012.

Great Britain: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. Diagnoses were made by routine examination of MZN-stained placental smears followed by confirmatory PCR testing or histopathology. 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. The potential zoonotic hazard of Q fever was highlighted to the submitting private veterinary surgeon and the farmer information sheet was provided:
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1210834106356

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.

Additionally in 2012, PCR detected the presence of C. burnetii in placental or uterine material from a further two submissions: (1) from the placenta of a dairy cow which had aborted, but limited further testing sufficient to confirm Q fever as the cause of the abortion was performed, and (2) from the placenta of a sheep from Scotland for which no further information was available. In these cases Q fever was not confirmed to be contributing to a clinical problem (hence a VIDA diagnosis was not applied) although the potential zoonotic hazard was highlighted.

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

There were seven incidents of Q fever abortion reported in 2011 - five incidents were in cattle, two were in sheep. Diagnosis was made by routine examination of stained placental smears with the newly introduced PCR used for confirmation. There were 4 incidents of Q fever infection reported in 20010: two incidents were in cattle, one in sheep and one in goats. These incidents were all reported in Great Britain - there were no recorded incidents of Q fever diagnosis in Northern Ireland during these years. Through the general scanning surveillance carried out during 2009, three cases were identified in Great Britain (two in cattle, one in goats), five in 2008 and four in 2007.

A PCR survey using abortion material collected from randomly selected abortion submissions during

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) - at farm - Clinical investigations [1)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic		Animal	unknown	4	4	3
Sheep - at farm - Clinical investigations [2)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic		Animal	unknown	1	1	0
Goats - at farm - Clinical investigations [3)]	AHVLA/AFBI	Suspect sampling	Not applicable	animal sample	Domestic		Animal	unknown	3	3	3

Comments:

[1)] Detection - post mortem and ancillary MZN and PCR test

[2)] Detection - post mortem and ancillary MZN and PCR test

[3)] 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 (AHVLA/ AFBI/ SAC). The total units tested are not known for the UK as a whole because the laboratories do not routinely report negative results, unless part of an official control programme or survey.

AHVLA = Animal Health and Veterinary Laboratories Agency in Great Britain.
The Scottish Agricultural College (SAC) supplies data on recorded incidents in Scotland to the 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

Frequency of the sampling

About 350 birds per year, April to October during GB mosquito season.

Type of specimen taken

Brain and kidney post mortem+ serum samplles from live wild birds.

Case definition

Target species (small passerines, corvids, waterside birds), birds with neurological signs, mass mortality incidents.

Diagnostic/analytical methods used

WNV real time PCR on brain and kidney. WNV cELISA on wild bird serum samples.

Control program/mechanisms

The control program/strategies in place

Annual wild bird surveillance, WNV infection notifiable in GB horses.

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

No West Nile Virus detected.

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 - at farm - Clinical investigations [1)]	AHVLA	Suspect sampling	Not applicable	animal sample > blood	Domestic	no	ELISA	Animal		11	0
Solipeds, domestic - at farm - Surveillance (Imported horses - export testing) [2)]	AHVLA	Selective sampling	Not applicable	animal sample > blood	Unknown	yes	ELISA	Animal		2	2

Comments:

[1)] Neurological signs

[2)] Export testing

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

Currently sampling mostly consists of clinical diagnostic cases.

Type of specimen taken

The results given for E. coli from animals relate to E. coli isolates from various isolation sites in each animal species, though most isolates will originate from faecal samples from clinically diseased animals under veterinary investigation (for cattle, isolates from mastitis cases have not been included in this year's report).

Control program/mechanisms

The control program/strategies in place

In 2006, a system was put in place in England and Wales to examine veterinary E. coli isolates for resistance to the indicator third generation cephalosporins cefpodoxime or ceftazidime and cefotaxime (ie isolates are tested for resistance to either cefpodoxime or both ceftazidime and cefotaxime). This testing regime was instituted because of the increasing prevalence of third generation cephalosporin resistance due to the possession of extended-spectrum beta-lactamases (ESBLs) that has been noted in human clinical E. coli isolates in many parts of Europe and also because of the increasing reports from a number of European countries of the initial detection of this type of resistance in animals. The testing regime is based on that commonly used in medical surveillance. Resistance to the indicator third generation cephalosporins is used as a screening test in the programme to identify isolates for further examination for the presence of ESBLs. Isolates resistant to the indicator third generation cephalosporins can possess a number of resistance mechanisms, including ESBL and ampC enzymes.

