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 2009

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: United Kingdom

Reporting Year:

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
Veterinary Laboratories Agency (VLA)	VLA is an Executive Agency of Defra. It has a regional network of veterinary laboratories and provides animal disease surveillance, diagnostic services and research	Data on zoonotic agents in animals and feed, collation of data from Scottish Agricultural College, antimicrobial resistance data on isolates from animals in GB
Department of Health	Government department . The aim of DH is to improve the health and well being of people in England	Overview
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

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Laboratory name	Description	Contribution
Food Standards Agency FSA	The Food Standards Agency is an independent government department set up by an act of parliament in 2000 to protect the public health and consumer interest in relation to food	Data on zoonotic agents in food in the UK
Health Protection Scotland 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 2009 .

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

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

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

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

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

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1. ANIMAL POPULATIONS

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

A. Information on susceptible animal population

Sources of information

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.

Counts of the number of premises with poultry are from the Great Britain Poultry Register. 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

Data on livestock populations are as at 1 June 2009 or 1st June 2008 where specified. The number of holdings with cattle relates to 1st June 2009. The number of holdings with pigs, horses and farmed deer and other livestock relates to 1st June 2008.

The number of poultry and poultry holdings for GB are taken from the Great Britain Poultry Register and refers to 1 June 2009. The data from Northern Ireland is as at 1 June 2009.

Data on slaughterings are annual totals. Data for cattle, sheep and pigs are annual UK totals for 2009. Data on slaughterings for all other species are annual UK totals relating to 2008.

Breeding flocks of Gallus gallus are adult flocks subject to monitoring and control procedures for Salmonella under implementation of the Control of Salmonella in Poultry Order 2007 (Reg. 2160/2003/EC and Reg. 1003/2005/EC). Only flocks on holdings eligible for inclusion in the NCP included in the total flock count (ie premises with 250 or more breeding chickens) and subject to at least one official test during 2009.

Laying flocks of Gallus gallus are adult flocks subject to monitoring and control procedures for Salmonella under implementation of the Control of Salmonella in Poultry Order 2007 (Reg. 2160/2003/EC and Reg. 1168/2006/EC). Number of flocks of laying hens derived from population data held by Animal Health, the

Great Britain Poultry Register and data held by the Department of Agriculture and Rural Development Northern Ireland. Only flocks on holdings eligible for inclusion in the NCP included in the total flock count. Other population data above derived from Agricultural Census and Great Britain Poultry Register - includes all premises of 50 or more poultry.

Broiler flocks of Gallus gallus are flocks subject to monitoring and control procedures for Salmonella under implementation of the Control of Salmonella in Broiler Flocks Order 2009 (Reg. 2160/2003/EC and Reg. 646/2007/EC). Number of flocks of broilers derived from returns of operator testing to private laboratories for all broiler flocks tested 3 weeks before moving to slaughter. Therefore, only flocks on holdings eligible for inclusion in the NCP included in the total flock count. Other population data above derived from Agricultural Census and Great Britain Poultry Register - includes all premises of 50 or more poultry.

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 2009. 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 [1]					4186456		90675	
	mixed herds [2]					5280638	2008	28240	2008
	dairy cows and heifers [3]			780476		2647373		30230	
	calves (under 1 year) [4]			42577		2858534		82254	
	- in total			2523327		10025481		95921	
Deer	farmed - in total					31386	2008	855	2008
Ducks	mixed flocks/holdings [5]							364	
	meat production flocks [6]					3536303		588	
	breeding flocks, unspecified - in total [7]					593321		896	
	- in total			14746543	2008	6264213		7156	
Gallus gallus (fowl)	grandparent breeding flocks for egg production line [8]	6						3	
	parent breeding flocks for egg production line [9]	84						31	
	breeding flocks for egg production line - in total [10]	90				6430584		34	

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*
Gallus gallus (fowl)	broilers	27780		784383781	2008	133413443			
	elite breeding flocks for meat production line [11]	70						11	
	laying hens [12]	4466		38411517	2008	39962857			
	breeding flocks for meat production line - in total [13]	1547						434	
	parent breeding flocks for meat production line [14]	1267						365	
	grandparent breeding flocks for meat production line [15]	210						58	
	elite breeding flocks for egg production line [16]	0						0	
	- in total [17]	33883		822795297	2008	211544933			
Geese	breeding flocks, unspecified - in total [18]					23504		666	
	mixed flocks/holdings [19]							224	
	meat production flocks [20]					199092		608	
	- in total [21]			411177	2008	260193		4131	
Goats	- in total			8446	2008	98597	2008	5680	2008
Pigs	breeding animals [22]			206667		494564	2008	7958	2008

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	fattening pigs [23]			8824174		4218948	2008	10770	2008
	- in total [24]			9030841	2008	4713512	2008	12279	2008
Sheep	animals over 1 year					15860627			
	meat production animals					0			
	animals under 1 year (lambs) [25]			13213659		16177427			
	- in total [26]			15381684		32038054		67915	2008
Solipeds, domestic	horses - in total [27]					370225	2008	61053	
Turkeys	breeding flocks, unspecified - in total [28]					759098		293	
	meat production flocks [29]					7368354		1590	
	mixed flocks/holdings [30]							65	
	- in total [31]			14925338	2008	9887372		2633	

Comments:

[1] Definition: bovine animals other than calves kept exclusively for the production of meat and including cows, heifers and bulls

[2] Definition: premises with both beef and dairy animals. Data for Great Britain only

[3] Definition: animals kept exclusively or principally for the production of milk for human consumption and/or dairy products. Number of slaughtered animals refers to heifers only

[4] Definition: bovine animals of not more than 300kg live weight and not yet having permanent teeth.

Table Susceptible animal populations

[5] Data for Great Britain only. Premises with multiple production purposes (breeding/laying/meat production)
[6] Data for Great Britain only
[7] Data for Great Britain only
[8] Number of flocks subject to at least one official test during 2009
[9] Number of flocks subject to at least one official test during 2009
[10] Number of flocks subject to at least one official test during 2009
[11] Number of flocks subject to at least one official test during 2009
[12] Number of flocks elligible for testing under the requirements of the Salmonella NCP and subject to at least one test during 2009
[13] Number of flocks subject to at least one official test during 2009
[14] Number of flocks subject to at least one official test during 2009
[15] Number of flocks subject to at least one official test during 2009
[16] Number of flocks subject to at least one official test during 2009
[17] Total number of flocks are all flocks elligible for testing under the Salmonella NCPs and subject to at least one test during 2009. All premises with 50 or more chickens included in totals for livestock numbers
[18] Data for Great Britain only
[19] Data for Great Britain only. Premises with multiple production purposes (breeding/laying/meat production)
[20] Data for Great Britain only
[21] Number of slaughtered animals for England, Scotland and Northern Ireland only.
[22] Data for Great Britain only. Includes sows in pig, gilts in pig, gilts not yet in pig, suckling sows, dry sows kept for further breeding and boars for service
[23] Data for Great Britain only
[24] Data for Great Britain only
[25] Data for animals slaughtered for Great Britain only.
[26] Livestock numbers and number of animals slaughtered for Great Britain only
[27] Horses on agricultural holdings
[28] Data for Great Britain only
[29] Data for Great Britain only
[30] Data for Great Britain only. Figure for turkey premises with multiple production purposes (mixed breeding/rearing/meat production)
[31] All premises with 50 or more turkeys included in figures for livestock numbers and number of holdings

Footnote:

Population data above derived from Agricultural Census and RADAR

Breeding flocks of Gallus gallus are adult flocks subject to monitoring and control procedures for Salmonella under implementation of the Control of Salmonella in Poultry Order 2007 (Reg. 2160/2003/EC and Reg. 1003/2005/EC). Only flocks on holdings eligible for inclusion in the NCP included in the total flock count (ie premises with 250 or more breeding chickens). Other population data above derived from Agricultural Census and Great Britain Poultry Register - includes all premises of 50 or more poultry.

Laying flocks of Gallus gallus are adult flocks subject to monitoring and control procedures for Salmonella under implementation of the Control of Salmonella in Poultry Order 2007 (Reg. 2160/2003/EC and Reg.

50 or more poultry.

Broiler flocks of Gallus gallus are flocks subject to monitoring and control procedures for Salmonella under implementation of the Control of Salmonella in Broiler Flocks Order 2009 (Reg. 2160/2003/EC and Reg. 646/2007/EC). Number of flocks of broilers derived from returns of operator testing to private laboratories for all broiler flocks tested 3 weeks before moving to slaughter. Therefore, only flocks on holdings eligible for inclusion in the NCP included in the total flock count. Other population data above derived from Agricultural Census and Great Britain Poultry Register - includes all premises of 50 or more poultry.

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

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

History of the disease and/or infection in the country

Salmonella Enteritidis and Salmonella Typhimurium have accounted for the majority of cases of human Salmonellosis for many years and have consistently been the most commonly implicated pathogens in general outbreaks of foodborne disease in the UK.

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.

National Control Programme in breeding flocks:
Two adult breeding flocks were positive for Salmonella Typhimuirum in 2009. None of the other 4 regulated Salmonella serovars as designated in the legislation, were identified in testing under the National Control Programme in adult breeding flocks in production during the year resulting in a prevalence figure of 0.122% (2/1637) for 2009, which is well below the target of 1%.

The UK Salmonella prevalence results for chicken breeding flocks have been very encouraging since the introduction of the current Salmonella National Control Programme in 2007. The EC prevalence target of 1% or less flocks positive for Salmonella Enteritidis, Typhimurium, Hadar, Infantis and Virchow has been achieved each year since the start of the programme, indicating the industry's success in achieving and maintaining very good Salmonella control within the breeding sector.

The Salmonella National Control Programme for laying flocks:
For the UK in 2009, the estimated prevalence of the target serovars S. Enteritidis and/or S. Typhimurium in adult laying flocks under the NCP was 0.36% (16/4466). The estimated prevalence of Salmonella positive adult laying flocks for all Salmonella serovars under the requirements of the NCP was 1.70% (76/4466). 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. By the end of 2008, the UK prevalence had already fallen to an estimated 1% and the results of the monitoring for 2009 indicate a further reduction to 0.36%, which is well below the EC definitive target of 2%.

The Salmonella National Control Programme for broiler flocks:
Ten broiler flocks were positive for S. Enteritidis. Two broiler flocks were positive for S. Typhimurium (ST). Two flocks were positive for S. Virchow but none were positive for S. Hadar or S. Infantis. Three hundred and fifty broiler flocks were positive for other non-regulated Salmonella serovars. Therefore in total 12/27780 flocks were positive for the regulated Salmonella serovars (0.043%).

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

Comparison of the Salmonella serotypes found in animals, feedingstuffs, food and man helps to sugget 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 882/20041 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.

2.1.2 Salmonellosis in humans

A. Salmonellosis in humans

Reporting system in place for the human cases

The reporting system is similar in England and Wales, Scotland, and Northern Ireland.

England and Wales:
Ascertainment of cases is via mandatory notification of food poisoning and voluntary reporting of isolations by publicly funded human diagnostic microbiology laboratories (National Health Service and Health Protection Agency). The study of infectious intestinal disease in England, carried out between 1993 and 1996 suggested a (true) rate of Salmonellosis in the community of 2.2/1000 of which some 2/3rds consulted a doctor and 1/3rd reached national surveillance (British Medical. Journal 17 April 1999: Wheeler et al.). Almost all isolates are forwarded to the Health Protection Agency Laboratory of Enteric Pathogens (LEP), Centre for Infections for confirmation and phage typing.

Scotland:
Food poisoning is a notifiable disease, however the organism responsible is not specified. The surveillance system for Salmonella is based on voluntary laboratory reporting of microbiologically confirmed cases. All isolates identified by routine microbiology laboratories are sent to the Scottish Salmonella Reference Laboratory for confirmation and further typing where appropriate.

Northern Ireland:
The surveillance system for Salmonellosis is primarily based on laboratory reporting of microbiologically confirmed cases. Food poisoning is a notifiable disease but the organism is most often not specified. It is a widely held belief that there is significant under-reporting of food poisoning including Salmonellosis. However, whenever infected persons attend their general practitioners and specimens are obtained for culture, there is almost complete reporting of laboratory confirmed infections. Information is available from some of the laboratory reports to indicate if this was an imported case. However this information is incomplete. Therefore follow-up investigations are undertaken to determine if infection was acquired outside of the UK.

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

The increase in Salmonellosis started in the mid 1980s and since 1989 about 30,000 isolates have been reported each year up to 1997. 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

Overall there has been a continued trend of reduction in the number of cases of Salmonellosis in humans in the UK.

Relevance as zoonotic disease

Salmonella Enteritidis and Salmonella Typhimurium have accounted for the majority of cases of human Salmonellosis for many years and have consistently been the most commonly-implicated pathogens in general outbreaks of foodborne disease.

2.1.3 Salmonella in foodstuffs

A. Salmonella spp. in pig meat and products thereof

Results of the investigation

No results available for 2009.

B. Salmonella spp. in bovine meat and products thereof

Results of the investigation

No results to report in 2009.

C. Salmonella spp. in broiler meat and products thereof

Results of the investigation

No results to report in 2009.

D. Salmonella spp. in eggs and egg products

Results of the investigation

No results to report in 2009.

E. Salmonella spp. in turkey meat and products thereof

Results of the investigation

No results to report in 2009.

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Zanzibar
Fruits and vegetables - precut - ready-to-eat [1)]	FSA	Single	25g	88	0				
Nuts and nut products - at retail - imported - Survey	FSA	Single	25g	20	0				
Spices and herbs - at retail - imported - Survey	FSA	Single	25g	238	1				1

Comments:

[1)] RETAIL

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 carried out as specified in EU legislation Regulation 2160/2003/EC and Regulation 1003/2005/EC 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

Other: When birds are 4 weeks old and 2 weeks before moving to laying phase/laying unit

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

Every 3 weeks during the production period from 1st April 2009.

In addition to the sampling above, 2 sets of Official Control Samples are collected from each breeding flock as follows: a) within 4 weeks of moving to the laying accommodation, b) 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 or chicks dead on arrival or culls

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

Sampling at the holding: Boot swabs or composite faeces

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

Sampling at the holding: Boot swabs or composite faeces

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 etc samples.

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 from 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 3 weeks during the laying/production period as follows:
- A minimum of 5 pairs of boot swabs or
- A composite faeces sample made up from 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 hatchery debris, fluff, additional boot swabs/faeces samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc.

Case definition

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

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

Reports of Salmonella isolates under the relevant legislation are classed as positive. For the regulated Salmonella serovars, 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

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

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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

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

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.

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 breeding 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

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

Directive 99/2003/EC and Regulation 2160/2003/EC lay down harmonised rules for the monitoring and control of Salmonella in breeding flocks of domestic fowl. The Regulation was implemented in the UK through the Poultry Breeding Flocks and Hatcheries Order, now the Control of Salmonella in Poultry Order (England) 2007 (and equivalent legislation in Scotland, Wales and Northern Ireland). This implements the National Control Programme (NCP) for Breeding Flocks (of chickens – Gallus gallus) required by Regulation (EC) No. 2160/2003, to meet the target for reduction in Salmonella prevalence set out in Regulation (EC) No. 1003/2005 by the end of December 2009.

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 Salmonellas of human health significance by the end of 2009. The EU target for breeding flocks is based on the 5 most frequent serotypes in human cases which are: S.Enteritidis, S. Typhimurium, S. Virchow, S. Hadar and S. Infantis. Any breeding flock found to be infected with Salmonella according to the protocol outlined above is placed under official control and the requirements of the Regulation 2160/2003/EC are carried out.

From 1st April 2009, Regulation 213/2009/EC allowed for an extension in the frequency of operator sampling at the holding from every 2 weeks to every 3 weeks, at the discretion of the Competent Authority. A reduction in the number of routine official samples required in each flock from 3 to 2 per year was also allowed from 1st April 2009. These derogations are applicable to Member States who have met the Salmonella reduction target as specified in the legislation for 2 consecutive years. From April 2009,

these derogations were implemented in the UK, although some breeding companies still sample at a 2 weekly frequency. For the first quarter of 2009 (prior to 1st April), operator and routine official testing frequency was as laid out in Regulation 1003/2005/EC

Measures in case of the positive findings or single cases

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

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 of public health significance.

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 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. 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.

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 and related legislation in Great Britain and 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 main provisions of the Zoonoses Order 1989 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 Salmonella NCP is implemented in the UK through the Control of Salmonella in Poultry Order (England) 2007 (and equivalent legislation in Scotland, Wales and Northern Ireland).

The main provisions of the Control of Salmonella in Poultry Order 2007 are:
- Under the NCP 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 GB Poultry Register). 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, Elite) and whether layer breeders or meat (broiler) breeders.
- It is a requirement of the NCP that owners 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

Two unrelated adult Parent Broiler Breeder flocks tested positive for S. Typhimurium in the first 6 months of the year. The phage types were DT 193 and DT193a. Both were new incidents, i.e. were not repeated detection of S. Typhimurium in flocks found positive in 2008. No other regulated Salmonella serovars (i.e. S. Enteritidis, S. Hadar, S. Infantis or S. Virchow) were detected in breeding flocks in 2009.

A further 20 adult breeding flocks tested positive for other Salmonella serovars (non-regulated Salmonella) during the period. Serovars comprised S. Dublin (10 flocks on 3 holdings), S. Mbandaka (2 flocks), S. Thompson (2 flocks on one holding), S. Agama (one flock), S. 3,19:-:- (1 flock), S. Oranienburg (1 flock), S. Saintpaul (1 flock), S. Kentucky (1 flock) and 1 untypable Salmonella 0:4.

A total of 1637 adult breeding flocks were subject to at least one routine Official Control Sampling during the year. The number of flocks on registered premises testing positive for regulated serovars was 2, meaning that the flock prevalence was 0.122%, which is well below the official target of 1%.

The UK Salmonella prevalence results for chicken breeding flocks have been very encouraging since the introduction of the current Salmonella National Control Programme in 2007. The EC prevalence target of 1% or less flocks positive for Salmonella Enteritidis, Typhimurium, Hadar, Infantis and Virchow has been achieved each year since the start of the programme, indicating the industry's success in achieving and maintaining very good Salmonella control within the breeding sector.

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

In 2008 (the second year of implementation of the current Salmonella NCP), eight adult breeding flocks were confirmed as infected with S. Typhimurium. Six flocks were located on one holding, 2 others on one other holding. No other regulated Salmonella serotypes (as designated in the legislation), were identified in testing under the National Control Programme in adult breeding flocks in 2008. The estimated prevalence for the top 5 servars for the UK for 2008 was 0.49% [8/1636], which is below the Community target of 1% of adult breeding flocks to remain positive for the regulated serovars by the end of 2009. A further 13 adult breeding flocks on 10 holdings were identified with non-regulated Salmonella serovars during the year.