Monitoring of veterinary E. coli isolates through the enhanced surveillance system instituted in 2006 continued in 2010.

Results of the investigation

A number of isolates resulting from submission of diagnostic samples have been tested for antimicrobial resistance in 2011 and the results are presented in the tables.

Additional information

The survey for ESBL E. coli in the caecal contents of broilers at slaughter in abattoirs was performed using selective media for ESBL E. coli. The percentage of individual broiler caecal samples (n=388) positive for CTX-M E. coli was 3.6%. The percentage of abattoirs (n=23) from which CTX-M E. coli were isolated was 52.2%. Broiler chickens originating from 12/21 (57.1%) companies were positive for CTX-M E. coli. The predominant CTX-M types detected were 1 (accounting for 78% of CTX-M isolates), 3 and 15.

Sampling for ESBL E. coli on turkey farms was carried out during the EU Baseline Survey for Salmonella in turkey flocks. Five boot swabs were collected per flock and cultured using selective media. 5.2% of meat farms were positive for CTX-M E. coli (n=308 farms) and 6.9% of breeding farms were positive for CTX-M E. coli (n=29 farms). The CTX-M types detected included CTX-M-1, -14, -15 and -55, of which CTX-M-14 was predominant and the only CTX-M ESBL detected on breeding farms.

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		16	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.25	
Fluoroquinolones	Ciprofloxacin		0.03	
Penicillins	Ampicillin		8	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		16	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.25	
Fluoroquinolones	Ciprofloxacin		0.03	
Penicillins	Ampicillin		8	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		16	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.25	
Fluoroquinolones	Ciprofloxacin		0.03	
Penicillins	Ampicillin		8	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

3.2 ENTEROCOCCUS, NON-PATHOGENIC

3.2.1 General evaluation of the national situation

3.2.2 Antimicrobial resistance in Enterococcus, non-pathogenic isolates

Table Cut-off values for antibiotic resistance of E. faecalis in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		512	
Amphenicols	Chloramphenicol		32	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		32	

Table Cut-off values for antibiotic resistance of E. faecalis in Animals

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	

Table Cut-off values for antibiotic resistance of E. faecalis in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		512	
Amphenicols	Chloramphenicol		32	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		32	
Tetracyclines	Tetracycline		2	

Table Cut-off values for antibiotic resistance of E. faecalis in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		512	
Amphenicols	Chloramphenicol		32	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		32	
Tetracyclines	Tetracycline		2	

Table Cut-off values for antibiotic resistance of E. faecium in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		128	
Amphenicols	Chloramphenicol		32	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		2	

Table Cut-off values for antibiotic resistance of E. faecium in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		128	
Amphenicols	Chloramphenicol		32	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		2	

Table Cut-off values for antibiotic resistance of E. faecium in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		128	
Amphenicols	Chloramphenicol		32	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		2	

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1 ENTEROBACTER SAKAZAKII

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:
- Food
- 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.

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 2012.

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 2012 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 2012, 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

United Kingdom 2011:

There were a total of 87 general outbreaks of foodborne infectious disease reported in the UK in 2011. 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 2011 was higher compared to 2010 when there were a total of 69 outbreaks reported.

The rise in the number of general outbreaks in 2011 could be due to the continued increase in outbreaks caused by Campylobacter spp (22/87 in 2011; 19/69 in 2010) and a rise in the outbreaks caused by Salmonella spp compared to the previous year (19 in 2011; 9 in 2010). Of these, 17 outbreaks caused by Campylobacter and 15 caused by Salmonella were reported in 2011 where the strength of the evidence implicating the foodstuff was classified as strong.

Outbreaks of Campylobacter have increased since 2009 and concurrently Campylobacter is now the most frequently implicated causative agent in reported outbreaks representing 25% of all outbreaks. In 2011, as in preceding years, most Campylobacter outbreaks were associated with consumption of undercooked poultry liver pâté or parfait from food service establishments. Salmonella spp. accounted for 22% of the outbreaks, most of which were caused by an increase in S. Enteritidis non PT 4 or S. Typhimurium. The next most frequently identified agents included: norovirus (9%, 8/87), VTEC O157 (9%, 8/87) and Clostridium perfringens (8%, 7/87).

A total of 2226 people were affected in these 87 foodborne outbreaks. There were 192 hospitalisations and three deaths. Salmonella and VTEC O157 accounted for the majority of people affected (597; 27% and 296; 13% respectively), and most of the hospital admissions (75; 38% and 86; 45%, respectively).

There was no regional pattern in the distribution of general foodborne outbreaks. Most outbreaks reported were from the North West (9), North East (8), East of England (7), South West (7) followed by South East (5), East Midlands (4), West Midlands (4) , London (3), and Yorkshire and Humber (2). Five outbreaks

occurred nationally.

There were no recorded general food-borne disease outbreaks in Northern Ireland in 2011.

United Kingdom 2011
There were a total of 69 foodborne outbreaks reported in the UK in 2011. Of these, 52 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 2010 was lower compared to 2009 (69 vs 96) and the relative proportions of outbreaks caused by Campylobacter and Salmonella changed in 2010. The number of outbreaks caused by Salmonella (13% or 9/69) decreased in 2010 whereas those caused by Campylobacter (27.5% or 19/69) increased. This mirrored the reported decreases in Salmonella laboratory confirmed cases and reported increases in Campylobacter laboratory confirmed cases in 2010. Noroviruses were the second most commonly reported pathogen after Campylobacter, implicated in 18.8% (13/69) of outbreaks. In 20.3% (14/69) of foodborne outbreaks reported during 2010, the causative agent was not determined.

United Kingdom 2007 - 2010:
There were a total of 96 possible food-borne outbreaks reported in 2009 in the UK. Outbreaks caused by Salmonella species and norovirus were the most commonly reported pathogens in 2009 (30/96, 31% and 17/96, 17%, respectively) while Campylobacter was the next most common (14/96, 15%). There were a total of 50 possible foodborne outbreaks reported in 2008 in the UK. The most common causative agent identified in the outbreaks was Salmonella species (25 outbreaks). In 2007, there were 25 possible foodborne outbreaks reported in the UK. During the year, the most common causative agent identified in the outbreaks was Salmonella species (8 outbreaks).

Relevance of the different causative agents, food categories and the agent/food category combinations

England and Wales:
The implicating food vehicle for a large proportion of the outbreaks was red meat (22%; 12/54) followed by poultry meat (17%; 9/54), fruits and vegetables (9%; 5/54) and composite/mixed foods (7%; 4/54). Crustacean & shellfish, eggs & eggs dishes and other foods were each implicated in 6% (3/54) of outbreaks each. Finfish was implicated in (4%, 2/54) and mixed meats in (2%; 1/54) of outbreaks.
A further 12 outbreaks (22%) had no food vehicle identified.
All the VTEC O157 outbreaks were reported to be caused by red meat while 86% of campylobacter outbreaks were caused by poultry meat. A food vehicle could not be identified in 43% of Salmonella outbreaks.
The evidence implicating a food vehicle in outbreaks included descriptive epidemiology in 54% (29/54), analytical epidemiology alone in 11% (6/54), descriptive epidemiology and microbiological evidence in 11% (6/54) and microbiological evidence alone in 2% (1/54). Twelve outbreaks had no evidence as no food vehicle was implicated.

Scotland:
Leeks and potatoes were linked to one food-borne outbreak of E.coli PT8, with 42 confirmed cases in

Scotland. This outbreak was part of a wider UK outbreak. An outbreak where Staphylococcal enterotoxin was the causative agent was linked to the consumption of Panna Cotta desert. Both these foodborne outbreaks had foodstuffs implicated with strong epidemiological evidence. A further three foodborne outbreaks were reported during the year with either no food vehicle identified or weak evidence.

Northern Ireland:
There were no foodborne outbreaks reported from Northern Ireland in 2011.