During 2007, there was only one report of the regulated Salmonella serovars - a Salmonella Typhimuirum in a parent Broiler Breeder (Meat Production Line) flock.

Additional information

One immature (in-rear) chicken breeding flock was detected positive for any Salmonella serovar in 2009 (S. Champaign)

B. Salmonella spp. in Gallus Gallus - broiler flocks

Monitoring system

Sampling strategy

Broiler flocks

Sampling carried out as specified in EU legislation Regulation 2160/2003/EC and Regulation 646/2007/EC 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

3 weeks prior 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

According to the requirements of the NCP, mandatory sampling is required within 3 weeks of the birds being sent to slaughter. 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 (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

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

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

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

Directive 99/2003/EC and Regulation 2160/2003/EC lay down harmonised rules for the monitoring and control of Salmonella in broiler flocks. The legislation sets out enhanced monitoring and controls for Salmonella which has been implemented by the National Control Programme (NCP) for broilers. The Regulation was implemented in the UK through the Control of Salmonella in Broiler Flocks Order (England) 2009 (and equivalent legislation in Scotland, Wales and Northern Ireland). This implements the Salmonella NCP for broilers required by Regulation (EC) No. 2160/2003, to meet the target for reduction in Salmonella prevalence set out in Regulation 646/2007/EC. 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 646/2007/EC sets a target for the UK broiler sector to ensure that no more than 1% of broiler flocks remain positive for Salmonellas of human health significance by the end of 2011. The EU target is based on the 2 most frequent serovars in human cases which are: S.Enteritidis and S. Typhimurium.

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

Measures in case of the positive findings or single cases

Broiler flocks: Before slaughter at farm

If S. Enteritidis or S. Typhimurium 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 licence to the slaughterhouse and further official sampling of all flocks in the next crop is carried out.

It is the responsibilty 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.

Public health authorities are advised of the isolation of Salmonella in broiler flocks. 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 of public health significance.

Notification system in place

In England, Wales and Scotland (Great Britain) all isolations of Salmonella must be reported under the Zoonoses Order 1989 and a culture supplied to the National Reference Laboratory.

In Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991] and a culture supplied to the National Reference Laboratory.

Results of the investigation

In total, 159 routine annual official sampling visits were carried out during the year. There were approximately 27780 flocks tested according to the requirements of the Salmonella NCP during 2009 - this number was derived from returns of operator testing to private and Government testing laboratories for all broiler flocks tested 3 weeks before moving to slaughter.

Ten broiler flocks were positive for S. Enteritidis. Two broiler flocks were positive for S. Typhimurium (ST). Two flocks were positive for S. Virchow but none were positive for S. Hadar or S. Infantis.

Three hundred and fifty broiler flocks were positive for other non-regulated Salmonella serovars. Two flocks tested positive for both S. Livingstone and S. Senftenberg, and another flock tested positive for both S. Livingstone and S. 6,7:D:-. These flocks have only been recorded as positive once in the total number of units positive.

Including all of these incidents, ninety-four flocks were found infected with S. Kedougou, eighty-one with S. Mbandaka, seventy-three with S. Livingstone, thirty-seven with S. Senftenberg, twenty-two with S. Ohio, fifteen with S. Montevideo, four with S. Kentucky, four with S. Orion, four with S. Thompson, two with S. Agama, one with S. Fluntern, one with S. Idikan, one with S. Kottbus, one with S. Larochelle, twelve with Salmonella strains with structures only and one with unspecified Salmonella species.

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

There was no official 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 preceeding years, 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.

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.

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

Monitoring system

Sampling strategy

Laying hens flocks

Sampling carried out as specified in EU legislation Regulation 2160/2003/EC and Regulation 1168/2006/EC and the UK Salmonella National Control Progamme (NCP) for laying hens (Gallus gallus).

Frequency of the sampling

Laying hens: Day-old chicks

Other: 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

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.

Type of specimen taken

Laying hens: Day-old chicks

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

Laying hens: Rearing period

Other: Boot swabs or composite faeces

Laying hens: Production period

Other: Boot swabs or composite faeces (plus dust sample on 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:
- 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 2 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 every 15 weeks during the laying/production period of the flock starting at 22-26 weeks of age as follows:
- A minimum of 2 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 (two pairs of boot swabs or two composite faeces samples, and a dust sample).

If the operator wishes to challenge sampling results, under an option allowable in Regulation 1237/2007/EC, he/she can request additional optional confirmatory testing to be carried out by 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.

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

Case definition

Laying hens: Day-old chicks

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

Reports of Salmonella isolates under the relevant legislation are classed as positive. For the regulated Salmonella serovars, 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

Laying hens: Rearing period

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

Reports of Salmonella isolates under the relevant legislation are classed as positive. For the regulated Salmonella serovars, 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.

Laying hens: Production period

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

Reports of Salmonella isolates under the relevant legislation are classed as positive. For the regulated Salmonella serovars, 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

Laying hens: Rearing period

Bacteriological method: ISO 6579:2002

Laying hens: Production period

Bacteriological method: ISO 6579:2002

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

Directive 99/2003/EC and Regulation 2160/2003/EC lay down harmonised rules for the monitoring and control of Salmonella in laying flocks of domestic fowl. The legislation sets out enhanced monitoring and controls for Salmonella in laying flocks which has been implemented by the National Control Programme (NCP) for laying flocks. The Regulation was implemented in the UK through the Control of Salmonella in Poultry Order (England) 2007 (and equivalent legislation in Scotland, Wales and Northern Ireland). This implements the Salmonella NCP for laying flocks (of chickens – Gallus gallus) required by Regulation (EC) No. 2160/2003, to meet the target for reduction in Salmonella prevalence set out in Regulation (EC) No. 1168/2006. The NCP applies to all those 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.

Regulation (EC) No. 1168/2006 sets a target for the UK laying flock sector to ensure that a 10% reduction year on year is achieved from the baseline of 8% prevalence set by the EU survey to a final prevalence of 2% or less. The EU target for laying flocks is based on the 2 most frequent serotypes in human cases which are: S.Enteritidis and S. Typhimurium. Any laying flock found to be infected with Salmonella according to the protocol outlined above is placed under official control and the requirements of the Regulation 2160/2003/EC are carried out.

According to Commission Regulation (EC) 1177/2006, the administration of antimicrobials to any bird of the species Gallus gallus as a specific method to control Salmonella is prohibited. The same legislation

also prohibits the administration of any live Salmonella vaccine to any bird of the species Gallus gallus where the manufacturer does not provide an appropriate method to distinguish bacteriologically wild-type strains of Salmonella from vaccine strains.

Measures in case of the positive findings or single cases

Laying hens flocks

If a flock was confirmed infected with S. Enteritidis or S. Typhimurium, a Salmonella advisory and investigation visit was carried out to the premises. All other flocks on the holding were sampled officially. Following depopulation of a S. Enteritidis/S. Typhimurium positive flock another official sample was required in the follow-on flock at 22-26 weeks of age.

From 1st January 2009, restrictions have been put in place on flocks confirmed positive for S. Enteritidis or S. Typhimurium and the eggs can not be used for human consumption unless they are heat treated to eliminate any risk of contamination. If the operator wishes to challenge sampling results, he/she can request additional optional confirmatory testing to be carried out by 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.

Notification system in place

All isolations of Salmonella must be reported and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 and related legislation in Great Britain and 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 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 where relevent.
- Compulsory cleansing and disinfection of premises and vehicles where relevent

The Salmonella NCP is implemented in the UK through the Control of Salmonella in Poultry Order (England) 2007 (and equivalent legislation in Scotland, Wales and Northern Ireland).

The main provisions of the Control of Salmonella in Poultry Order 2007 are:
- Owners of chicken laying flocks of more than 250 birds must be registered unless officials have access to flock information from another source (e.g. the GB Poultry Register). Information supplied should include the name and address of the holding, the number of laying hens on the holding.
- It is a requirement of the NCP that owners 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.

Results of the investigation

There were a total of 4466 flocks in production in the UK in 2009. This includes all premises where there were more than 350 hens in production during the year. In total, 1504 routine annual official sampling visits were carried out during the year.

Twelve adult chicken laying flocks, originating from 8 unique holdings, were positive for S. Enteritidis. Four of these flocks were infected with S. Enteritidis PT4, two were infected with S. Enteritidis PT6 and one was infected with S. Enteritidis PT8. Phagetyping information is not available for the other 5 positive flocks, which were all housed on one holding. Four adult chicken laying flocks, originating from 4 unique holdings, were positive for S. Typhimurium. One was infected with S. Typhimurium DT41, one was infected with S. Typhimurium DT99 and one was infected with S. Typhimurium DT195. Two flocks, on 2 separate holdings were positive for S. Infantis. One of these flocks was also positive for S. Enteritidis, so has only been counted once in the overall total of positive flocks. No flocks were positive for S. Hadar or S. Virchow. 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. Senftenburg (10.5%) followed by S. Agona (9.2%).

For the UK in 2009, the estimated prevalence of the target serovars S. Enteritidis and/or S. Typhimurium in adult laying flocks under the NCP was 0.36% (16/4466). The estimated prevalence of Salmonella positive adult laying flocks for all Salmonella serovars under the requirements of the NCP was 1.70% (76/4466). 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. By the end of 2008, the UK prevalence had already fallen to an estimated 1% and the results of the monitoring for 2009 indicate a further reduction to 0.36%, which is well below the EC definitive target of 2%.

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

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. There were 2 flocks on the same holding found positive for both S. Enteritidis and S. Typhimurium. These flocks were only counted as postive once with the initially detected serovar as per the requirements of the legislation. One adult flock was positive for S. Virchow RDNC. No flocks were positive for S. Infantis or S. Hadar. Overall, fifteen adult flocks were positive for Salmonella serovars other than the regulated Salmonella serovars designated in the legislation.

The majority of egg production in the UK has 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. During 2007 there were 67 incidents of Salmonella recorded in commercial egg laying flocks in the UK during routine monitoring/ surveilance carried out by farm business operators. Of these, 31 were S. Enteritidis and 3 were S. Typhimurium. Overall, in layers up to the start of 2008, the total number of routine reports was low and this coupled with the voluntary nature of the sampling makes it difficult to establish any trend.

Additional information

Thirty-eight immature (in-rear) chicken laying flocks, on a total of thirty-two unique holdings, were detected positive for any Salmonella serovar in 2009. Seven flocks, on a total of five unique holdings, were positive for S. Typhimurium. All were infected with S. Typhimurium DT99 after a hatchery contamination incident with this pigeon-related phage type. All flocks were killed before coming in to lay. No in-rear chicken laying flocks were positive for S. Enteritidis, S. Hadar, S. Infantis or S. Virchow. Thirty-one flocks, on a

total of twenty-seven unique holdings, were found positive for the other Salmonella serovars.

D. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

Over 90% of the isolates from cattle are from samples taken for diagnostic purposes.

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 relevant legislation 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

Vaccination against Salmonella Dublin 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 plan for Salmonella in cattle. All Salmonellas isolated must be reported to the competent authority. Advice is given and visits to the farm by Government officials may be made, particularly if the Salmonella is 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 human outbreak of Salmonellosis associated with the farm.

Measures in case of the positive findings or single cases

Advice is given on contol 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 and a culture supplied to the National Reference Laboratory under the Zoonoses Order 1989 and related legislation in Great Britain and in Northern Ireland all

isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991]

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.

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 Great Britain, 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:
The number of reports from cattle increased by 20% compared to 2008. This upsurge in cattle reports may reflect the 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). Salmonella Dublin remains the most common serovar isolated from cattle (68.6% of incidents) for the eleventh consecutive year. S. Typhimurium was the second most common serovar (8.4% of incidents), followed by S. Mbandaka (8.1% of incidents), S. Montevideo (3.7%) and S. Anatum (2.7). There were 3 reported incidents involving S. Enteritidis in 2009.

No incidents due to S. Infantis, S. Hadar or S. Virchow were reported.

Northern Ireland:
There were a total of 131 reports of isolation of Salmonella from cattle in Northern Ireland in 2009. The majority of these were S. Dublin (121)

The 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. For the purposes of completing the tables in the report, the number of units tested is recorded as the number of positive units.

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

2008 - Great Britain:
There were ~ 4% fewer Salmonella incidents in cattle reported in 2008 (595) compared to 2007 (619). Incidents of Salmonella Typhimurium decreased by 11% compared to 2007 (from 83 to 74). Salmonella Dublin incidents increased by 0.5% (from 375 to 377). Salmonella Dublin was the most common serovar in cattle (63% of incidents), followed by S. Typhimurium (12% of incidents), S. Mbandaka (5% of incidents), S. Montevideo and S. Anatum (3% each). There was only one reported incident involving S. Enteritidis in 2008.

2008 - Northern Ireland:
There were a total of 229 reports of isolation of Salmonella from cattle in Northern Ireland in 2008. The majority of these were S. Dublin (213)

2007:
The number of reports of Salmonellosis in cattle in the UK in 2007 increased to 857 compared to 750 reported in 2006. There were 989 reports in 2005 and 1218 reports in 2004.

The majority of incidents reported are from samples taken for diagnostic purposes, and not from samples from healthy animals. The number of recorded incidents may also have been affected by changes to the recording system (see 2004 report).

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 ducks - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

Breeding flocks

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

Meat production flocks

As for breeding birds.

Frequency of the sampling

Breeding flocks: Day-old chicks

No official sampling undertaken. Voluntary sampling.

Breeding flocks: Rearing period

No official sampling undertaken. Voluntary sampling.

Breeding flocks: Production period

No official sampling undertaken. Voluntary sampling.

Meat production flocks: Day-old chicks

No official sampling undertaken. Voluntary sampling.

Meat production flocks: Rearing period

No official sampling undertaken. Voluntary sampling.

Meat production flocks: Before slaughter at farm

No official sampling undertaken. Voluntary sampling.

Meat production flocks: At slaughter (flock based approach)

No official sampling undertaken. Voluntary sampling.

Methods of sampling (description of sampling techniques)

Meat production flocks: Before slaughter at farm

Case definition

Breeding flocks: Day-old chicks

Culture and isolation of Salmonella from samples taken from the animal/flock or associated with its environment. Reports of Salmonella isolates under the relevant legislation 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.

Breeding flocks: Rearing period

As above.

Breeding flocks: Production period

As above

Meat production flocks: Day-old chicks

As above

Meat production flocks: Rearing period

As above

Meat production flocks: Before slaughter at farm

As above

Meat production flocks: At slaughter (flock based approach)

As above

Diagnostic/analytical methods used

Breeding flocks: Day-old chicks

Various methods may be used

Breeding flocks: Rearing period

Various methods may be used

Breeding flocks: Production period

Various methods may be used

Meat production flocks: Day-old chicks

Various methods may be used

Meat production flocks: Rearing period

Various methods may be used

Meat production flocks: Before slaughter at farm

Various methods may be used

Meat production flocks: At slaughter (flock based approach)

Various methods may be used

Vaccination policy

Breeding flocks

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.

Control program/mechanisms

The control program/strategies in place

Breeding flocks

Breeding flocks are encouraged to monitor in the same way as Gallus gallus under Regulation 2160/2003/EC, but there is no official Salmonella control programme in the duck industry sector.

Meat production flocks

Producers are encouraged to monitor for Salmonella, but there is no official control programme.

Measures in case of the positive findings or single cases

Public health authorities are advised of the isolation of Salmonellas, and the owner is given advice and visits will be made to the farm by a Government official if the salmonella is of public health significance.

Notification system in place

In England, Wales and Scotland (GB) all isolations of Salmonella must be reported and a culture must be supplied to the National Reference Laboratory - 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] and a culture must be supplied to the National Reference Laboratory.

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.

Results of the investigation

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, 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 units tested in 2009 are not known because the laboratories do not report negative results unless as part of an official control programme or survey. For the purposes of completing the tables in the report, the number of units tested is recorded as the number of positive units.

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

There were 277 reports of Salmonella recorded in ducks during 2008. These were all incidents recorded in Great Britain. 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). S. Orion was the second most commonly reported serotype (18.0% of all duck incidents) and the number of reports of this serotype had increased compared with the same period in 2007 (50 reports in 2008; 32 reports in 2007). The number of reports of S. Kedougou (24 reports) had also increased in 2008 compared with 2007 in which there were only five reported. There was a big decrease seen in the number of reports of S. Indiana (95 reports compared with 149 in 2007) and S. Binza (19 reports compared with 42 in 2007). Smaller decreases were noted in the number of reports of S. Mbandaka (28 reports compared with 36 in 2007) and S. Give (10 reports compared with 17 in 2007).

There was one incident of S. Enteritidis in ducks (PT9b) compared with ten during 2007. There were 4 incidents of S. Typhimurium reported in ducks during the year.

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.

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

Monitoring system

Sampling strategy

Breeding flocks

Reports of Salmonella in geese usually arise from samples sent by a private veterinarian for diagnostic purposes. There is no official control plan for the control of Salmonella in the geese industry sectors.

Case definition

Breeding flocks: Production period

Culture and isolation of Salmonella from samples taken from the animal/flock or associated with its environment. Reports of Salmonella isolates under the relevant legislation 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.

Meat production flocks: Before slaughter at farm

As above

Diagnostic/analytical methods used

Breeding flocks: Production period

Various methods may be used

Meat production flocks: Before slaughter at farm

Various methods may be used

Vaccination policy

Breeding flocks

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.

Control program/mechanisms

The control program/strategies in place

Breeding flocks

Breeding flocks are encouraged to monitor in the same way as Gallus gallus under Regulation 2160/2003/EC, but there is no official Salmonella control programme in the goose industry sector.

Meat production flocks

Producers are encouraged to monitor for Salmonella, but there is no official control programme.

Measures in case of the positive findings or single cases

Breeding flocks

Public health authorities are advised of the isolation of Salmonellas, and the owner is given advice and visits will be made to the farm by a Government official if the salmonella is of public health significance.

Meat Production flocks

Public health authorities are advised of the isolation of Salmonellas, and the owner is given advice and visits will be made to the farm by a Government official if the salmonella is of public health significance.

Notification system in place

In England, Wales and Scotland (Great Britain) all isolations of Salmonella must be reported under the Zoonoses Order 1989 and a culture must be supplied to the National Reference Laboratory.

In Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991] and a culture must be supplied to the National Reference Laboratory.

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.

Results of the investigation

Submission of samples from geese is most likely to be for diagnostic purposes. There were 2 reports of Salmonella from geese in the UK during 2009 - S. Typhimurium DT193 and S. Bovismorbificans.

The number of units tested in 2009 are not known because the laboratories do not report negative results unless as part of an official control programme or survey. For the purposes of completing the tables in the report, the number of units tested is recorded as the number of positive units.

G. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Breeding herds

On average, approximately 90% of incidents are from the isolation of Salmonella in samples taken for diagnostic purposes (clinical samples).
There is no routine official sampling.

Multiplying herds

As for breeding herds

Fattening herds

As for breeding herds.

The Zoonoses National Control Programme for Salmonella in 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

Breeding herds

No official sampling undertaken in 2009. Voluntary sampling - mostly submission of diagnotic material for clinical disease investigations

Multiplying herds

No official sampling undertaken in 2009. Voluntary sampling - mostly submission of diagnotic material for clinical disease investigations

Fattening herds at farm

No official sampling undertaken in 2009. Voluntary sampling - mostly submission of diagnotic material for clinical disease investigations

Fattening herds at slaughterhouse (herd based approach)

Voluntary sampling - industry Zoonoses National Control Programme

Type of specimen taken

Breeding herds

Voluntary.

Multiplying herds

Voluntary.

Fattening herds at farm

Voluntary.

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 relevant legislation 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.

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

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

Fattening herds

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

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

Recent actions taken to control the zoonoses

Following recognition that the Zoonoses Action Plan (ZAP) Salmonella Programme had not achieved its objective for reducing Salmonella in pigs (positive meat juice samples from farm assured herds in the year to 31st March 2008 stood at 29.4%1), the British Pig Executive (BPEx) launched the Zoonoses National Control Programme for pigs (ZNCP) in Great Britain April 2008. Under this new programme producers are sent a new style report showing their rolling annual meat juice ELISA results (detecting Group B and Group C1 Salmonellas), and are encouraged to aim for <10 per cent of results in the positive or weak-positive categories. 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 VLA.

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

Since December 2007, BPEX has also supported some 30 farms which have elected to undertake interventions to control Salmonella. These interventions include vaccination, feed acidification, addition of probiotic to feed, use of meal feed, and others.

Measures in case of the positive findings or single cases

Public health authorities are advised of the isolation of Salmonella, and the owner is given advice and visits will be made by Government officials to the farm if the Salmonella is of public health significance.

Notification system in place

In England, Wales and Scotland (GB) all isolations of Salmonella must be reported - Zoonoses Order 1989 and a culture must be supplied to the National Reference Laboratory.

In Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991] and a culture must be supplied to the National Reference Laboratory.

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.
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 were 207 reports of Salmonella in pigs in 2009. The most commonly isolated serovar was Salmonella Typhimuirum (150 reports - 72.5%). For the first time, 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. Overall, the number of pig Salmonella incidents and isolations dropped slightly in 2009 compared to 2008 (when there were 219 reports). However specifically in Great Britain, there was again an increase in the number of incidents recorded, with 182 compared to 174 in 2008 and 163 in 2007.

The main definitive (DTs) and undefined (U) phage types (DTs) of S. Typhimurium, DT193 and U288 were again the most commonly reported types in 2009.

The number of units tested in 2009 are not known because the laboratories do not report negative results unless as part of an official control programme or survey. For the purposes of completing the tables in the report, the number of units tested is recorded as the number of positive units.

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

There were 219 reported Salmonella incidents and isolations in pigs in the UK in 2008. However, specifically in Great Britain there was an increase in number of incidents recorded with 174 recorded incidents compared to 163 in 2007. Salmonella Typhimurium was the most commonly found isolate, though its relative contribution in 2008 – 67% of all incidents in the UK - is lower than at any time since 1998. S. Derby was the second most common serovar, though at 7.5% of incidents in Great Britain, its relative contribution was almost half that of incidents recorded in Great Britain in 2004. S. London was the third most common serovar, increasing to nearly 6% of pig incidents in GB in 2008.

There were no more reports of S. Anatum in pigs in 2008, following its re-appearance in 2007 for the first time since 2002.

The number of Salmonella reports from routine reporting during 2007 (226) was an increase on the number seen in 2006 (201) and 2005 (194). There were 164 reports in 2004. In 2007, S. Typhimurium was the most commonly reported serovar, comprising 70% of total reports, with a total of 158 incidents reported during the year. The most frequently reported phage types were U288 (77 incidents) and DT 193 (30 incidents). There were 8 reports of DT 104 during the year.

The most commonly isolated serovars in 2006 were S. Typhimurium (140) and S. Derby (28) which comprised 70% and 14% of total reports respectively. The most commonly reported phage type of S. Typhimurium during 2006 was DT193.

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 serotype isolated from humans in the UK. Salmonella Derby is not common in isolates of Salmonella from humans.

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). Molecular studies are underway to compare strains to those isolated from humans in the UK and in other European countries.

H. 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)

Monitoring for Salmonella in turkey fattening and breeding flocks is carried out on a voluntary basis by the food business operator. This is also performed by operators who are members of some farm assurance schemes

In Northern Ireland nearly all of the turkey breeding flocks are registered with the Northern Ireland Poultry Health Assurance Scheme (NIPHAS) and so do serological tesing for Salmonella.

Meat production flocks

As for breeding birds.

Frequency of the sampling

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

No official sampling undertaken in 2009. Voluntary sampling.

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

No official sampling undertaken in 2009. Voluntary sampling.

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

No official sampling undertaken in 2009. Voluntary sampling.

Meat production flocks: Day-old chicks

No official sampling undertaken in 2009. Voluntary sampling.

Meat production flocks: Rearing period

No official sampling undertaken in 2009. Voluntary sampling.

Meat production flocks: Before slaughter at farm

No official sampling undertaken in 2009. Voluntary sampling.

Meat production flocks: At slaughter (flock based approach)

No official sampling undertaken in 2009. Voluntary sampling.

Type of specimen taken

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

Voluntary

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

Voluntary

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

Voluntary

Meat production flocks: Day-old chicks

Voluntary

Meat production flocks: Rearing period

Voluntary

Meat production flocks: Before slaughter at farm

Voluntary

Meat production flocks: At slaughter (flock based approach)

Voluntary

Case definition

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.

Monitoring system

Case definition

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

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

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

As above

Meat production flocks: Day-old chicks

As above

Meat production flocks: Rearing period

As above

Meat production flocks: Before slaughter at farm

As above

Meat production flocks: At slaughter (flock based approach)

As above

Diagnostic/analytical methods used

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

Various may be used

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

Various may be used

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

Various may be used

Meat production flocks: Day-old chicks

Various may be used

Meat production flocks: Rearing period

Various may be used

Meat production flocks: Before slaughter at farm

Various may be used

Meat production flocks: At slaughter (flock based approach)

Various may be used

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.

Control program/mechanisms

The control program/strategies in place

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

Breeding flocks are encouraged to monitor in the same way as Gallus gallus under Directive 99/2003/EC and Regulation (EC) No. 2160/2003, but there was no official Salmonella control programme for turkeys operating in 2009.

Meat production flocks

Producers are encouraged to monitor for Salmonella, but there was no official control programme in the turkey industry sector in 2009.

Measures in case of the positive findings or single cases

Public health authorities are advised of the isolation of Salmonella, and 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 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 and related legislation in Great Britain and in Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991]

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.

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

Most of the samples in turkeys are taken for monitoring purposes but diagnostic samples are also included. The voluntary nature of sampling and the relatively low numbers involved make it difficult to detect trends. Laboratories are required to report all isolations of Salmonella but the number of samples examined with negative results is not known. The results do indicate those serovars which are likely to be the most common in turkeys.

There were 71 reports of Salmonella in turkeys in 2009. This is an increase of 24% compared to 2008, where 56 reports of Salmonella incidents/isolations were received. There was only 1 report of S. Typhimurium and no reports of S. Enteritidis during the year. The most commonly isolated serovars were

S. Kedougou (39.4%) and S. Derby (23.9%)

In Northern Ireland, there were no reports of isolations of Salmonella from turkeys in 2009.

The number of units tested in 2009 are not known because the laboratories do not report negative results unless as part of an official control programme or survey. For the purposes of completing the tables in the report, the number of units tested is recorded as the number of positive units.

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

There were 56 reports of Salmonella in turkeys in 2008. This is a reduction of 49.5% during 2008 compared with the same period in 2007. There was a decrease in S. Typhimurium, S. Derby, S. Kottbus, S. Newport and S. Senftenberg. The most commonly reported serotypes were S. Kedougou (39.3% of all turkey incidents) and S. Derby (35.7% of all turkey incidents). There was only one report of S. Typhimurium (U302) during January – December 2008 compared with 12 in January – December 2007. The number of reports of S. Kedougou increased in January – December 2008 to 22 reports compared with 14 reports in the same period in 2007. Reports of S. Derby decreased in January – December 2008 from 37 to 20 as did reports of S. Kottbus (25 reports to 8 reports). There were no reports of S. Newport in turkeys compared with 7 in January – December 2007.

There were 111 reports of Salmonella in turkeys in 2007. The most commonly reported serotypes in 2007 were S. Derby (37 isolations) and S. Kottbus (25 isolations) which comprised 32.4% and 21.9% of total reports respectively. There were 12 isolations of S. Typhimurium from turkeys during 2007, compared to only 1 in 2008 and 1 in 2009.

There were 171 reported incidents of Salmonella in turkeys in 2006, a reduction on the 279 reported incidents in 2005 and the 243 cases in 2004. The most commonly reported serotypes were S. Typhimurium, S. Derby and S. Kottbus which comprised 22%, 16% and 15% of total reports respectively. The phage types reported were mainly DT104 (32 incidents).

The reduction in reports of Salmonella detected in turkeys over the last few years is considered to be mainly due to the voluntary application and improvement of Salmonella control measures on turkey farms following the EU wide baseline survey carried out in 2006-2007 and in preparation for the start of the turkey Salmonella NCP, due to be implemented in 2010.

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 serotypes reported are not commonly found in human isolates.

Table Salmonella in breeding flocks of Gallus gallus

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	Salmonella spp., unspecified
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - at farm - Control and eradication programmes - official and industry sampling [1)]	1547	NRL	Flock	1547	18	0	0	0	2	0	0
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes - official and industry sampling [2)]	90	NRL	Flock	90	4	0	0	0	0	0	0
Gallus gallus (fowl) - breeding flocks, unspecified - during rearing period - at farm - Control and eradication programmes - industry sampling [3)]		NRL	Flock	1	1	0	0	0	0	0	0

	Salmonella spp.
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - at farm - Control and eradication programmes - official and industry sampling [1)]	16
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes - official and industry sampling [2)]	4
Gallus gallus (fowl) - breeding flocks, unspecified - during rearing period - at farm - Control and eradication programmes - industry sampling [3)]	1

Table Salmonella in breeding flocks of Gallus gallus

Comments:

[1)] Elite, Grandparent and Parent flocks

[2)] Elite, Grandparent and Parent flocks

[3)] Number of existing flocks in rear not known. Number of units tested are not known. Therefore for purposes of completing the table, number of units tested is recorded as the same as number of positive units.

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 flocks according to Regulation 1003/2005/EC as amended in April 2009 by Regulation 213/2009/EC.

"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 number of flocks in the broiler- and layer- breeder line categories that were registered and subject to at least one official test during 2009 is used as the denominator population. For the regulated Salmonella serovars, a flock is counted as positive once only during the period 1st January to 31st December 2009, regardless of the number of tests carried out/isolates obtained.

The number of Salmonella positive in-rear flocks is also recorded. For in-rear flocks, the number of existing flocks and number of flocks tested is not known.

Table Salmonella in other poultry

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Hadar	S. Infantis	S. Virchow
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling	4466	NRL	Flock	4466	76	12	3	0	0	1	0
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry	4466	NRL	Flock	4466	45	5	2	0	0	1	0
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling	4466	NRL	Flock	1504	28	4	1	0	0	0	0
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - suspect sampling [1)]	4466	NRL	Flock	3	3	3	0	0	0	0	0
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling [2)]	27780	NRL	Flock	27780	364	10	2	0	0	0	2
Ducks - at farm - Monitoring - industry sampling		NRL	Flock	301	301	1	8	8	52	0	0
Gallus gallus (fowl) - laying hens - at farm - Control and eradication programmes - industry sampling - census sampling (Day old and during rearing period) [3)]		NRL	Flock	38	38	0	7	0	0	0	0
Geese - at farm - Monitoring - industry sampling		NRL	Flock	2	2	0	1	0	0	0	0
Turkeys - at farm - Monitoring - industry sampling		NRL	Flock	71	71	0	1	0	0	0	0

Table Salmonella in other poultry

	Salmonella spp.
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling	60
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry	37
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling	23
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - suspect sampling [1)]	0
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling [2)]	350
Ducks - at farm - Monitoring - industry sampling	232
Gallus gallus (fowl) - laying hens - at farm - Control and eradication programmes - industry sampling - census sampling (Day old and during rearing period) [3)]	31
Geese - at farm - Monitoring - industry sampling	1
Turkeys - at farm - Monitoring - industry sampling	70

Comments:

[1)] Total number of flocks tested under official suspect sampling category unknown. In order to complete table the units tested is recorded as the number of units positive

[2)] The number of existing flocks and number of flocks tested is derived from the number of samples submitted to private and Government veterinary laboratories for testing of all elligible broiler flocks 3 weeks prior to slaughter.

Table Salmonella in other poultry

[3] Total number of existing flocks not known. Total number of units (flocks) tested not known. In order to complete table the units tested is recorded as the number of units positive. Includes isolations of Salmonella resulting from additional voluntary industry monitoring.

Footnote:

NRL = Salmonella National Reference Laboratory.

Data on turkeys, ducks and geese from Great Britain only (there were no reported isolations of Salmonella in these species in Northern Ireland in 2009). Most isolates from these other poultry are derived from voluntary industry monitoring for Salmonella. All figures for these species are 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 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. Therefore for purposes of completing the table, number of units tested is recorded as the same as number of positive units.

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 (EC) No. 1168/2006. In 2009, one flock was positive for both S. Enteritidis and S. Infantis. This flock has been counted only once in the total.

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 (EC) No. 646/2007. The number of existing flocks and number of flocks tested is derived from the samples submitted to private and Government veterinary laboratories to fulfill the requirements of the NCP for testing of all elligible broiler flocks 3 weeks prior to slaughter. Two flocks tested positive for both S. Livingstone and S. Senftenberg, and another flock tested positive for both S. Livingstone and S. 6,7:D:-. These flocks have only been recorded as positive once in the total number of units positive.

"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

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Salmonella spp.
Cattle (bovine animals) - at farm - Clinical investigations	NRL	Animal	895	895	3	68	13	811
Other animals - unspecified - Clinical investigations	NRL	Animal	24	24	1	5	0	18
Pigs - at farm - Clinical investigations	NRL	Animal	207	207	0	150	1	56
Sheep - at farm - Clinical investigations	NRL	Animal	135	135	0	4	2	129
Solipeds, domestic - at farm - Clinical investigations	NRL	Animal	30	30	2	9	1	18

Footnote:

NRL = Salmonella National Reference Laboratory.
In the table "other animals unspecified" refers to isolates from Northern Ireland from non-defined miscellaneous animal species.
All figures from Northern Ireland for cattle, sheep, horses, pigs and other animals are total number of isolations of Salmonella. All figures from Great Britain (England, Scotland and Wales) are 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 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. Therefore for purposes of completing the table, number of units tested is recorded as the same as number of positive units

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Salmonella spp.
Partridges - at farm - Clinical investigations	NRL	Animal	5	5	0	2	0	3
Pheasants - at farm - Clinical investigations	NRL	Animal	29	29	0	11	5	13

Footnote:

Data for Great Britain (England, Scotland and Wales only)
NRL = Salmonella National Reference Laboratory.
All figures from Great Britain are 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 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. Therefore for purposes of completing the table, number of units tested is recorded as the same as number of positive units

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 2005. (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

Great Britain:
In the three years from 2006 until 2008 there has been little change in the isolation rate of Salmonella. In 2006 it was 1.1%, in 2007 0.9% and in 2008 1.1%. An increase in the total numbers of tests recorded between 2007 and 2008 is noted with approximately 5,500 extra tests reported (2007 – 35,999; 2008 – 41,537). For 2009, there was a reduction on previous years in the isolation rate of Salmonella with 310 positive tests out of a total of 39,647 recorded tests carried out, giving an isolation rate of 0.78%.

There were 360 batches of home produced protein subjected to official testing under the Animal Byproducts Regulations 2005 during 2009 and 18 of these (5%) were positive for Salmonella. The serovars reported during 2009 were S. Senftenburg (10 isolations), S. Tennessee (4 isolations), S. Schwarzengrund (1 isolation), S. Typhimurium (1 isolation) and unspecified Salmonella (3 isolations). This was an increase on the number of Salmonella positive batches detected in 2008 (10/285 tested batches or 3.5%).

Northern Ireland:
In total 118 isolations of Salmonella resulted from testing carried out in feed material of animal origin

during the year. There were 3 isolations of S. Enteritidis and 2 of S. Typhimurium. There was no information on the results of testing carried out on other feed materials during the year.

General:
The number of reported isolations of Salmonella considered to be of greatest potential public health significance (S. Typhimurium, S. Enteritidis, S. Hadar, S. Virchow, S. Infantis) was low (the low numbers involved does not allow for any significance to be attached to changes in the isolation rates of these serotypes). Amongst the other serotypes no especial conclusions can be drawn, there being no obvious trends visible in the data.

It is not possible to determine trends from these data, but they do indicate the wide variety of Salmonella serotypes which may be present in feed materials and the need to manage this risk during the production process.

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

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

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Agona	S. Anatum	S. Idikan
Compound feedingstuffs for pigs - process control - Surveillance - HACCP and own checks	NRL	Batch	500g	10	10	0	0	0	0	1	0
Compound feedingstuffs for poultry (non specified) - process control - Surveillance - HACCP and own checks	NRL	Batch	500g	15	15	0	0	0	2	0	4
Compound feedingstuffs, not specified - process control - Surveillance - HACCP and own checks (Compound ruminant feed)	NRL	Batch	500	10	10	0	0	0	0	0	0

	S. Infantis	S. Kedougou	S. Kentucky	S. Mbandaka	S. Rissen	S. Senftenberg	S. Tennessee
Compound feedingstuffs for pigs - process control - Surveillance - HACCP and own checks	0	4	1	3	1	0	0
Compound feedingstuffs for poultry (non specified) - process control - Surveillance - HACCP and own checks	2	0	0	5	0	0	2
Compound feedingstuffs, not specified - process control - Surveillance - HACCP and own checks (Compound ruminant feed)	0	0	0	5	0	3	2

Footnote:

Table contains data for Great Britain - England, Scotland and Wales only.
Number of units tested are not known. Salmonella isolates are serotyped at the Salmonella National Reference Laboratory (NRL).
The sample size recommended is 500g made up of a statistical number of sub-samples from the batch. A sub-sample of the 500g is examined. The samples are taken by the industry and examined in private laboratories as part of the HACCP.