Relevance of the different type of places of food production and preparation in outbreaks

Analysis of the data for England and Wales for 2012 indicated that most outbreaks occurred in the food service sector (70%, 38/54) and included restaurants, pubs, hotels, event caterers, etc. The remaining outbreaks occurred in institutional or residential settings (7%; 4/54) such as prisons and nursing homes retail settings (7%; 4/54) and other foodborne settings (8/54; 15%). Specifically by pathogen, 100 %(6/6), 85% (6/7) and 80% (4/5) of norovirus, campylobacter and Salmonella Enteritidis non-PT4 respectively were linked to food services.
More than one contributory factor may be identified in an outbreak. The contributory factors reported included: inadequate heat treatment (12/54), cross contamination (10/54), storage too long or too warm (6/54), infected food handler (4/54), unprocessed contaminated ingredient (3/54), inadequate chilling (2/54), poor personal hygiene (2/54) and poor hand washing facilities (1/54).washing facilities (1/54).. Thirty outbreaks had no identified contributory factor.

In Scotland, the food-borne outbreaks recorded with strong evidence during the year occurred at a caterers (1) and in the community (1).

Descriptions of single outbreaks of special interest

In January 2011, the Health Protection Agency Laboratory of Gastrointestinal Pathogens noted an increase in the number of received isolates being typed as vero cytotoxin-producing Escherichia coli (VTEC) O157 phage type 8 vero cytotoxin 1+2 (PT8 VT 1+2). At the start of the outbreak, cases of VTEC O157 PT8 VT 1+2, were almost exclusively confined to England. Subsequently, epidemiologists from the HPA Department of Gastrointestinal, Emerging and Zoonotic Infections and Health Protection Scotland Gastrointestinal and Zoonoses Team considered the surveillance data from the two centres and concluded that there had been an increase in the reporting of VTEC O157 PT 8 VT 1+2 across Great Britain which started in December 2010. No cases were identified in Northern Ireland.

In total, 250 laboratory-confirmed cases were identified. These included: one death; 74 hospital admissions; four cases of haemolytic uraemic syndrome; 13 cases of asymptomatic carriage. Seventy percent of the cases were female and 60% were adults. The highest recorded rates of infection were in Scotland and Yorkshire/Humberside. In depth face to face interviews with a carefully selected group of cases were carried out by a hand picked team of experienced health protection practitioners from the public health authorities in England, Scotland and Wales. These interviews showed that a higher than expected proportion of cases reported handling and preparing soil bearing vegetables in their kitchens. A second case control study was conducted to test the hypothesis that transmission of infection was associated with the handling and preparation of soil bearing vegetables in domestic kitchens. This found a statistical association between handling and preparing raw leeks (OR 40.0; CI 2.08-769.4; p-value 0.01) and potatoes (OR 11.98; CI 1.02-140.9; p-value 0.05) in the home.

(Reference: HPA. (2011). National increase in VTEC O157 PT 8: Conclusion of investigations. Health Protection Report Volume 5 No 39; 30 September 2011. Available at: http://www.hpa.org.uk/hpr/archives/2011/news3911.htm#pt8)

Additional information

Evidence from reported foodborne outbreaks occurring in the UK during 2011 has again shown that the majority of outbreaks were linked specifically to food service premises, and that these were related to inadequate cooking of the food and/or cross contamination in the kitchen. Public Health Authorities have reiterated advice to caterers to make sure poultry livers are cooked thoroughly and of the need to adopt appropriate control measures and follow food safety advice provided by the UK Food Standards Agency (Reference: Food Standards Agency. Safer Food, Better Business. Available at: http://www.food.gov.uk/foodindustry/regulation/hygleg/hyglegresources/sfbb/).

Improving hygiene and lowering the risk of introducing Campylobacter, Salmonella, C. perfringens, VTEC O157, norovirus and other pathogens into the food service sector are needed in order to reduce the risk of infection.