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Salmonella spp.
Feed material of cereal grain origin - maize	NRL	Batch	500g	1	1	0	0	0	1
Feed material of cereal grain origin - wheat derived	NRL	Batch	500g	2	2	0	1	0	1
Feed material of oil seed or fruit origin - palm kernel derived	NRL	Batch	500g	2	2	0	0	0	2
Feed material of oil seed or fruit origin - rape seed derived	NRL	Batch	500g	13	13	0	0	0	13
Feed material of oil seed or fruit origin - soya (bean) derived	NRL	Batch	500g	43	43	0	2	0	41
Feed material of oil seed or fruit origin - sunflower seed derived	NRL	Batch	500g	18	18	0	0	0	18
Feed material of cereal grain origin - rice derived	NRL	Batch	500g	3	3	0	0	0	3
Other feed material - miscellaneous	NRL	Batch	500g	38	38	1	4	0	33

Footnote:

Data for Great Britain (England, Scotland and Wales) only.

Isolates derived from non-official sampling are from samples taken by feed business operators as part of HACCP. 500g sample recommended but may vary (operators may take more or less). Salmonella isolates are sent to the National Reference Laboratory (NRL) for serotyping.

Number of units tested are not known.

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Salmonella spp.
Feed material of land animal origin - blood meal - Monitoring - official sampling	NRL	Batch	500g	10	0	0	0	0	0
Feed material of land animal origin - bone meal - Monitoring - official sampling	NRL	Batch	500g	4	0	0	0	0	0
Feed material of land animal origin - feather meal - Monitoring - official sampling	NRL	Batch	500g	5	0	0	0	0	0
Feed material of land animal origin - greaves - Monitoring - official sampling	NRL	Batch	500g	6	0	0	0	0	0
Feed material of land animal origin - meat and bone meal - Monitoring - official sampling	NRL	Batch	500g	33	8	0	1	0	7
Feed material of land animal origin - poultry offal meal - Monitoring - official sampling	NRL	Batch	500g	11	0	0	0	0	0
Feed material of marine animal origin - fish meal - Monitoring - official sampling	NRL	Batch	500g	22	0	0	0	0	0
Other feed material - Monitoring - official sampling	NRL	Batch	500g	269	10	0	0	0	10
Other feed material - miscellaneous (all testing) [1)]	NRL	Batch	500g	118	118	3	2	1	112

Comments:

[1)] Northern Ireland only

Footnote:

Salmonella isolates are sent to the National Reference Laboratory (NRL) for serotyping.

Data for Great Britain (England, Scotland and Wales): Home produced feed materials of animal origin are subjected to official testing under the Animal Byproducts Regulations 2005. The table above details only the results of this official testing. In total, 360 batches were tested and 18 batches were positive for Salmonella.

material of animal origin are included in the table "Salmonella serovars in feedstuffs".

Data for Northern Ireland:
Results of all testing for Salmonella in feed material of animal origin. Number of units tested is not known. Units positive are number of Salmonella isolations.

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		Birds - wild - Game birds		Ducks		Geese
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	0	895	0	207	597	0	0	0	0	34	301	0	2
Number of isolates per serovar													
S. 13,23:i:-	0	0	0	0	1	0	0	0	0	0	0	0	0
S. 3,19:-:-	0	0	0	0	3	0	0	0	0	0	0	0	0
S. 4,12:d:-	0	0	0	0	1	0	0	0	0	0	0	0	0
S. 4,5,12:i:-	0	14	0	12	0	0	0	0	0	0	0	0	0
S. 6,7:-:-	0	0	0	0	1	0	0	0	0	0	0	0	0
S. 6,7:b:-	0	0	0	0	1	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
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	0	895	0	207	597	0	0	0	0	34	301	0	2
Number of isolates per serovar													
S. 6,7:d:-	0	0	0	0	1	0	0	0	0	0	0	0	0
S. 6,7:z10:-	0	0	0	0	1	0	0	0	0	0	0	0	0
S. Agama	0	2	0	0	10	0	0	0	0	0	0	0	0
S. Agona	0	0	0	0	8	0	0	0	0	0	0	0	0
S. Ajiobo	0	1	0	0	1	0	0	0	0	0	0	0	0
S. Anatum	0	21	0	1	7	0	0	0	0	0	0	0	0
S. Bovismorbificans	0	1	0	3	1	0	0	0	0	0	0	0	1
S. Bredeney	0	0	0	0	1	0	0	0	0	0	1	0	0
S. Champaign	0	0	0	0	1	0	0	0	0	0	0	0	0
S. Choleraesuis	0	0	0	2	0	0	0	0	0	0	0	0	0
S. Colindale	0	0	0	0	0	0	0	0	0	0	0	0	0
S. Derby	0	0	0	8	2	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
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	0	895	0	207	597	0	0	0	0	34	301	0	2
Number of isolates per serovar													
S. Dublin	0	645	0	0	11	0	0	0	0	0	0	0	0
S. Ealing	0	0	0	0	1	0	0	0	0	0	0	0	0
S. Enteritidis	0	3	0	0	23	0	0	0	0	0	1	0	0
S. Fluntern	0	0	0	0	1	0	0	0	0	0	0	0	0
S. Gallinarum biovar Pullorum	0	0	0	0	2	0	0	0	0	2	0	0	0
S. Give	0	0	0	1	2	0	0	0	0	0	25	0	0
S. Goldcoast	0	0	0	2	15	0	0	0	0	0	0	0	0
S. Hadar	0	0	0	0	0	0	0	0	0	0	52	0	0
S. Havana	0	0	0	0	0	0	0	0	0	0	5	0	0
S. Heidelberg	0	2	0	0	0	0	0	0	0	0	1	0	0
S. II 58:1,z,13,z28:z6	0	1	0	0	0	0	0	0	0	0	0	0	0
S. IIIb 61:-:1,5,7	0	0	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
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	0	895	0	207	597	0	0	0	0	34	301	0	2
Number of isolates per serovar													
S. IIIb61:k:1,5,7	0	0	0	0	0	0	0	0	0	0	0	0	0
S. Idikan	0	0	0	0	1	0	0	0	0	0	0	0	0
S. Indiana	0	2	0	0	1	0	0	0	0	0	118	0	0
S. Infantis	0	0	0	0	2	0	0	0	0	0	0	0	0
S. Kedougou	0	0	0	6	102	0	0	0	0	0	7	0	0
S. Kentucky	0	0	0	0	6	0	0	0	0	0	0	0	0
S. Kimuenza	0	0	0	1	0	0	0	0	0	0	0	0	0
S. Kottbus	0	5	0	0	3	0	0	0	0	2	0	0	0
S. Larochelle	0	0	0	0	1	0	0	0	0	0	0	0	0
S. Livingstone	0	0	0	0	86	0	0	0	0	0	0	0	0
S. London	0	0	0	3	0	0	0	0	0	0	0	0	0
S. Mapo	0	0	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
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	0	895	0	207	597	0	0	0	0	34	301	0	2
Number of isolates per serovar													
S. Mbandaka	0	62	0	0	105	0	0	0	0	7	13	0	0
S. Mikawasima	0	0	0	0	0	0	0	0	0	0	0	0	0
S. Montevideo	0	29	0	0	16	0	0	0	0	2	0	0	0
S. Muenster	0	0	0	0	0	0	0	0	0	0	0	0	0
S. Newport	0	8	0	1	1	0	0	0	0	0	1	0	0
S. Ohio	0	5	0	0	26	0	0	0	0	0	0	0	0
S. Oranienburg	0	0	0	0	1	0	0	0	0	0	0	0	0
S. Orion	0	0	0	1	4	0	0	0	0	3	61	0	0
S. Oslo	0	2	0	0	0	0	0	0	0	0	0	0	0
S. Ouakam	0	0	0	0	3	0	0	0	0	0	0	0	0
S. Panama	0	0	0	1	0	0	0	0	0	0	0	0	0
S. Paratyphi B var. Java	0	1	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
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	0	895	0	207	597	0	0	0	0	34	301	0	2
Number of isolates per serovar													
S. Poona	0	0	0	0	2	0	0	0	0	0	0	0	0
S. Reading	0	1	0	4	0	0	0	0	0	0	0	0	0
S. Rissen	0	1	0	7	1	0	0	0	0	0	0	0	0
S. Saintpaul	0	0	0	0	1	0	0	0	0	0	0	0	0
S. Senftenberg	0	0	0	0	86	0	0	0	0	0	0	0	0
S. Species	0	0	0	2	1	0	0	0	0	0	0	0	0
S. Stanley	0	0	0	1	0	0	0	0	0	0	0	0	0
S. Stourbridge	0	1	0	0	3	0	0	0	0	0	0	0	0
S. Tennessee	0	0	0	0	10	0	0	0	0	0	0	0	0
S. Thompson	0	1	0	0	7	0	0	0	0	0	0	0	0
S. Typhimurium	0	68	0	150	19	0	0	0	0	13	8	0	1
S. Virchow	0	0	0	0	2	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
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	0	895	0	207	597	0	0	0	0	34	301	0	2
Number of isolates per serovar													
S. enterica subsp. arizonae	0	0	0	0	0	0	0	0	0	0	0	0	0
S. enterica subsp. diarizonae	0	0	0	0	0	0	0	0	0	0	0	0	0
S. enterica subsp. enterica, rough	0	6	0	0	0	0	0	0	0	0	0	0	0
Salmonella spp., unspecified	0	13	0	1	12	0	0	0	0	5	8	0	0

Serovar	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory											
Number of isolates serotyped	0	0	1	0	24	0	135	0	29	71	0
Number of isolates per serovar											
S. 13,23:i:-	0	0	0	0	0	0	0	0	0	0	0
S. 3,19:-:-	0	0	0	0	0	0	0	0	0	0	0
S. 4,12:d:-	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory											
Number of isolates serotyped	0	0	1	0	24	0	135	0	29	71	0
Number of isolates per serovar											
S. 4,5,12:i:-	0	0	0	0	0	0	0	0	3	0	0
S. 6,7:-:-	0	0	0	0	0	0	0	0	0	0	0
S. 6,7:b:-	0	0	0	0	0	0	0	0	0	0	0
S. 6,7:d:-	0	0	0	0	0	0	0	0	0	0	0
S. 6,7:z10:-	0	0	0	0	0	0	0	0	0	0	0
S. Agama	0	0	0	0	1	0	0	0	3	0	0
S. Agona	0	0	0	0	0	0	1	0	0	0	0
S. Ajiobo	0	0	0	0	0	0	0	0	0	0	0
S. Anatum	0	0	0	0	0	0	0	0	0	0	0
S. Bovismorbificans	0	0	0	0	0	0	0	0	1	1	0
S. Bredeney	0	0	0	0	0	0	0	0	0	0	0
S. Champaign	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory											
Number of isolates serotyped	0	0	1	0	24	0	135	0	29	71	0
Number of isolates per serovar											
S. Choleraesuis	0	0	0	0	0	0	0	0	0	0	0
S. Colindale	0	0	0	0	0	0	0	0	0	1	0
S. Derby	0	0	0	0	1	0	2	0	0	17	0
S. Dublin	0	0	1	0	5	0	11	0	1	0	0
S. Ealing	0	0	0	0	0	0	0	0	0	0	0
S. Enteritidis	0	0	0	0	1	0	0	0	2	0	0
S. Fluntern	0	0	0	0	0	0	0	0	0	0	0
S. Gallinarum biovar Pullorum	0	0	0	0	0	0	0	0	0	0	0
S. Give	0	0	0	0	0	0	0	0	0	0	0
S. Goldcoast	0	0	0	0	0	0	0	0	0	0	0
S. Hadar	0	0	0	0	0	0	0	0	0	0	0
S. Havana	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory											
Number of isolates serotyped	0	0	1	0	24	0	135	0	29	71	0
Number of isolates per serovar											
S. Heidelberg	0	0	0	0	0	0	0	0	0	0	0
S. II 58:1,z,13,z28:z6	0	0	0	0	0	0	0	0	0	0	0
S. IIIb 61:-:1,5,7	0	0	0	0	0	0	22	0	0	0	0
S. IIIb61:k:1,5,7	0	0	0	0	0	0	60	0	0	0	0
S. Idikan	0	0	0	0	0	0	0	0	0	0	0
S. Indiana	0	0	0	0	0	0	0	0	0	6	0
S. Infantis	0	0	0	0	0	0	0	0	0	0	0
S. Kedougou	0	0	0	0	0	0	0	0	0	28	0
S. Kentucky	0	0	0	0	0	0	0	0	0	0	0
S. Kimuenza	0	0	0	0	0	0	0	0	0	0	0
S. Kottbus	0	0	0	0	1	0	0	0	0	10	0
S. Larochelle	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory											
Number of isolates serotyped	0	0	1	0	24	0	135	0	29	71	0
Number of isolates per serovar											
S. Livingstone	0	0	0	0	0	0	0	0	0	0	0
S. London	0	0	0	0	0	0	0	0	0	0	0
S. Mapo	0	0	0	0	0	0	1	0	0	0	0
S. Mbandaka	0	0	0	0	0	0	0	0	1	1	0
S. Mikawasima	0	0	0	0	0	0	0	0	1	0	0
S. Montevideo	0	0	0	0	0	0	15	0	0	1	0
S. Muenster	0	0	0	0	0	0	0	0	1	0	0
S. Newport	0	0	0	0	0	0	2	0	5	0	0
S. Ohio	0	0	0	0	0	0	0	0	0	0	0
S. Oranienburg	0	0	0	0	0	0	0	0	0	0	0
S. Orion	0	0	0	0	0	0	1	0	0	1	0
S. Oslo	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory											
Number of isolates serotyped	0	0	1	0	24	0	135	0	29	71	0
Number of isolates per serovar											
S. Ouakam	0	0	0	0	0	0	0	0	0	0	0
S. Panama	0	0	0	0	0	0	0	0	0	0	0
S. Paratyphi B var. Java	0	0	0	0	0	0	0	0	0	0	0
S. Poona	0	0	0	0	0	0	0	0	0	0	0
S. Reading	0	0	0	0	0	0	0	0	0	0	0
S. Rissen	0	0	0	0	0	0	0	0	0	0	0
S. Saintpaul	0	0	0	0	0	0	0	0	0	0	0
S. Senftenberg	0	0	0	0	2	0	0	0	0	3	0
S. Species	0	0	0	0	4	0	3	0	0	0	0
S. Stanley	0	0	0	0	0	0	0	0	0	0	0
S. Stourbridge	0	0	0	0	0	0	0	0	1	0	0
S. Tennessee	0	0	0	0	0	0	0	0	0	0	0

Table Salmonella serovars in animals

Serovar	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
Sources of isolates	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory											
Number of isolates serotyped	0	0	1	0	24	0	135	0	29	71	0
Number of isolates per serovar											
S. Thompson	0	0	0	0	0	0	0	0	0	0	0
S. Typhimurium	0	0	0	0	5	0	4	0	9	1	0
S. Virchow	0	0	0	0	0	0	0	0	0	0	0
S. enterica subsp. arizonae	0	0	0	0	0	0	4	0	0	0	0
S. enterica subsp. diarizonae	0	0	0	0	4	0	0	0	0	0	0
S. enterica subsp. enterica, rough	0	0	0	0	0	0	0	0	0	0	0
Salmonella spp., unspecified	0	0	0	0	0	0	9	0	1	1	0

Footnote:

In the table "Salmonella spp unspecified" refers to isolates where structure only was determined or where the Salmonella serovar was not specified. "Other animals unspecified" refers to isolates from Northern Ireland from non-defined miscellaneous animal species.

NRL = Salmonella National Reference Laboratory.

Data on turkeys, ducks and geese from Great Britain only.

Data on serovars detected in chickens (Gallus gallus) are derived from monitoring carried out under the requirements of the Salmonella National Control Programmes in breeding chickens, layers and broilers as well as

All data from Northern Ireland for cattle, sheep, horses, pigs and other animals are based on total number of isolations of Salmonella. All data from Great Britain (England, Scotland and Wales) are 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 premise within a 30 day period.

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Feed material of cereal grain origin - maize		Feed material of cereal grain origin - rice derived		Feed material of cereal grain origin - wheat derived		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - palm kernel derived		Feed material of oil seed or fruit origin - rape seed derived
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	0	0	1	0	2	0	2	0	22	0	2	0	13
Number of isolates per serovar													
Salmonella spp., unspecified			0		0		0		0		0		0
Other serotypes			0		1		0		4		0		2
S. 4,12:d:-			0		0		0		0		0		0
S. 6,7:-:-			0		0		0		0		0		0
S. Adelaide			0		0		0		0		0		0
S. Agona			0		0		0		1		0		0
S. Anatum			0		0		0		0		0		0
S. Babelsberg			0		0		0		1		0		0
S. Bardo			0		0		0		0		0		0
S. Cerro			0		0		0		0		0		0

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Feed material of cereal grain origin - maize		Feed material of cereal grain origin - rice derived		Feed material of cereal grain origin - wheat derived		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - palm kernel derived		Feed material of oil seed or fruit origin - rape seed derived
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	0	0	1	0	2	0	2	0	22	0	2	0	13
Number of isolates per serovar													
S. Cubana			0		0		0		0		0		1
S. Derby			0		0		0		0		0		0
S. Ealing			0		0		0		0		0		3
S. Enteritidis			0		0		0		0		0		0
S. Havana			0		0		0		0		0		2
S. Hongkong			0		0		0		0		0		0
S. Infantis			0		0		0		0		0		0
S. Kedougou			0		0		0		1		0		0
S. Kentucky			0		0		0		4		0		0
S. Kingston			0		0		0		0		0		0
S. Lexington			0		0		0		0		0		0

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Feed material of cereal grain origin - maize		Feed material of cereal grain origin - rice derived		Feed material of cereal grain origin - wheat derived		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - palm kernel derived		Feed material of oil seed or fruit origin - rape seed derived
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	0	0	1	0	2	0	2	0	22	0	2	0	13
Number of isolates per serovar													
S. Livingstone			1		0		0		0		0		0
S. Mbandaka			0		0		0		0		0		1
S. Montevideo			0		0		0		2		0		0
S. Orion			0		0		0		0		0		0
S. Ouakam			0		0		1		1		0		0
S. Paratyphi B var. Java			0		1		0		0		0		0
S. Reading			0		0		0		0		0		0
S. Rissen			0		0		0		0		0		2
S. Schwarzengrund			0		0		0		0		0		0
S. Senftenberg			0		0		0		4		2		0
S. Taksony			0		0		0		0		0		0

Table Salmonella serovars in feed

Serovar	Compound feedingstuffs for pigs		Feed material of cereal grain origin - maize		Feed material of cereal grain origin - rice derived		Feed material of cereal grain origin - wheat derived		Feed material of marine animal origin - fish meal		Feed material of oil seed or fruit origin - palm kernel derived		Feed material of oil seed or fruit origin - rape seed derived
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	0	0	1	0	2	0	2	0	22	0	2	0	13
Number of isolates per serovar													
S. Tennessee			0		0		0		4		0		2
S. Typhimurium			0		0		1		0		0		0
S. Vejle			0		0		0		0		0		0
S. Westhampton			0		0		0		0		0		0

Serovar	Feed material of oil seed or fruit origin - rape seed derived	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	0	43	0	18	0	156	0
Number of isolates per serovar							
Salmonella spp., unspecified		0		0		1	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - rape seed derived	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	0	43	0	18	0	156	0
Number of isolates per serovar							
Other serotypes		2		1		112	
S. 4,12:d:-		1		0		1	
S. 6,7:-:-		1		0		1	
S. Adelaide		1		0		0	
S. Agona		2		6		3	
S. Anatum		0		0		2	
S. Babelsberg		0		0		0	
S. Bardo		0		0		1	
S. Cerro		1		0		0	
S. Cubana		1		1		0	
S. Derby		0		0		1	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - rape seed derived	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	0	43	0	18	0	156	0
Number of isolates per serovar							
S. Ealing		2		0		0	
S. Enteritidis		0		0		4	
S. Havana		0		1		2	
S. Hongkong		1		0		0	
S. Infantis		1		0		0	
S. Kedougou		0		0		0	
S. Kentucky		1		0		0	
S. Kingston		0		2		0	
S. Lexington		3		1		1	
S. Livingstone		2		0		1	
S. Mbandaka		9		2		1	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - rape seed derived	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	0	43	0	18	0	156	0
Number of isolates per serovar							
S. Montevideo		0		0		0	
S. Orion		2		0		0	
S. Ouakam		0		0		0	
S. Paratyphi B var. Java		0		0		0	
S. Reading		0		0		1	
S. Rissen		2		1		0	
S. Schwarzengrund		0		0		4	
S. Senftenberg		7		1		3	
S. Taksony		0		1		0	
S. Tennessee		2		1		9	
S. Typhimurium		2		0		6	

Table Salmonella serovars in feed

Serovar	Feed material of oil seed or fruit origin - rape seed derived	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	0	43	0	18	0	156	0
Number of isolates per serovar							
S. Vejle		0		0		1	
S. Westhampton		0		0		1	

Footnote:

Table includes all Salmonella serovars isolated from official testing under the Animal Byproducts Regulations 2005 and feed business operator testing for own checks/HACCP under the Defra Codes of Practice.