Second community – based infectious intestinal disease study (IID2):
The final report of the second national study of infectious intestinal disease incidence in the UK, known as IID2, was published by the Food Standards Agency earlier this month and is available at:http://www.foodbase.org.uk/. The purpose of the IID2 Study was primarily to find out the incidence of IID in the UK, what microorganisms cause it and to find out if the situation had changed since a similar study conducted in England in the mid-1990s (IID1). A secondary aim was to compare official statistics with the "true" level of IID experienced by people in the community.
Key findings were the following:
- The incidence of IID in the community in the UK was substantial, with around one in four of the population suffering from an episode of IID in a year - up to 17 million cases annually. Around 2% of the population visit their GP with symptoms of IID each year - an estimated one million consultations annually.
- Approximately 50% of people with IID reported absence from school or work because of their symptoms – representing nearly 19 million days lost (over 11 million days lost in people of working age) (http://www.gutfeelings.org.uk).
- The most commonly identified microorganisms found in stool samples from those with IID in the community were norovirus (16.5%), sapovirus (9.2%), Campylobacter spp. (4.6%) and rotavirus (4.1%). The most commonly identified microorganisms found in stool samples from those with IID presenting to GPs were norovirus (12.4%), Campylobacter spp. (13%), sapovirus (8.8%) and rotavirus (7.3%).
- For every case of IID in the UK reported to national surveillance there were around 10 GP consultations and 147 cases in the community.
- Only one specimen tested positive for Clostridium difficile (<1%), suggesting that this microorganism which is usually associated with healthcare settings is not found very often in the community at large.

Since not all IID is foodborne, further work is required to estimate the burden of foodborne disease and to update the models currently used to estimate foodborne disease.

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	4	unknown	26	0	2	6
Salmonella - S. Enteritidis	2	14	5	0	4	6
Salmonella - Other serovars	2	11	0	0	2	4
Campylobacter	0	0	0	0	7	7
Listeria - Listeria monocytogenes	0	0	0	0	3	3
Listeria - Other Listeria	0	0	0	0	0	0
Yersinia	0	0	0	0	0	0
Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	1	137	16	0	4	5
Bacillus - B. cereus	0	0	0	0	1	1
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	1	17	0	0	4	5

	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	1	1
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	3	61	0	0	7	10
Viruses - Hepatitis viruses	0	0	0	0	0	0
Viruses - Other Viruses	2	108	0	0	0	2
Other agents - Histamine	1	3	0	0	2	3
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	4	118	0	0	2	6

Table Foodborne Outbreaks: detailed data for Bacillus

Please use CTRL for multiple selection fields

B. cereus

	Value
FBO Code	2012/47
Number of outbreaks	1
Number of human cases	200
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	MINCE BEEF
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Temporary mass catering (fairs, festivals)
Place of origin of problem	Temporary mass catering (fairs, festivals)
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Campylobacter

Please use CTRL for multiple selection fields

Campylobacter spp., unspecified

	Value
FBO Code	2012/28
Number of outbreaks	1
Number of human cases	5
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	CHICKEN LIVER
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2012/93
Number of outbreaks	1
Number of human cases	4
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	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2012/45
Number of outbreaks	1
Number of human cases	39
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	CHICKEN LIVER PATE AND CARVERY CHICKEN
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Domestic
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2012/9
Number of outbreaks	1
Number of human cases	3
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	CHICKEN LIVER
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2012/5
Number of outbreaks	1
Number of human cases	2
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Sheep meat and products thereof
More food vehicle information	LAMB SHOULDER WITH LAMB LIVER
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2012/51
Number of outbreaks	1
Number of human cases	8
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	Temporary mass catering (fairs, festivals)
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Campylobacter spp., unspecified

	Value
FBO Code	2012/57
Number of outbreaks	1
Number of human cases	4
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	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Clostridium

Please use CTRL for multiple selection fields

C. perfringens

	Value
FBO Code	2012/111
Number of outbreaks	1
Number of human cases	16
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Mixed food
More food vehicle information	JERK CHICKEN THIGHS, BROWN CHICKEN STEW, CHOPPED CHICKEN DEEP FRIED, GOAT CURRY, RICE AND RED KIDNEY BEANS
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	

C. perfringens

	Value
FBO Code	2012/113
Number of outbreaks	1
Number of human cases	22
Number of hospitalisations	1
Number of deaths	1
Food vehicle	Turkey meat and products thereof
More food vehicle information	TURKEY
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