In Great Britain (England, Scotland and Wales), a total of 39,647 samples were tested for Salmonella during the year across all feed categories (official and feed business operator). For Northern Ireland, the total number of samples is not known.

Table Salmonella Enteritidis phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Ducks		Other animals - unspecified		Solipeds, domestic
	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
	0	3	0	0	24	0	0	0	1	0	0	1	0
4	0	0	0	0	6	0	0	0	0	0	0	1	0
PT 1	0	0	0	0	2	0	0	0	0	0	0	0	0
PT 11	0	1	0	0	0	0	0	0	0	0	0	0	0
PT 13a	0	0	0	0	0	0	0	0	0	0	0	0	0
PT 14b	0	0	0	0	0	0	0	0	0	0	0	0	0
PT 23	0	0	0	0	1	0	0	0	0	0	0	0	0
PT 6	0	0	0	0	2	0	0	0	0	0	0	0	0
PT 8	0	2	0	0	13	0	0	0	0	0	0	0	0
PT 9b	0	0	0	0	0	0	0	0	1	0	0	0	0

Table Salmonella Enteritidis phagetypes in animals

Phagetype	Solipeds, domestic
	Clinical
	2
4	0
PT 1	0
PT 11	0
PT 13a	1
PT 14b	1
PT 23	0
PT 6	0
PT 8	0
PT 9b	0

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
	0	68	0	149	15	0	0	0	0	13	8	0	1
1	0	2	0	1	0	0	0	0	0	0	1	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0
DT 104	0	24	0	8	2	0	0	0	0	0	0	0	0
DT 104b	0	9	0	2	0	0	0	0	0	0	0	0	0
DT 12	0	0	0	3	0	0	0	0	0	0	0	0	0
DT 120	0	1	0	8	0	0	0	0	0	0	0	0	0
DT 135	0	3	0	0	0	0	0	0	0	0	0	0	0
DT 161	0	0	0	0	0	0	0	0	0	0	0	0	0
DT 193	0	7	0	38	1	0	0	0	0	1		0	1
DT 193a	0	0	0	1	1	0	0	0	0	0	0	0	0
DT 195	0	1	0	0	1	0	0	0	0	0	0	0	0
DT 208	0	0	0	2	0	0	0	0	0	0	0	0	0

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
	0	68	0	149	15	0	0	0	0	13	8	0	1
DT 30	0	0	0	1	0	0	0	0	0	1	1	0	0
DT 40	0	1	0	0	0	0	0	0	0	0	0	0	0
DT 41	0	1	0	1	1	0	0	0	0	0	0	0	0
DT 56	0	2	0	0	0	0	0	0	0	0	0	0	0
DT 66a	0	1	0	0	0	0	0	0	0	0	0	0	0
DT 8	0	2	0	1	1	0	0	0	0	11	6	0	0
DT 80	0	1	0	0	0	0	0	0	0	0	0	0	0
DT 94	0	0	0	1	0	0	0	0	0	0	0	0	0
DT 99	0	0	0	0	3	0	0	0	0	0	0	0	0
DT U302	0	1	0	2	0	0	0	0	0	0	0	0	0
Not typeable	0	8	0	11	0	0	0	0	0	0	0	0	0
Other	0	3	0	9	0	0	0	0	0	0	0	0	0

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Birds - wild - Game birds		Ducks		Geese
	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring
	0	68	0	149	15	0	0	0	0	13	8	0	1
RDNC	0	1	0	1	3	0	0	0	0	0	0	0	0
U 288	0	0	0	57	2	0	0	0	0	0	0	0	0
U 311	0	0	0	2	0	0	0	0	0	0	0	0	0

Phagetype	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
	0	0	0	0	4	0	4	0	9	1	0
1	0	0	0	0	0	0	1	0	0	0	0
2	0	0	0	0	0	0	0	0	1	0	0
DT 104	0	0	0	0	1	0	1	0	0	0	0
DT 104b	0	0	0	0	0	0	0	0	1	1	0

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
	0	0	0	0	4	0	4	0	9	1	0
DT 12	0	0	0	0	0	0	0	0	0	0	0
DT 120	0	0	0	0	0	0	0	0	0	0	0
DT 135	0	0	0	0	0	0	0	0	0	0	0
DT 161	0	0	0	0	0	0	0	0	1	0	0
DT 193	0	0	0	0	1	0	0	0	1	0	0
DT 193a	0	0	0	0	0	0	0	0	0	0	0
DT 195	0	0	0	0	0	0	0	0	0	0	0
DT 208	0	0	0	0	0	0	0	0	0	0	0
DT 30	0	0	0	0	0	0	0	0	0	0	0
DT 40	0	0	0	0	0	0	0	0	0	0	0
DT 41	0	0	0	0	0	0	2	0	1	0	0
DT 56	0	0	0	0	0	0	0	0	1	0	0

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Geese	Goats		Other animals - unspecified		Sheep		Solipeds, domestic		Turkeys	
	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
	0	0	0	0	4	0	4	0	9	1	0
DT 66a	0	0	0	0	0	0	0	0	0	0	0
DT 8	0	0	0	0	0	0	0	0	0	0	0
DT 80	0	0	0	0	0	0	0	0	0	0	0
DT 94	0	0	0	0	0	0	0	0	0	0	0
DT 99	0	0	0	0	0	0	0	0	0	0	0
DT U302	0	0	0	0	0	0	0	0	1	0	0
Not typeable	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	2	0	0	0	2	0	0
RDNC	0	0	0	0	0	0	0	0	0	0	0
U 288	0	0	0	0	0	0	0	0	0	0	0
U 311	0	0	0	0	0	0	0	0	0	0	0

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 tested during 2009 for antimicrobial resistance were mainly selected from isolates tested under the Zoonoses Order from Great Britain, derived 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 laboratories 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

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 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 < 29, 29, 19, 19, 20 and 15mm respectively). For other antimicrobials the VLA veterinary

breakpoint was used (tetracyclines, ampicillin, nalidixic acid, sulphonamides, resistant < 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 Veterinary Laboratories Agency or Animal Health 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 2009, 799 Salmonella isolates were tested for antimicrobial susceptibility from cattle and 85% were fully sensitive. Three S. Enteritidis isolates were recovered from cattle in England and Wales and these isolates were fully susceptible to the antimicrobials tested. For S. Typhimurium in cattle from England and Wales, 70 isolates were available for testing and 36% were fully sensitive, an increase on the figure of 7% recorded for 2008. These fully susceptible S. Typhimurium isolates in cattle belonged to a range of different phage types. 47% of S. Typhimurium isolates were resistant to more than 4 antimicrobials. There were 32 S. Typhimurium DT104 or DT104B isolates tested from cattle and 28 had the typical ACSSuT pattern of penta-resistance frequently associated with DT104; two isolates of DT104 were detected from cattle with penta-resistance together with additional resistance to nalidixic acid. Considering all Typhimurium phage types, resistance to nalidixic acid was detected in 6% of S. Typhimurium isolates from cattle. Resistance to cefotaxime or ceftazidime was not detected in Salmonella isolates from cattle.

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 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 - 2009 in S. Typhimurium DT104 isolates from cattle. In England and Wales in 2009, 799 Salmonella isolates were tested from cattle and 85% were fully sensitive; this can be compared to figures of 625 Salmonella isolates with 81.8% fully sensitive in 2008, 592 Salmonella isolates with 82.8% fully sensitive in 2007 and 758 Salmonella isolates, with 77.3% fully sensitive during 2006.

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 foodstuff derived from cattle

Sampling strategy used in monitoring

Frequency of the sampling

The UK government undertakes national microbiological food surveillance. 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.

Results of the investigation

No results to report in 2009.

C. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Results of the investigation

No results to report in 2009.

D. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Results of the investigation

No results to report for 2009.

E. 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] There was official sampling of breeding pigs in 2008, though not in 2009. 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. Isolates from the Salmonella survey of breeding pigs were also tested in 2008.

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 laboratories 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

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 < 29, 29, 19, 19, 20 and 15mm respectively). For other antimicrobials the VLA veterinary breakpoint was used (tetracyclines, ampicillin, nalidixic acid, sulphonamides, resistant < 13mm).

For the Salmonella baseline survey of slaughter pigs in 2007, the antimicrobial susceptibility testing methods described in SANCO / 431/ 2007 were used. These methods utilise epidemiological cut-off values derived by EUCAST.

Results of the investigation

In England and Wales in 2009, 485 Salmonella isolates were tested from pigs. 8% of these isolates were fully sensitive, a decline from 2008 when 34% were fully sensitive, but similar to the figure of 11% observed in 2007. These fluctuations reflect in part changes to the surveillance procedures which occurred in 2008, as the data in that year included isolates from the breeding pig survey, whereas in other years it will have comprised mainly isolates derived from clinical material and surveillance of pigs at slaughter. The contribution of S. Typhimurium to the total number of Salmonella isolates tested influences the fully susceptible figure because this serotype commonly shows antimicrobial resistance. In 2009, 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, 237 isolates were available for testing in 2009 and 2.1% were fully sensitive, lower than the figures observed in 2008 when 4.5% were fully sensitive, but similar to the figure of 1.4% obtained in 2007. 66% of S.Typhimurium isolates showed resistance to more than 4 antimicrobials in 2009, compared to 49% in 2008. A total of 13 S. Typhimurium DT 104 isolates were examined from pigs and 3 of these were pentaresistant ACSSuT, whilst four were ACSSuT with additional resistance to trimethoprim/ sulphonamides and two were ACSSuT with additional resistance to nalidixic acid. Resistance to ciprofloxacin was observed in three isolates of S. Typhimurium; these isolate were all phage type DT193. Ciprofloxacin resistance was not observed in Salmonella isolates of other serotypes from pigs in 2009. 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.

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

It is evident that in general terms, isolates from pigs tend to be more resistant than those from cattle or sheep. A low number of Salmonella isolates resistant to cefotaxime were detected in pigs in 2009 and these were found to possess the ESBL CTX-M-1. The isolates originated from epidemiologically-linked groups of pigs and farm visits have been performed to evaluate the situation and advise on control procedures. A very low prevalence of resistance to ciprofloxacin was detected in Salmonella Typhimurium isolates from pigs. The proportion of isolates of S. Typhimurium which were fully-susceptible to the panel of antimicrobials tested was similar to the figure observed in 2007. In England and Wales in 2009, the proportion of fully sensitive Salmonella isolates declined compared to the figure observed in 2008. This increase may reflect in part a change in surveillance in 2009 regarding the population sampled.

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.

F. 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) were selected from isolates derived from testing carried out under the National Control Programmes

Type of specimen taken

As per requirements of the Salmonella National Control Programmes

Methods of sampling (description of sampling techniques)

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 laboratories 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

Salmonella isolates recovered from laying hens and broilers 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).

The British Society for Antimicrobial Chemotherapy (BSAC) standardised disc diffusion method was used to test Salmonella isolates from turkeys 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.

Cut-off values used in testing

Salmonella isolates recovered from laying hens and broilers 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.

Testing of turkeys 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 < 29, 29, 19, 19, 20 and 15mm respectively). For other antimicrobials the VLA veterinary breakpoint was used (tetracyclines, ampicillin, nalidixic acid, sulphonamides, resistant < 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 Veterinary Laboratories Agency/ Animal Health 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 laying hens and broilers in England and Wales in 2009, 169 Salmonella isolates were tested from broilers and 157 from layers.

In broilers, 37% of the Salmonella isolates were fully sensitive. For S. Enteritidis there were only 6 isolates recovered and eligible for inclusion under the EFSA protocol and all of these were fully sensitive. There were no isolates of S. Typhimurium recovered from broilers. Considering all Salmonella serotypes the most prevalent serotype was S. Kedougou. There were no Salmonella isolates recovered form broilers which were resistant to cefotaxime; however, 15 isolates (9%) were resistant to both ciprofloxacin and to nalidixic acid and these isolates belonged to the serotypes Senftenberg (7), Mbandaka (5), Livingstone (1) and included two rough strains (O-rough:g,s,t:-).

In layers, 85% of the Salmonella isolates were fully sensitive. For S. Enteritidis 18 isolates were tested and all of these were fully sensitive. There were 26 isolates of S. Typhimurium tested from layers and of these, 20 were fully sensitive. Three of the S. Typhimurium isolates were resistant to more than 4 antimicrobials. No Salmonella isolates from layers were resistant to cefotaxime; five Salmonella isolates were resistant to both ciprofloxacin and nalidixic acid belonging to serotypes Senftenberg (4) and an incomplete serotype 3,10:f,g:-.

In England and Wales 107 Salmonella isolates were tested from turkeys under Zoonoses Order monitoring in 2009 and 16% were fully sensitive – similar to the figure of 18% reported in 2008. There were no S. Enteritidis isolates recovered from this species. For S. Typhimurium in turkeys, only one isolate was reported and this had an ASSuT pattern of resistance and was phage type DT104B. No resistance was detected to the third generation cephalosporin cefotaxime in Salmonella isolates from turkeys. Resistance to nalidixic acid was detected in four isolates (three of serotype Senftenberg and one Orion) with two isolates also resistant to ciprofloxacin (single isolates of Senftenberg and Orion).

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

During 2009, no resistance to cefotaxime was detected in Salmonella isolates from chickens (Gallus gallus) or turkeys. Resistance to ciprofloxacin was detected in 2009 in Salmonella isolates from turkeys, layers and broilers, including isolates of S. Senftenberg from all three types of poultry. This represents a

change from the situation in 2008, when ciprofloxacin resistance was not detected in Salmonella isolates from chickens. The percentage of fully-susceptible Salmonella isolates from turkeys showed little change over the period 2008-2009.

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.

Table Antimicrobial susceptibility testing of Salmonella in Turkeys

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.		S. Kedougou	
Isolates out of a monitoring program (yes/no)			no		no		no	
Number of isolates available in the laboratory			1		107		56	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol			1	0	107	2	56	1
Fluoroquinolones - Ciprofloxacin			1	0	107	2	56	0
Quinolones - Nalidixic acid			1	0	107	4	56	0
Trimethoprim			1	0	107	5	56	5
Sulfonamides - Sulfonamide			1	1	107	85	56	56
Aminoglycosides - Streptomycin			1	1	107	63	56	38
Aminoglycosides - Gentamicin			1	0	107	1	56	0
Penicillins - Ampicillin			1	1	107	3	56	0
Tetracyclines - Tetracycline			1	1	107	84	56	54
Fully sensitive			1	0	107	17	56	0
Resistant to 1 antimicrobial			1	0	107	2	56	0
Resistant to 2 antimicrobials			1	0	107	22	56	15
Resistant to 3 antimicrobials			1	0	107	60	56	40
Resistant to 4 antimicrobials			1	1	107	5	56	1
Resistant to >4 antimicrobials			1	0	107	1	56	0
Cephalosporins - Cefotaxim			1	0	107	0	56	0

Footnote:
Routine surveillance samples derived from voluntary industry Salmonella monitoring in 2009. Disc diffusion method

Table Antimicrobial susceptibility testing of Salmonella in Pigs

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.		S. 4,5,12:i:-	
Isolates out of a monitoring program (yes/no)			no		no		no	
Number of isolates available in the laboratory			237		485		81	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol			237	149	485	169	65	13
Fluoroquinolones - Ciprofloxacin			237	3	485	3	65	0
Quinolones - Nalidixic acid			237	11	485	13	65	0
Trimethoprim			237	167	485	273	65	27
Sulfonamides - Sulfonamide			237	215	485	369	65	62
Aminoglycosides - Streptomycin			237	180	485	264	65	62
Aminoglycosides - Gentamicin			237	5	485	34	65	26
Penicillins - Ampicillin			237	200	485	281	65	62
Tetracyclines - Tetracycline			237	206	485	368	65	54
Fully sensitive			237	5	485	38	65	1
Resistant to 1 antimicrobial			237	17	485	76	65	2
Resistant to 2 antimicrobials			237	5	485	47	65	0
Resistant to 3 antimicrobials			237	3	485	44	65	9
Resistant to 4 antimicrobials			237	51	485	82	65	24
Resistant to >4 antimicrobials			237	156	485	198	65	29
Cephalosporins - Cefotaxim			237	0	485	10	65	5

Footnote:

Isolates derived mostly from clinical diagnostic samples submitted by private veterinary practitioners for disease diagnosis. Disc diffusion method

Table Antimicrobial susceptibility testing of Salmonella in Gallus gallus (fowl) - laying hens

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.		Other serotypes	
Isolates out of a monitoring program (yes/no)	yes		yes		yes		yes	
Number of isolates available in the laboratory	18		26		157		35	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	18	0	26	1	157	1	35	0
Fluoroquinolones - Ciprofloxacin	18	0	26	0	157	5	35	4
Quinolones - Nalidixic acid	18	0	26	0	157	5	35	4
Trimethoprim	18	0	26	3	157	8	35	1
Sulfonamides - Sulfonamide	18	0	26	6	157	14	35	2
Aminoglycosides - Streptomycin	18	0	26	5	157	6	35	1
Aminoglycosides - Gentamicin	18	0	26	0	157	1	35	1
Penicillins - Ampicillin	18	0	26	4	157	7	35	0
Tetracyclines - Tetracycline	18	0	26	6	157	14	35	2
Fully sensitive	18	18	26	20	157	133	35	28
Resistant to 1 antimicrobial	18	0	26	0	157	5	35	1
Resistant to 2 antimicrobials	18	0	26	0	157	9	35	5
Resistant to 3 antimicrobials	18	0	26	2	157	5	35	0
Resistant to 4 antimicrobials	18	0	26	1	157	2	35	1
Resistant to >4 antimicrobials	18	0	26	3	157	3	35	0
Cephalosporins - Cefotaxim	18	0	26	0	157	0	35	0

Footnote:

Salmonella isolates reported according to Decision 2007/407/EC for laying hens for 2009. All isolates collected through industry and official sampling under the requirements of the the Salmonella National Control Programme for laying hens. More than one isolate per positive flock included in the analysis.

Broth microdilution method

Table Antimicrobial susceptibility testing of Salmonella in Gallus gallus (fowl) - broilers

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.		S. Kedougou	
Isolates out of a monitoring program (yes/no)	yes				yes		yes	
Number of isolates available in the laboratory	6				169		41	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	6	0			169	19	41	1
Fluoroquinolones - Ciprofloxacin	6	0			169	15	41	0
Quinolones - Nalidixic acid	6	0			169	15	41	0
Trimethoprim	6	0			169	72	41	35
Sulfonamides - Sulfonamide	6	0			169	79	41	38
Aminoglycosides - Streptomycin	6	0			169	14	41	5
Aminoglycosides - Gentamicin	6	0			169	7	41	2
Penicillins - Ampicillin	6	0			169	13	41	2
Tetracyclines - Tetracycline	6	0			169	37	41	17
Fully sensitive	6	6			169	62	41	1
Resistant to 1 antimicrobial	6	0			169	14	41	2
Resistant to 2 antimicrobials	6	0			169	44	41	22
Resistant to 3 antimicrobials	6	0			169	34	41	12
Resistant to 4 antimicrobials	6	0			169	8	41	2
Resistant to >4 antimicrobials	6	0			169	7	41	2
Cephalosporins - Cefotaxim	6	0			169	0	41	0

Footnote:

Salmonella isolates reported according to Decision 2007/407/EC for broilers for 2009. All isolates collected through industry and official sampling under the requirements of the the Salmonella National Control Programme for broilers. One isolate per positive flock selected for testing by the dilution method.

Table Antimicrobial susceptibility testing of Salmonella in Cattle (bovine animals)

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.		S. Dublin	
Isolates out of a monitoring program (yes/no)	no		no		no		no	
Number of isolates available in the laboratory	3		70		799		518	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	3	0	70	32	799	35	518	2
Fluoroquinolones - Ciprofloxacin	3	0	70	4	799	4	518	0
Quinolones - Nalidixic acid	3	0	70	4	799	7	518	2
Trimethoprim	3	0	70	0	799	1	518	0
Sulfonamides - Sulfonamide	3	0	70	43	799	71	518	3
Aminoglycosides - Streptomycin	3	0	70	44	799	110	518	37
Aminoglycosides - Gentamicin	3	0	70	0	799	0	518	0
Penicillins - Ampicillin	3	0	70	38	799	66	518	3
Tetracyclines - Tetracycline	3	0	70	43	799	67	518	4
Fully sensitive	3	3	70	25	799	683	518	478
Resistant to 1 antimicrobial	3	0	70	1	799	42	518	35
Resistant to 2 antimicrobials	3	0	70	1	799	3	518	2
Resistant to 3 antimicrobials	3	0	70	2	799	9	518	1
Resistant to 4 antimicrobials	3	0	70	8	799	26	518	0
Resistant to >4 antimicrobials	3	0	70	33	799	36	518	2
Cephalosporins - Cefotaxim	3	0	70	0	799	0	518	0

Footnote:

Isolates derived mostly from clinical diagnostic samples submitted by private veterinary practitioners for disease diagnosis. Disc diffusion method

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

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

S. Enteritidis	Gallus gallus (fowl) - laying hens - adult																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	18																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	18	0											17	1								2	64
Tetracyclines - Tetracycline	8	18	0								1	16	1										1	64
Fluoroquinolones - Ciprofloxacin	0.06	18	0		2	16																	0.008	8
Quinolones - Nalidixic acid	16	18	0										18										4	64
Trimethoprim	2	18	0							16	2												0.5	32
Aminoglycosides - Streptomycin	32	18	0									7	7	2	2								2	128
Aminoglycosides - Gentamicin	2	18	0						9	9													0.25	32
Penicillins - Ampicillin	4	18	0									17	1										0.5	32
Cephalosporins - Cefotaxim	0.5	18	0				8	9	1														0.06	4
Sulfonamides	256	18	0												2	7	7	2					8	1024

Footnote:

Salmonella isolates reported according to Decision 2007/407/EC for laying hens for 2009. All isolates collected through industry and official sampling under the requirements of the the Salmonella National Control Programme for laying hens. More than one isolate per positive flock included in the analysis

Table Antimicrobial susceptibility testing of S. Typhimurium in Gallus gallus (fowl) - laying hens - adult - Control and eradication programmes - official and industry sampling - objective sampling - quantitative data [Dilution method]

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

S. Typhimurium	Gallus gallus (fowl) - laying hens - adult - Control and eradication programmes - official and industry sampling - objective sampling																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	26																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	26	1										7	18			1							2	64
Tetracyclines - Tetracycline	8	26	6								1	19				1	5							1	64
Fluoroquinolones - Ciprofloxacin	0.06	26	0		5	21																		0.008	8
Quinolones - Nalidixic acid	16	26	0										25	1										4	64
Trimethoprim		26	3							23				1		2								0.5	32
Aminoglycosides - Streptomycin	32	26	5											1	17	3	1	2	2					2	128
Aminoglycosides - Gentamicin	2	26	0						21		4	1												0.25	32
Penicillins - Ampicillin	4	26	4								16	6				4								0.5	32
Cephalosporins - Cefotaxim	0.5	26	0				22	4																0.06	4
Sulfonamides	256	26	6											14	4	2					6			8	1024

Footnote:

Salmonella isolates reported according to Decision 2007/407/EC for laying hens for 2009. All isolates collected through industry and official sampling under the requirements of the the Salmonella National Control Programme for laying hens. More than one isolate per positive flock included in the analysis

Table Antimicrobial susceptibility testing of S. Enteritidis in Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - official and industry sampling - objective sampling - quantitative data [Dilution method]

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

S. Enteritidis	Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - official and industry sampling - objective sampling																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	6																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	6	0										1	5										2	64
Tetracyclines - Tetracycline	8	6	0								2	4												1	64
Fluoroquinolones - Ciprofloxacin	0.06	6	0			6																		0.008	8
Quinolones - Nalidixic acid	16	6	0										5	1										4	64
Trimethoprim	2	6	0							5		1												0.5	32
Aminoglycosides - Streptomycin	32	6	0									2	4											2	128
Aminoglycosides - Gentamicin	2	6	0						6															0.25	32
Penicillins - Ampicillin	4	6	0								1	5												0.5	32
Cephalosporins - Cefotaxim	0.5	6	0				1	5																0.06	4
Sulfonamides	256	6	0														5	1						8	1024

Footnote:

Salmonella isolates reported according to Decision 2007/407/EC for broilers for 2009. All isolates collected through industry and official sampling under the requirements of the the Salmonella National Control Programme for broilers. One isolate per positive flock selected for testing by the dilution method.

Table Antimicrobial susceptibility testing of Salmonella spp. in Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - official and industry sampling - objective sampling - quantitative data [Dilution method]

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

Salmonella spp.	Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - official and industry sampling - objective sampling																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	169																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	169	19										14	113	23	17	2							2	64
Tetracyclines - Tetracycline	8	169	37								15	80	25	12	1	2	34							1	64
Fluoroquinolones - Ciprofloxacin	0.06	169	15	1	88	48	17			6	9													0.008	8
Quinolones - Nalidixic acid	16	169	15										129	21	4		15							4	64
Trimethoprim	2	169	72							80	12	5	1		2	69								0.5	32
Aminoglycosides - Streptomycin	32	169	14									2	14	102	30	7	3	4	7					2	128
Aminoglycosides - Gentamicin	2	169	7						120	39	3			3	2	2								0.25	32
Penicillins - Ampicillin	4	169	13							1	76	52	27	4	1	8								0.5	32
Cephalosporins - Cefotaxim	0.5	169	0				58	65	28	18														0.06	4
Sulfonamides	256	169	79											1	18	43	25	2	1	2	1	76		8	1024

Footnote:

Salmonella isolates reported according to Decision 2007/407/EC for broilers for 2009. All isolates collected through industry and official sampling under the requirements of the the Salmonella National Control Programme for broilers. One isolate per positive flock selected for testing by the dilution method.

Table Antimicrobial susceptibility testing of Salmonella spp. in Gallus gallus (fowl) - laying hens - adult - Control and eradication programmes - official and industry sampling - objective sampling - quantitative data [Dilution method]

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

Salmonella spp.	Gallus gallus (fowl) - laying hens - adult - Control and eradication programmes - official and industry sampling - objective sampling																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	157																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	157	1										25	117	14		1						2	64
Tetracyclines - Tetracycline	8	157	14								31	100	11	1	1	1	12						1	64
Fluoroquinolones - Ciprofloxacin	0.06	157	5		77	72	3		5														0.008	8
Quinolones - Nalidixic acid	16	157	5										142	10			5						4	64
Trimethoprim	2	157	8							145	3	1		3		5							0.5	32
Aminoglycosides - Streptomycin	32	157	6									7	13	44	68	19	1	3	2				2	128
Aminoglycosides - Gentamicin	2	157	1						48	82	24	2				1							0.25	32
Penicillins - Ampicillin	4	157	7							1	72	68	9		1	1	5						0.5	32
Cephalosporins - Cefotaxim		157	0				59	70	28														0.06	4
Sulfonamides	256	157	14											15	20	82	21	3	2	2	12		8	1024

Footnote:

Salmonella isolates reported according to Decision 2007/407/EC for laying hens for 2009. All isolates collected through industry and official sampling under the requirements of the the Salmonella National Control Programme for laying hens. More than one isolate per positive flock included in the analysis.

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

Test Method Used
Disc diffusion Broth dilution

Standard methods used for testing
VLA/BSAC EFSA

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol	EFSA/BSAC	16	20
Tetracyclines	Tetracycline	EFSA/VLA	8	13
Fluoroquinolones	Ciprofloxacin	EFSA/BSAC	0.06	19
Quinolones	Nalidixic acid	EFSA/VLA	16	13
Trimethoprim	Trimethoprim	EFSA	2	
Sulfonamides	Sulfonamides	EFSA/BSAC	256	13
Aminoglycosides	Streptomycin	EFSA/VLA	32	13
	Gentamicin	EFSA/BSAC	2	19
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides	BSAC		15
Cephalosporins	Cefotaxim	EFSA/BSAC	0.5	29
Penicillins	Ampicillin	EFSA/VLA	4	13

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 <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.06	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulfonamides	Sulfonamides		256	
Aminoglycosides	Streptomycin		32	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.5	
Penicillins	Ampicillin		4	

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

Test Method Used
Disc diffusion Broth dilution

Standard methods used for testing
EFSA VLA/BSAC

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol	EFSA/BSAC	16	20
Tetracyclines	Tetracycline	EFSA/VLA	8	13
Fluoroquinolones	Ciprofloxacin	EFSA/BSAC	0.06	19
Quinolones	Nalidixic acid	EFSA/VLA	16	13
Trimethoprim	Trimethoprim	EFSA	2	
Sulfonamides	Sulfonamides	EFSA/BSAC	256	13
Aminoglycosides	Streptomycin	EFSA/VLA	32	13
	Gentamicin	EFSA/BSAC	2	19
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides	BSAC		15
Cephalosporins	Cefotaxim	EFSA/BSAC	0.5	29
Penicillins	Ampicillin	EFSA/VLA	4	13

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

During the last 25 years, reported cases of human illness caused by Campylobacter spp. have generally risen year on year, but have remained relatively stable lately. There was a slight increase in 2004 compared with 2003, minimal change between 2004 and 2005 but an increase in reported cases in 2006 and 2007.There were fewer cases in 2008, but again an increase seen in 2009.

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.

Campylobacter are commonly found in animals but are seldom associated with disease in the animal. Most isolations of Campylobacter in animals are due to investigations into abortion cases (Campylobacter foetopathy).

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

Food:
No survey data is available for 2009.

Animals:
Only one specific national survey was conducted in animals in 2009: a Campylobacter prevalence survey in broilers. The survey followed the same guidelines for caecal sampling and testing as laid out in the EU technical specifications for a baseline survey on the prevalence of Campylobacter spp. in broiler flocks and Salmonella spp. and Campylobacter spp. in broiler carcasses carried out in the EU in accordance with Commission Decision 2007/516/EC of 21/7/2007.The Campylobacter prevalence in 2009 (77.5%) was similar to that reported in the baseline EU survey in 2008 where the UK prevalence was 75.8%.

Clinical diagnostic samples from animals in the UK, submitted to the Veterinary Laboratories Agency, the Scottish Agricultural College and the Agri-food and Biosciences Institute in 2009, were predominantly Campylobacter foetopathy 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. The total units tested referred to in the table is the total number of Campylobacter isolates (n=215), mainly from ruminant abortion cases, which were identified during 2009 from clinical diagnostic samples submitted by private veterinarians to government laboratories and subject to further examination/typing.

Human campylobacteriosis due to thermophilic Campylobacters is a major cause of food poisoning, although non-thermophylic strains (such as C. fetus) can also (rarely) cause severe zoonotic illness. In Great Britain in 2009, a total of 220 Campylobacter isolates (mainly from ruminant abortion cases) were identified by the VLA during 2009: 151 ovine, 54 bovine, 1 porcine, 7 miscellaneous species and 7 avian. Ninety five (63%) of the ovine isolates were C.fetus fetus with the remaining 56 (37%) a mixture of enteric strains. Of the 31 (57%) venereal bovine isolates, 18 (33%) were C. fetus venerealis intermedius, 8 (15%) were C. fetus fetus and 5 (9%) C. fetus venerealis. The remaining 21 (43%) were a mixture of enteric

(thermophilic) strains. The one porcine isolate was C. jejuni; the isolates from miscellaneous species comprised 4 (57%) C. fetus fetus and 3 (43%) C. jejuni; the avian isolates were 4 (57%) C. coli and 3 (43%) C. jejuni.

Analysis of all incidents of foetopathy in sheep and goats in Great Britain during the year indicated Campylobacter spp. (both thermophillic and non-thermophillic) accounted for 12.6% (111 out of a total 904 investigated incidents) of all diagnoses of foetopathy investigated during the year.

Clinical diagnostic samples from Great Britain, submitted to the Veterinary Laboratories Agency in 2008, were predominantly Campylobacter foetopathy cases. During the year, 244 putative Campylobacter spp isolates from bovine and ovine abortions were submitted for confirmation and speciation within VLA. Of the 88 bovine abortion isolates, 27 (31%) were thermophilic Campylobacters (largely C. jejuni or C. coli)compared with 18% in 2007. Of the 156 ovine abortion samples, 32 (21%) were thermophilic Campylobacters (11% in 2007). Two goat isolates were thermophilic Campylobacters. The remaining isolates associated with bovine and ovine abortions were predominately C. fetus. C.jejuni/coli isolates were also identified from various other host species, including a great bustard and a rhea with enteritis but their role in the etiology of the disease was unclear.

In 2007, clinical diagnostic samples from Great Britain were also predominantly Campylobacter foetopathy cases, with 299 (84%) of the 356 isolates submitted from ovine and bovine abortion cases. There were a larger number of submissions during 2007 compared to 2006, which appeared to reflect an increase in ovine Campylobacter abortions due to Campylobacter fetus fetus, with a relative fall in the number of abortions due to C. coli and C. jejuni.

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

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 actions taken to control the zoonoses

The Food Standards Agency has continued its campaign directed at broiler producers to reduce the number of infected poultry flocks arriving at slaughter. The campaign has a number of elements but an increased awareness of the need for the highest standards of biosecurity at farm level is seen as being of high importance.

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 voluntary reporting of isolation by publicly funded human diagnostic microbiology laboratories [Health Protection Agency, 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. have generally risen year on year, but have remained relatively stable lately. There was a slight increase in 2004 compared with 2003, minimal change between 2004 and 2005 but an increase in reported cases in 2006 and 2007. Number of reported cases reduced slightly in 2008, but increased again in 2009.

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.

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

The number of reports of Campylobacter in humans in the UK gradually increased during the 1980's and 1990's reaching a peak in the UK in 1998 of over 65,000 cases. There has been a general downward trend since then although it may be levelling off, with an increase in reported cases in recent years. The route of transmission to humans in many sporadically occurring cases remains obscure.

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 survey data is available for 2009.

2.2.4 Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

In 2009, a three-year national Campylobacter prevalence survey in broilers was completed (conducted during 2007-2009). The 2009 survey followed the same guidelines for caecal sampling and testing as laid out in the EU technical specifications for a baseline survey on the prevalence of Campylobacter spp. in broiler flocks and Salmonella spp. and Campylobacter spp. in broiler carcasses carried out in the EU in accordance with Commission Decision 2007/516/EC of 21/7/2007. The study unit was a ‘slaughter batch’ defined as ‘a delivery of broilers which have been raised in the same flock to a slaughterhouse on one single day’. The sampling was randomised for slaughterhouse, the sampling day and the slaughter batch to be sampled on a selected day and weighted according to slaughter throughput. This meant that abattoirs with a high annual throughput were more likely to be randomly selected for sampling during the calendar year than those with lower throughputs. The sampling was also spread evenly across the year with 1/12th of the total sample taken each month. The studied population represented 88% of the annual slaughter throughput in the UK. A total of 34 UK abattoirs participated in the survey and 24 were selected to take samples during 2009 from which 400 eligible batches were sampled and tested for Campylobacter. Ten birds were selected from each batch and caecal samples collected at the evisceration point. At the laboratory, the caecal contents were removed and pooled to one composite sample.

Frequency of the sampling

At slaughter

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughter

Organs:caecal samples

Diagnostic/analytical methods used

At slaughter

Bacteriological method:ISO 10272: 2006

Results of the investigation

The Campylobacter prevalence in 2009 (77.5%) was similar to that reported in the baseline EU survey in 2008 where the UK prevalence was 75.8%.