C. perfringens

	Value
FBO Code	2012/8
Number of outbreaks	1
Number of human cases	6
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	ROAST PORK JOINT
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Residential institution (nursing home, prison, boarding school)
Place of origin of problem	Residential institution (nursing home, prison, boarding school)
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

C. perfringens

	Value
FBO Code	2012/21
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	2
Number of deaths	0
Food vehicle	Other or mixed red meat and products thereof
More food vehicle information	ROAST BEEF AND ROAST PORK
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Residential institution (nursing home, prison, boarding school)
Place of origin of problem	Residential institution (nursing home, prison, boarding school)
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
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	2012/30
Number of outbreaks	1
Number of human cases	10
Number of hospitalisations	2
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	Unknown
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Verotoxigenic E. coli (VTEC) - VTEC O157

	Value
FBO Code	2012/83
Number of outbreaks	1
Number of human cases	3
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	ROAST PORK (ROAST HOG) - MAIN MEAL
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Temporary mass catering (fairs, festivals)
Place of origin of problem	Temporary mass catering (fairs, festivals)
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Verotoxigenic E. coli (VTEC) - VTEC O157

	Value
FBO Code	2012/102
Number of outbreaks	1
Number of human cases	3
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	ROAST PORK (MAIN MEAL) AND COLD MEATS
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Temporary mass catering (fairs, festivals)
Place of origin of problem	Temporary mass catering (fairs, festivals)
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Verotoxigenic E. coli (VTEC) - VTEC O157

	Value
FBO Code	2012/97
Number of outbreaks	1
Number of human cases	2
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	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Listeria

Please use CTRL for multiple selection fields

L. monocytogenes - L. monocytogenes serovar 4b

	Value
FBO Code	2012/76
Number of outbreaks	1
Number of human cases	14
Number of hospitalisations	14
Number of deaths	1
Food vehicle	Bakery products
More food vehicle information	PORK PIES
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	Cross-contamination
Mixed Outbreaks (Other Agent)	
Additional information	

L. monocytogenes - L. monocytogenes serovar 1/2a

	Value
FBO Code	2012/75
Number of outbreaks	1
Number of human cases	4
Number of hospitalisations	4
Number of deaths	2
Food vehicle	Bovine meat and products thereof
More food vehicle information	PRESSED BEEF ALSO CALLED POTTED BEEF AND BEEF STEW
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Mobile retailer, market/street vendor
Place of origin of problem	Mobile retailer, market/street vendor
Origin of food vehicle	Domestic
Contributory factors	Cross-contamination
Mixed Outbreaks (Other Agent)	
Additional information	

L. monocytogenes - L. monocytogenes, unspecified

	Value
FBO Code	
Number of outbreaks	1
Number of human cases	6
Number of hospitalisations	6
Number of deaths	2
Food vehicle	Mixed food
More food vehicle information	Sandwiches
Nature of evidence	Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans
Outbreak type	General
Setting	Hospital/medical care facility
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Other contributory factor
Mixed Outbreaks (Other Agent)	
Additional information	Other cpntributory factor - vulnerable patient groups

Table Foodborne Outbreaks: detailed data for Other agents

Please use CTRL for multiple selection fields

Histamine

	Value
FBO Code	2012/10
Number of outbreaks	1
Number of human cases	3
Number of hospitalisations	3
Number of deaths	0
Food vehicle	Fish and fish products
More food vehicle information	RAW FISH
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Histamine

	Value
FBO Code	2012/31
Number of outbreaks	1
Number of human cases	4
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Fish and fish products
More food vehicle information	TUNA
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of food vehicle	Imported from outside EU
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Parasites

Please use CTRL for multiple selection fields

Giardia - G. intestinalis (lamblia)

	Value
FBO Code	2012/63
Number of outbreaks	1
Number of human cases	5
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Mixed food
More food vehicle information	MIXED CANTEEN FOOD - PROBABLY SALADS
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Canteen or workplace catering
Place of origin of problem	Canteen or workplace catering
Origin of food vehicle	Domestic
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	
Additional information	