Additional information

Clinical diagnostic samples from animals in the UK, submitted to the Veterinary Laboratories Agency, the Scottish Agricultural College and the Agri-food and Biosciences Institute in 2009, are recorded in the tables. The total units tested are not known because the laboratories do not report negative results, unless part of an official control programme or survey. The total units tested referred to in the table is the total number of Campylobacter isolates (n=215), mainly from ruminant abortion cases, which were identified during 2009 from clinical diagnostic samples submitted by private veterinarians to government laboratories and subject to further examination/typing. Seven avian isolates were recorded during 2009, of which 4 (57%) were C. coli and 3 (43%) C. jejuni. One of these reported incidents was the isolation of Campylobacter jejuni from the liver and spleen of 25-week-old laying hens, confirming ‘vibrionic

hepatitis.

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified	C. fetus
Gallus gallus (fowl) - broilers - at slaughterhouse [1)]	VLA	Slaughter batch	400	310	84	225	1	0	0	
Birds - at farm - Clinical investigations [2)]	VLA/AFBI	Animal	7	7	4	3	0	0	0	0
Cattle (bovine animals) - at farm - Clinical investigations	VLA/AFBI	Animal	54	54	0	0	0	0	21	33
Pigs - at farm - Clinical investigations	VLA/AFBI	Animal	1	1	0	1	0	0	0	0
Sheep - at farm - Clinical investigations	VLA/AFBI	Animal	153	153	0	3	0	0	55	95

Comments:

[1)] Survey
[2)] Miscellaneous avian species

Footnote:

VLA = Veterinary Laboratories Agency in Great Britain
AFBI = Agri-fod and Biosciences Institute in Northern Ireland

Data from clinical sample submissions. The total units tested are not known because the laboratory does not report negative results, unless part of an official control programme or survey. The total units tested referred to in the table is the total number of Campylobacter isolates (n=215), mainly from ruminant abortion cases, which were identified during 2009 from clinical diagnostic samples submitted by private veterinarians to government laboratories and subject to further examination/typing.

2.2.5 Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in cattle

Sampling strategy used in monitoring

Frequency of the sampling

No national survey was carried out in 2009.

Isolates from a survey of cattle in Great Britain arriving for slaughter at the abattoir was carried out in 2003 and the antimicrobial resistance in the isolates was reported in the 2004 report.

Methods used for collecting data

.

Control program/mechanisms

The control program/strategies in place

Advice is available on the responsible use of medicines on farm.

Results of the investigation

The last survey was reported in 2004.

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

Results of the investigation

No data is available for 2009

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

Sampling strategy used in monitoring

Frequency of the sampling

No data is available for 2009.

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

Results of the investigation

No data is available to report for 2009.

E. Antimicrobial resistance in Campylobacter jejuni and coli in pigs

Sampling strategy used in monitoring

Frequency of the sampling

The last survey was conducted in 2007: the results were reported in 2008 and relate to isolates recovered from the caecum of pigs at slaughter. Prior to the 2007 survey, a survey was performed in 2003 and the results are reported in the 2004 annual report.

F. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

The last survey was conducted in 2008.

Type of specimen taken

Campylobacter spp. isolates recovered from the caecae of broilers after slaughter were examined in accordance with the latest EFSA recommendation

Laboratory used for detection for resistance

Cut-off values used in testing

Results of the investigation

The summarised results were reported in 2008.

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

Poultry is recognised as the most common source of Campylobacter in humans and resistance among Campylobacter in poultry could have consequences for the treatment of infections in humans. There are no internationally accepted performance standards for antimicrobial susceptibility testing for Campyobacter. Consequently, discrepancies are often observed in the scientific literature reporting on Campylobacter susceptibility patterns and comparison between studies should be made with caution.

Table Cut-off values used for antimicrobial susceptibility testing of Campylobacter in Animals

Test Method Used	Standard methods used for testing

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

Table Cut-off values used for antimicrobial susceptibility testing of Campylobacter in Food

Test Method Used	Standard methods used for testing

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

Table Cut-off values used for antimicrobial susceptibility testing of Campylobacter in Feed

Test Method Used	Standard methods used for testing

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

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

Laboratory reports of listeriosis in humans in the UK have fallen from a peak in the late 1980's following 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 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.

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

Food:
Results of surveys carried out in 2009 are given in the tables. Results are also reported for samples taken from certain RTE foodstuffs as part of the EU harmonised survey prior to the work being halted. In milk and dairy products, of the 45 cheese samples tested, all were negative for Listeria monocytogenes, however 2 (1 pasteurised cows milk cheese and 1 unknown milk cheese) tested positive for Listeria species (L. seeligeri/welshmeri).

Animals:
During 2009, listeriosis was diagnosed in 196 incidents in animals in the UK, in all cases from clinical diagnostic samples submitted by private veterinarians to the Veterinary Laboratories Agency, the Scottish Agricultural College and the Agri-food and Biosciences Institute. This included 63 incidents in cattle, where Listeria monocytogenes was diagnosed as the cause of abortion or encephalitis, usually associated with the feeding of poor quality silage. In sheep and goats there were 128 incidents where listeriosis was diagnosed during 2009, including meningitis, septicaemia or abortions caused by Listeria monocytogenes and Listeria ivanovii. Analysis of all incidents of foetopathy in sheep and goats during the year indicated Listeria spp. accounted for 2.6% (23 out of a total 904 investigated incidents) of all diagnoses of foetopathy investigated during the year. Listeria monocytogenes was implicated as the cause of death due to septicaemia in a 4 month old cria and the cause of meningitis and septicaemia in a group of captive water voles. Listeriosis was not disgnosed in pigs during the year.

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

Listeria monocytogenes bacteria are widely distributed in the environment, and especially in sites with decaying vegetable material. 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.

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.

2.3.2 Listeriosis in humans

A. Listeriosis in humans

Reporting system in place for the human cases

Based on laboratory reports

Case definition

Positive laboratory reports

Diagnostic/analytical methods used

Culture

History of the disease and/or infection in the country

Laboratory reports have fallen from a peak in the late 1980s following advice to pregnant women to avoid ripened soft cheeses and pates.

2.3.3 Listeria in foodstuffs

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Crustaceans - unspecified - cooked - at retail	FSA	Single		32	1	32	1	32	1	0
Fish - smoked - at retail	FSA	Single		41	2	41	2	41	2	0
Meat from bovine animals - meat products - cooked, ready-to-eat - at retail [1)]	FSA	Single	25g	8	0	8	0	8	0	0
Meat from broilers (Gallus gallus) - fresh	FSA	Single		115	1	115	1	115	0	1
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at retail [2)]	FSA	Single	25g	1	0	1	0	1	0	0
Meat from pig - meat products - cooked, ready-to-eat - at retail [3)]	FSA	Single	25g	27	0	27	0	27	0	0
Meat from other animal species or not specified - meat products - cooked, ready-to-eat - chilled [4)]	FSA	Single	25g	2	0	2	0	2	0	0
Meat from poultry, unspecified - meat products - cooked, ready-to-eat - chilled [5)]	FSA	Single	25g	5	0	5	0	5	0	0
Meat from turkey - meat products - cooked, ready-to-eat - chilled [6)]	FSA	Single	25g	4	0	4	0	4	0	0

Comments:

[1)] EU harmonised method
[2)] EU harmonised method
[3)] EU harmonised method
[4)] EU harmonised method
[5)] EU harmonised method

Table Listeria monocytogenes in other foods

[6] EU harmonised method

Footnote:

The entries 'EU harmonised method' are the results obtained prior to the halt being placed on the EU harmonised survey of Listeria monocytogenes in certain RTE foods.

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at retail [1)]	FSA	Single	25g	11	0	11	0	11	0	0
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at retail [2)]	FSA	Single	25g	10	0	10	0	10	0	0
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - at retail [3)]	FSA	Single	25g	4	0	4	0	4	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - at retail [4)]	FSA	Single	25g	1	0	1	0	1	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from raw or low heat-treated milk - at retail [5)]	FSA	Single	25g	1	0	1	0	1	0	0
Cheeses made from goats' milk - soft and semi-soft [6)]	FSA	Single	25g	2	0	2	0	2	0	0
Cheeses, made from mixed milk from cows, sheep and/or goats - soft and semi-soft [7)]	FSA	Single	25g	1	0	1	0	1	0	0
Cheeses, made from unspecified milk or other animal milk - soft and semi-soft [8)]	FSA	Single	25g	12	0	12	0	12	0	0
Cheeses, made from unspecified milk or other animal milk - soft and semi-soft - made from pasteurised milk [9)]	FSA	Single	25g	3	0	3	0	3	0	0

Comments:

[1)] EU harmonised method
[2)] EU harmonised method
[3)] EU harmonised method
[4)] EU harmonised method

Table Listeria monocytogenes in milk and dairy products

[5] EU harmonised method
[6] EU harmonised method
[7] EU harmonised method
[8] EU harmonised method
[9] EU harmonised method

Footnote:

Of the 45 cheese samples tested all were -ve for Listeria monocytogenes, however 2 (1 pasteurised cows milk cheese and 1 unknown milk cheese) tested positive for Listeria species (L. seeligeri/welshmeri).

The entries 'EU harmonised method' are the results obtained prior to the halt being placed on the EU harmonised survey of Listeria monocytogenes in certain RTE foods.

2.3.4 Listeria in animals

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria	L. monocytogenes	Listeria spp., unspecified	L. ivanovii
Alpacas - at farm - Clinical investigations	VLA/AFBI	Animal	1	1	1	0	0
Birds - at farm - Clinical investigations (Miscellaneous species)	VLA/AFBI	Animal	3	3	0	3	0
Cattle (bovine animals) - at farm - Clinical investigations	VLA/AFBI	Animal	63	63	18	45	0
Sheep and goats - at farm - Clinical investigations	VLA/AFBI	Animal	128	128	8	116	4
Voles - Clinical investigations	VLA/AFBI	Animal	1	1	1	0	0

Footnote:

VLA = Veterinary Laboratories Agency in Great Britain.
AFBI = Agri-food and Biosciences Institute in Northern Ireland.

Diagnoses made from clinical diagnostic material submitted to the VLA/AFBI. The total units tested are not known because the laboratory does not report negative results, unless part of an official control programme or survey. The total numbers above are numbers of incidents. There may be more than one diagnosis in the same incident

2.4 E. COLI INFECTIONS

2.4.1 General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

History of the disease and/or infection in the country

The first report in humans 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 cases per year. Scotland has consistently recorded the highest rates per 100,000 population since the late 1980s.

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

Food:
A butchers shop survey was carried out in 2009. 1944 samples of cooked ready-to-eat meats were sampled - none were positive for Verotoxigenic E. coli.

Animals:
No national surveys were carried out in 2009. A survey of eligible cattle, sheep and pigs was carried out in 2003 - see annual report for 2004.

In Great Britain, VTEC O157 outbreak investigations are undertaken by the Veterinary Laboratories Agency (VLA)at the request of public health colleagues on agricultural premises/ premises with animals thought to have a potential link with human disease cases. 14 premises were visited and such investigations undertaken into potential human-animal contact links in 2009. 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 90 human cases. 11 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).

In 2008, there were 6 investigations carried out where animal-associated sources of human infection were suspected - with isolates of VTEC indistinguishable on PFGE from the human cases of disease detected on 2 of the premises. In 2007, 2 of the 3 premises investigated also yielded isolates with the same phage type and PFGE profiles as the human disease cases.

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. In outbreak investigations carried out in 2009, where potential links to animal contacts were examined, several animal species in 11 out of the 14 premises investigated showed VTEC isolates with PFGE profiles indistinguishable from the human isolates from the human outbreak cases.

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 cases per year. Scotland has consistently recorded the highest rates per 100,000 population since the late 1980s.

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

Relevance as zoonotic disease

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

2.4.3 Escherichia coli, pathogenic in foodstuffs

Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Meat from other animal species or not specified - meat products - cooked, ready-to-eat - Survey [1)]	HPA	Single	25g	1944	0	0	0	0

Comments:

[1)] Butchers shop survey

Footnote:

Detection method ISO 16654

2.4.4 Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

The last national survey in cattle, sheep, and pigs was conducted in 2003 in Great Britain, and results are in the report for 2004.

In Great Britain, VTEC O157 outbreak investigations are undertaken by the Veterinary Laboratories Agency (VLA)at the request of public health colleagues and variously involve collaboration with other organisations, including the Environmental Health departments of Local Authorities and the Health and Safety Executive. They are undertaken according to formal VLA guidelines. Determination of phage type (PT), Vero cytotoxin (VT) type and comparison of human and animal isolates by pulsed field gel electrophoresis (PFGE) are performed by the E. coli/ Shigella/ Yersinia/ Vibrio Reference Unit of the Laboratory of Enteric Pathogens, HPA Centre for Infections, Colindale. If isolates from animals circumstantially implicated in outbreaks have the same PT and indistinguishable PFGE profiles from human cases, this is taken as confirmatory evidence of a causal association. In practice, there can be minor PFGE 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 currently under development. Other VTEC O157 PTs may be detected incidentally during the investigation of animal premises.

14 premises were visited and such investigations undertaken in 2009.

Type of specimen taken

Animals at farm

Faeces

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 Veterinary Laboratories Agency (VLA), the Health and Safety Executive and other Government departments' websites. The VLA also visits farmer and veterinary meetings on request to talk about VTEC O157 and control of other zoonoses in farmed livestock. Prevention of the spread of E.coli in animals relies on good hygiene, such as keeping any bedding clean and dry. A leaflet has been produced on the prevention of E.coli O157 in cattle which can be found at:
http://www.defra.gov.uk/vla/science/docs/sci_vtec_leaflet.pdf.

Advice for farmers, but which could also in part be applied to 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 is available at: http://www.hse.gov.uk/pubns/ais23.pdf

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

Results of the investigation

Outbreak investigations in Great Britain - all livestock spp:
14 premises were identified as potentially linked to human disease outbreaks during 2009. 9 of these were premises open to the general public (open farms and a dance festival on a commercial dairy premise), 2 were on commercial farms with links to human cases and one case comprised of possible exposures to a brook where cattle grazed near a sports field. 2 investigations involved possible animal contacts in a domestic setting.

In 12 of the 14 investigations, E. coli O157 was detected in samples taken from animals present on the premises (including lambs, cattle, sheep, goats, pigs, deer, llamas, equines, rabbits and chickens). In 11 investigations, molecular profiling indicated matches between human isolates and some or all of the isolates from animal species sampled during the investigation. Phage types detected included predominantly PT 21/28, but 2, 34, 54, 8 and 32 were also detected.

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

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.

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

Great Britain (England, Scotland and Wales):
Bovine tuberculosis (TB) is the most serious endemic disease of cattle in GB. The sustained progress achieved in controlling bovine TB in GB 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 the 1986 and 2001, the total number of TB herd breakdowns ('incidents') in GB rose at an average annual rate of 14.5%. Since two years after the Food & Mouth Disease epidemic of 2001 (July 2003 onwards) this average annual rate of increase has slowed down. In 2009 there was a reduction in the herd incidence of the disease relative to 2008. In 2008 there was an overall worsening in key epidemiological parameters relative to 2006 and 2007.

At the end of 2009, the United Kingdom as a whole was 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 awarded OTF status in October 2009 due to the low herd incidence of the disease (Commission Decision 2009/761/EC).

Despite not having OTF status, just over 94% of all cattle herds in Great Britain still retained their individual OTF status at the end of 2009 and the distribution of bovine TB incidents continues to be geographically clustered. Areas of the South West and the West Midlands of England and the South and West of Wales account for the vast majority of confirmed incidents and test reactors. Confirmed TB incidents occur sporadically outside those regions, usually as a result of the translocation of infected cattle from areas of endemic TB (cattle movements). Scientific evidence suggests that in the endemic TB areas of GB the Eurasian badger, Meles meles constitutes a significant reservoir of infection for cattle.

Northern Ireland:
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. Since 1996, there has been evidence of an increase. A number of reasons are considered to have influenced the continued incidence of the disease in cattle. These include the effect of a reservoir of the disease in feral species, cattle movements and cattle contact between small, fragmented farm holdings.

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

Great Britain (England, Wales and Scotland):
At the end of 2009 approximately 2.0 per cent of British herds were under movement restrictions due to a bovine TB incident. Other herds were restricted because of overdue testing. The balance (94.0%) of British herds were OTF at the end of 2009. There was a provisional 8.3% decrease in the total number of new TB incidents in Great Britain in 2009 (4,574) compared with 2008 (4,986). Of these new TB breakdowns, 79% occurred in the West of England and in Wales. Taking into account the overall number of tuberculin skin tests performed in unrestricted herds (59,959 in 2009, an increase from 56,581 in 2008), this equates to a total herd TB incidence of 7.6%, compared to 8.4% for the previous year. The estimated

herd incidence of bovine TB breakdowns confirmed by post-mortem examination and culture in 2009 was 4.1% (4.7% for 2008). Approximately 5.0 TB test reactors were identified for every 1,000 animals tested in 2009. A total of 1,012 cattle carcases with suspicious TB lesions (of which 704 yielded M. bovis on culture) were detected at commercial slaughter of cattle, thus supplementing active TB surveillance by skin testing.

Northern Ireland:
Approximately 24,000 herds were tuberculin tested during 2009 (1.6 million cattle). The herd and animal incidence of TB has remained relatively level over the last year with the current levels running at 5.61% and 0.512%, respectively (previous 13-24 months, herd incidence = 5.57%, animal incidence = 0.527%). At the end of 2009, the 12-month moving average for TB reactors was 683 per month (compared to 700 in December 2008). The 12-month moving average for new TB herd breakdowns was 108 herds per month (cf. 106 in December 2008). At the end of 2008, 4.3% of herds in Northern Ireland were under bovine TB restriction due to a bovine TB incident. This is a reduction on the 5.35% of herds under restriction at the end of 2007. Peak incidence occurred during the spring of 2003 (herd incidence = 10.2%; animal incidence = 0.99%).

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

The incidence of human TB in the UK has been rising gradually since the mid 1980s and it is highest in big conurbations, particularly in London. In the UK, the vast majority of cases of human TB are caused by infection with M. tuberculosis, often acquired by direct contagion from an infected human. Bovine TB is a recognised zoonosis and cases of human infection continue to be diagnosed in the UK. However, the advent of pasteurisation of virtually all the milk supply and a compulsory TB control programme in cattle has drastically reduced the incidence of human M. bovis infection in the UK population from the levels recorded prior to the 1950s.

The sale of raw milk from cows has been banned in Scotland since 1983. A small number of registered producers in England and Wales (163 dairy cow, 44 goat and 4 sheep establishments at the end of 2004) can still legally sell raw drinking milk directly to the consumer. In the absence of compulsory pasteurisation in England and Wales, dairy cattle and buffalo herds selling raw milk directly to consumers must undergo annual TB testing by the Animal Health Agency (AH). When the OTF status of a dairy herd is suspended, AH 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 heat treatment. The medical authorities are also informed once infection with M. bovis is confirmed in tuberculin reactors or in cattle carcases undergoing routine meat inspection.