Cryptosporidium - C. parvum

	Value
FBO Code	2012/73
Number of outbreaks	1
Number of human cases	305
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Vegetables and juices and other products thereof
More food vehicle information	LOOSE LEAF SALAD
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Disseminated cases
Place of origin of problem	Other
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Salmonella

Please use CTRL for multiple selection fields

S. Enteritidis

	Value
FBO Code	2012/86
Number of outbreaks	1
Number of human cases	9
Number of hospitalisations	2
Number of deaths	0
Food vehicle	Eggs and egg products
More food vehicle information	PASTEURISED LIQUID EGG WHITE
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Disseminated cases
Place of origin of problem	Farm (primary production)
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

S. Enteritidis - PT 4

	Value
FBO Code	2012/54
Number of outbreaks	1
Number of human cases	8
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Eggs and egg products
More food vehicle information	YORKSHIRE PUDDING
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

S. Enteritidis

	Value
FBO Code	2012/52
Number of outbreaks	1
Number of human cases	30
Number of hospitalisations	6
Number of deaths	0
Food vehicle	Vegetables and juices and other products thereof
More food vehicle information	MIXED SALAD
Nature of evidence	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	

S. Agona

	Value
FBO Code	2012/18
Number of outbreaks	1
Number of human cases	14
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	PORK
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

S. Typhimurium - DT 193

	Value
FBO Code	2012/61
Number of outbreaks	1
Number of human cases	4
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	ROAST PORK - ROAST HOG (SERVED IN BAGUETTE)
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Mobile retailer, market/street vendor
Place of origin of problem	Mobile retailer, market/street vendor
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

S. Enteritidis

	Value
FBO Code	2012/62
Number of outbreaks	1
Number of human cases	6
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Eggs and egg products
More food vehicle information	DISH MADE WITH EGGS
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	Other contributory factor
Mixed Outbreaks (Other Agent)	
Additional information	

S. Typhimurium - U 311

	Value
FBO Code	2012/60
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Mixed food
More food vehicle information	VARIOUS BUFFET - FINGER FOODS - SELF CATERED
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Mobile retailer, market/street vendor
Place of origin of problem	Mobile retailer, market/street vendor
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

S. Newport

	Value
FBO Code	2012/4
Number of outbreaks	1
Number of human cases	51
Number of hospitalisations	5
Number of deaths	2
Food vehicle	Fruit, berries and juices and other products thereof
More food vehicle information	WHOLE, SLICED AND MIXED WATERMELON
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Disseminated cases
Place of origin of problem	Farm (primary production)
Origin of food vehicle	Imported from outside EU
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Unknown agent

Please use CTRL for multiple selection fields

Unknown

	Value
FBO Code	2012/23
Number of outbreaks	1
Number of human cases	8
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Other, mixed or unspecified poultry meat and products thereof
More food vehicle information	DUCK WRAP
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Unknown

	Value
FBO Code	2012/104
Number of outbreaks	1
Number of human cases	24
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Mixed food
More food vehicle information	CHUTNEY, GREEN CHUTNEY, ALOO BONDA AND VADA (VEGETARIAN DISHES)
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	School, kindergarten
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Viruses

Please use CTRL for multiple selection fields

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2012/50
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Buffet meals
More food vehicle information	COLD BUFFET FOODS - MAINLY SANDWICHES
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Temporary mass catering (fairs, festivals)
Place of origin of problem	Temporary mass catering (fairs, festivals)
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2012/108
Number of outbreaks	1
Number of human cases	5
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	RAW OYSTERS SERVED ON BED OF SALT
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Domestic
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2012/40
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	OYSTERS
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2012/110
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 PARFAIT
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2012/37
Number of outbreaks	1
Number of human cases	40
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Mixed food
More food vehicle information	MIXED OR BUFFET MEALS
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Other setting
Place of origin of problem	Other
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2012/114
Number of outbreaks	1
Number of human cases	6
Number of hospitalisations	0
Number of deaths	1
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, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	2012/112
Number of outbreaks	1
Number of human cases	67
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Fruit, berries and juices and other products thereof
More food vehicle information	FRUIT SALAD - RASPBERRIES, BLUEBERRIES, BLACKBERRIES AND MELON (SLICED AT HOTEL)
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	