Every year since 1990, between 20 and 50 (typically 40) people have been diagnosed with zoonotic TB in the UK. This represents between 1.0 and 1.5% of all culture-confirmed cases of TB in humans, a proportion similar to that reported in other industrialised countries. This figure has remained stable, with no discernible positive or negative trend despite the increasing incidence of TB in cattle. The vast majority of these cases represent infections contracted abroad (i.e. classed as “imported” cases) or reactivation of long-standing latent TB infection contracted before the introduction of milk pasteurisation in the 1950s. The geographical distribution of human M. bovis infections does not mirror that of bovine TB in the cattle population. However, in recent years some isolated incidents of clinical M. bovis infection in young and middle-aged people have been reported in Great Britain, suggestive of recent transmission from native animal reservoirs or infected humans, rather than reactivation of old latent infection or “imported” cases. There are no documented instances of infection associated with eating contaminated meat.

Recent actions taken to control the zoonoses

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 for 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 one (or two, if post-mortem evidence of infection with M. bovis is found) tuberculin 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.

Milk from dairy herds under TB restrictions destined for human consumption must undergo heat treatment (pasteurization). 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 medical authorities are notified when M. bovis infection is confirmed in tuberculin reactors or in cattle during routine slaughter. In Great Britain it is a statutory requirement that all cattle over 42 days old moving out of a 1 or 2 yearly tested herd must undergo tuberculin skin testing with a negative result within 60 days prior to movement, unless the herd or movement meets an exemption. Cattle over 42 days of age moved to farms in Scotland from 1- and 2-yearly testing areas, must be subject to post-movement testing in addition to pre-movement TB testing.

Additional information

Under domestic TB legislation, the identification of suspect tuberculous lesions in the carcasses of domestic mammals other than cattle is notifiable to Animal Health/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 the Veterinary Laboratories Agency/DARDNI.

During 2009, Mycobacterium bovis infection was confirmed by culture of the organism from 6 sheep, 23 domestic pigs, 68 alpacas, 27 domestic cats, 3 dogs, 18 wild deer and 1 wildebeest. Some of these isolations (e.g. pigs, camelids) represent incidents involving two or more infected animals from the same holding. In Northern Ireland, 106 badgers (found dead including road traffic accidents) were tested and 7 were found positive for M. bovis. No Mycobacterium tuberculosis was detected in any of these animals.

2.5.2 Tuberculosis, mycobacterial diseases in humans

A. Tuberculosis due to Mycobacterium bovis in humans

Reporting system in place for the human cases

Surveillance system in humans in Great Britain:
Access to reference laboratories able to differentiate M. bovis and M. tuberculosis exists for all publicly funded human diagnostic microbiology laboratories (National Health Service, Health Protection Agency and National Public Health Service for Wales) in England and Wales. 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.

Surveillance system in humans in Northern Ireland:
Enhanced surveillance of tuberculosis in humans in Northern Ireland is the same as that used in England and Wales: notification of clinical cases of pulmonary and non-pulmonary tuberculosis, reporting of mycobacterial isolates from confirmed cases and death certification.

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.

History of the disease and/or infection in the country

In England and Wales between 1993 and 2006, reports of M. bovis infection in humans have fluctuated between 6 and 37 per annum. The majority have occurred in older age groups and reflects reactivation of pre-existing infection. In Scotland since 1986 annual reports of M. bovis have varied between 2 and 14. In Scotland in 2008 there were three reported cases of tuberculosis due to M.bovis. This compares with one case in 2007 and 6 in 2006. All three cases in 2008 were reported in males over the age of 65.

In Northern Ireland between 1989 and 2009 the number of reports of M. bovis has varied from 0 to 7 per year. In Northern Ireland in 2008 there were 2 cases of M. bovis notified during the year. This compares with 3 in 2006 and 5 cases in 2005.

In the UK in total in 2007 there were 22 (provisional) laboratory reports of tuberculosis due to M. bovis, compared to a total of 32 for the previous year.

In England and Wales in 2007 there were 21 (provisional) laboratory reports of tuberculosis due to M.

bovis, compared to a total of 22 in 2006.

In Scotland in 2007 there was one recorded case in 2007 and 6 in 2006.

There were no reported infections of M. bovis in humans in Northern Ireland in 2007, compared with 3 in 2006 and 5 cases in 2005.

Results of the investigation

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

See results of the investigations above.

Relevance as zoonotic disease

The advent of pasteurisation of virtually all the milk supply and a compulsory TB control programme in cattle has drastically reduced the incidence of human M. bovis infection in the UK population from the levels recorded prior to the 1950s. Every year since 1990, between 20 and 50 (typically 40) people have been diagnosed with zoonotic TB in the UK. This represents between 1.0 and 1.5% of all culture-confirmed cases of TB in humans, a proportion similar to that reported in other industrialised countries. This figure has remained stable, with no discernible positive or negative trend despite the increasing incidence of TB in cattle. The vast majority of these cases represent infections contracted abroad (i.e. classed as “imported” cases) or reactivation of long-standing latent TB infection contracted before the introduction of milk pasteurisation in the 1950s. The geographical distribution of human M. bovis infections does not mirror that of bovine TB in the cattle population. However, in recent years some isolated incidents of clinical M. bovis infection in young and middle-aged people have been reported in Great Britain, suggestive of recent transmission from native animal reservoirs or infected humans, rather than reactivation of old latent infection or “imported” cases. There are no documented instances of infection associated with eating contaminated meat.

The sale of raw milk from cows has been banned in Scotland since 1983. A small number of registered producers in England and Wales (163 dairy cow, 44 goat and 4 sheep establishments at the end of 2004) can still legally sell raw drinking milk directly to the consumer. In the absence of compulsory pasteurisation in England and Wales, dairy cattle and buffalo herds selling raw milk directly to consumers must undergo annual TB testing by the Animal Health Agency (AH). When the OTF status of a dairy herd is suspended, AH 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 heat treatment. The medical authorities are also informed once infection with M. bovis is confirmed in tuberculin reactors or in cattle carcases undergoing routine meat inspection.

Additional information

Public health advice is given to herd keepers of infected herds and health authorities are advised of incidents. Purchasers of bulk milk are advised of application of restrictions to their suppliers.

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 is regionalised 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 enjoy OTF status.

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

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 2, 4 or 6 years. At the end of 2009 each nominal testing frequency remained the same as 2008 with approximately 32.5% of all cattle herds in Great Britain annually tested. The remainder were tested every two (12.5%), three (0.7%), or four (54.3%) years. TB testing intervals for the whole country are reviewed every year, to ensure compliance with Annex A of Directive 64/432/EEC. A review took place at the end of 2009 (to come into effect at the beginning of 2010). Interim adjustments may take place locally in response to a rising TB incidence. Furthermore, individual herds in 2, 3 and 4 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.).

Statutory pre-movement testing is carried out on all animals over 42 days of age moving out of 1 and 2-yearly testing parishes or herds.

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. All cattle carcases destined for human consumption are officially inspected post-mortem in accordance with the Fresh Meat Directives. Any affected carcases or parts of the carcase are disposed of and do not enter the food chain. The presence of disease is confirmed by the finding of lesions

characteristic of TB in reactors, or by the culture of M. bovis in samples from any suspect carcase.

Methods of sampling (description of sampling techniques)

In the UK, all testing of cattle for TB is by 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 TB in a herd. The SICCT test is the primary screening test and the only diagnostic method approved for certification of UK herds as officially TB free (OTF). The programme of regular tuberculin herd testing is supplemented 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. 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. Where inconclusive test reactors (IRs) are disclosed, they are required to be isolated and retested once after 60 days. In Scotland and Wales (and in England from 1st January 2010), any IRs that do not resolve at this retest are classed as reactors and removed to slaughter.

All M. Bovis isolates are routinely genotyped to enable 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 gamma interferon (γIFN) blood test (Bovigam) continued in 2009 to enhance the sensitivity of the cattle testing programme. Since October 2006, the use of the γIFN test alongside the skin test has been mandatory in certain prescribed circumstances, primarily as an ancillary parallel test in new confirmed 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. Overall, 30,624 γIFN tests were carried out in 2009 in GB and 3,261 positive animals identified for removal.

Northern Ireland:
Use of the γIFN test continued during 2008. It is mainly used as a voluntary ancillary test to the SICCT in herds where infection is confirmed and its use allows earlier removal of diseased animals than the SICCT alone. Overall, 11,642 tests were carried out in 2008 and 272 γIFN positive but SICTT negative animals were removed.

Case definition

M. bovis infection is confirmed in test reactors and 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 (breakdown) is one in which at least one confirmed animal has been found.

Vaccination policy

Vaccination of cattle against TB is not carried out in the UK and is expressly forbidden by the domestic animal health legislation.

Development of cattle vaccines and oral badger vaccines continues. The earliest projected date for the

use of a BCG cattle vaccine with a differential diagnostic test to Differentiate Infected from Vaccinated Animals (a so-called 'DIVA test') is 2015 and the earliest projected date for a licensed BCG oral badger vaccine is late 2014.

Other preventive measures than vaccination in place

Movement restrictions are placed on the herd and remain in place until the status of the herd has been resolved. Removal of restrictions are dependent upon the herd giving negative results to one herd test if the disease is not confirmed, or two consecutive herd tests if infection is confirmed. Cleansing and disinfection of the premises where the disease has been identified in the herd is also required. A trace on the movements of animals into and out of the herd prior to the detection of infection are carried out using a computerised database which records all animal movements as well as tuberculosis, brucellosis and other disease data. Traced animals or herds may be placed under movement restriction until appropriate tests have been carried out. Public health advice is given to the herd keeper and health authorities are informed.

Control program/mechanisms

The control program/strategies in place

As stated above, 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 1 and 2-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 1 or 2 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 has been a new requirement for cattle of 42 days of age or more from low incidence areas of England (3 and 4 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 new Orders retained the obligation to notify the regional veterinary leads of the Animal Health Agency of any suspicion of TB in live cattle and deer and cattle/deer carcases. They also introduced a new 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 to the Veterinary Laboratories Agency in Great Britain.

Recent actions taken to control the zoonoses

As described in General Evaluation above.

Measures in case of the positive findings or single cases

Measures in case of positive findings: 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.

Results of the investigation

Great Britain (England, Wales and Scotland):
At the end of 2009 approximately 2.0 per cent of British herds were under movement restrictions due to a bovine TB incident. Other herds were restricted because of overdue testing. The balance (94.0%) of British herds were OTF at the end of 2009. There was a provisional 8.3% decrease in the total number of new TB incidents in Great Britain in 2009 (4,574) compared with 2008 (4,986). Of these new TB breakdowns, 79% occurred in the West of England and in Wales. Taking into account the overall number of tuberculin skin tests performed in unrestricted herds (59,959 in 2009, an increase from 56,581 in 2008), this equates to a total herd TB incidence of 7.6%, compared to 8.4% for the previous year. The estimated herd incidence of bovine TB breakdowns confirmed by post-mortem examination and culture in 2009 was 4.1% (4.7% for 2008). Approximately 5.0 TB test reactors were identified for every 1,000 animals tested in 2009. A total of 1,012 cattle carcases with suspicious TB lesions (of which 704 yielded M. bovis on culture) were detected at commercial slaughter of cattle, thus supplementing active TB surveillance by skin testing.

Northern Ireland:
Approximately 24,000 herds were tuberculin tested during 2009 (1.6 million cattle). The herd and animal incidence of TB has remained relatively level over the last year with the current levels running at 5.61% and 0.512%, respectively (previous 13-24 months, herd incidence = 5.57%, animal incidence = 0.527%). At the end of 2009, the 12-month moving average for TB reactors was 683 per month (compared to 700 in December 2008). The 12-month moving average for new TB herd breakdowns was 108 herds per month (cf. 106 in December 2008). At the end of 2008, 4.3% of herds in Northern Ireland were under bovine TB restriction due to a bovine TB incident. This is a reduction on the 5.35% of herds under restriction at the end of 2007. Peak incidence occurred during the spring of 2003 (herd incidence = 10.2%; animal incidence = 0.99%).

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

See General Evaluation

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

These are described in the General Evaluation above.

Additional information

Public health advice is given to herd keepers of infected herds and health authorities are advised of incidents. Purchasers of bulk milk are advised of application of restrictions to their suppliers.

B. Mycobacterium bovis in farmed deer

Monitoring system

Sampling strategy

Deer (Farmed and Park)
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 Agency (AH). Under the same order, AH have statutory powers to enforce TB testing at the expense of the owner. 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 and requires the slaughter of reactors with the payment of compensation and, in appropriate circumstances, enables Defra to slaughter deer exposed to infection.

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 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
Similar legislation exists and similar procedures and testing protocols are followed

Vaccination policy

Vaccination is not permitted.

Measures in case of the positive findings or single cases

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.

Notification system in place

TB in deer became notifiable in Great Britain on 1 June 1989, under the Tuberculosis (Deer) Order 1989

(as amended). It is also notifiable in Northern Ireland under similar legislation.

Results of the investigation

United Kingdom - Great Britain:
During 2009, M. Bovis was cultured from 1 farmed and 18 wild (or other) tuberculous deer carcasses detected at postmortem inspection (statutory notifications to Animal Health or Veterinary Laboratories Agency). 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 2009, M. bovis was isolated from 15 out of 107 animal carcasses submitted to histopathological and bacteriological examination. Between 2008 and 2009, 150 wild deer were tested, with 2 positive M. bovis cases detected and one unspecified Mycobacterium spp.

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. Although meat from wild deer destined for the domestic market was not subject to statutory meat inspection until 1st January 2006, stalkers and deer managers may receive training in carcass inspection and have a statutory obligation to report suspicion of disease to the local DVM.

A quantitative risk assessment carried out by the Central Science Laboratory (CSL) in 2005 concluded that some deer species (principally fallow deer – Dama dama) had the potential to act as maintenance hosts for M. bovis TB, although the prevalence of TB infection in deer is not high (less than 5%) and the ecology of wild deer made it unlikely that they would have any close direct contact with cattle. However, there was considerable uncertainty in the model's outputs and one of the data deficiencies identified as responsible for a considerable proportion of this uncertainty was the prevalence of M. bovis infection in deer, together with the abundance and distribution of the various deer species. As a result, Defra initiated in December 2006 a field survey of TB prevalence in wild deer in the South-west Peninsula and the Cotswolds (England) with the aim of providing indicative values for the prevalence M. bovis TB in all deer species found in areas of high TB prevalence in cattle. The results of the survey published in 2008, showed M. bovis infection is present at a very low prevalence (less than 1%, except in one area where it is 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.

Defra has 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.

More detailed information about this research can be found on Defra's website: http://www.defra.gov.uk/animalh/tb/index.htm

Northern Ireland

There are 3 species of wild or feral deer in the province and surveys in the mid-1990s demonstrated widespread TB infection, principally in red deer (Cervus elaphus) and fallow deer (Dama dama) with a prevalence of 8% (4.8% if one heavily infected locality was excluded). However, the low number of deer (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 unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Badgers [1)]	NRL	Animal	106	20	7	0	13
Goats [2)]	NRL	Animal	15	7	0	0	7
Pigs [3)]	NRL	Animal	117	74	23	0	51
Sheep [4)]	NRL	Animal	10	6	6	0	0
Alpacas [5)]	NRL	Animal	120	72	68	0	4
Antelopes - wild [6)]	NRL	Animal	3	1	1	0	0
Cats - pet animals [7)]	NRL	Animal	104	64	27	0	37
Deer - wild [8)]	NRL	Animal	198	24	20	0	4
Dogs - pet animals [9)]	NRL	Animal	11	5	3	1	1
Lamas [10)]	NRL	Animal	3	0	0	0	0

Comments:

[1)] Northern Ireland - survey

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

[3)] Routine meat inspection at slaughterhouse

[4)] Routine meat inspection at slaughterhouse

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

[6)] Wildebeest. 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

Table Tuberculosis in other animals

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

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

Footnote:

NRL = National Reference Laboratory

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

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	26287	26287	24023	1608	1293	12	.75	91.39	6.69	5.38
Total : [1)]	26287	26287	24023	1608	1293	12	.75	91.39	6.69	5.38
Total - 1	26780	26780	23922	1598	1273	10	.63	89.33	6.68	5.32

Comments:

[1)] N.A.

Footnote:

Total number of herds based on the number of cattle herds presenting cattle for a TB herd test during the last 4 years.

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

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	1612813	1599025	1601500	1601500	8198	8198	8905	100.15	.51
Total : [1)]	1612813	1599025	1601500	1601500	8198	8198	8905	100.15	.51
Total - 1	1622541	1647300	1592213	1592213	8390	8390	9001	96.66	.53

Comments:

[1)] N.A.

Footnote:

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. Due to animal population changes (births, deaths and the timing of herd testing during the year), it is not possible to give the exact number of animals to be tested during the year, therefore the estimate is based on the average for the previous 4 years and in 2009, this estimate was less than the actual total number of animals tested.

Table Tuberculosis in farmed deer

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			
United Kingdom	300	30000					no routine test			110	16
Total : [1)]	300	30000	0	0	0	0	N.A.	0	0	110	16

Comments:

[1)] N.A.

Footnote:

The total numbers of animals and herds listed are figures for Great Britain, obtained from the UK Agricultural census (June 2009) and are approximate. No population data is available for Northern Ireland.
No routine tuberculin testing of deer is carried out in the UK and there is no data available on tuberculin tests in deer.
Official post-mortem examination of all slaughtered animals is implemented. Lesions suspicious of TB were detected in 3 animals in Great Britain in 2009. Confirmation of TB was obtained in 1 animal. In Northern Ireland, lesions suspicious of TB were detected in 107 animals and confirmation of TB was obtained in 15 animals.

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

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			
United Kingdom	84515	8394000	79455	94.01	4574	5.41	See footnote	6941610	443879	1012	704
Total : [1)]	84515	8394000	79455	94.01	4574	5.41	N.A.	6941610	443879	1012	704

Comments:

[1)] N.A.

Footnote:

In the table "United Kingdom" refers to Great Britain - England, Scotland and Wales.
Officially free herds - Number of herds: the balance (5.99%) represents all herds with OTF status suspended or withdrawn at the end of 2009 for any reason (e.g. test reactors, suspect cases at routine slaughter, overdue TB tests etc.)
Infected herds - Number of herds: there were 4574 new herd TB incidents, including confirmed, unconfirmed and unclassified incidents. There were 1072 herds under movement restriction on 31 December 2009.
Routine tuberculin testing - Interval between routine tuberculin tests: of all herds (a)32.5% annually, (b)12.5% tested every 2 years, (c)0.7% tested every 3 years, (d)54.3% every 4 years.
Routine tuberculin testing - Number of animals tested: all tuberculin skin tests and interferon-gamma blood tests on individual animals (it is not possible to easily differentiate routine from non-routine animal tests).
Number of tests carried out before introduction to the herd: pre-movement tuberculin tests of cattle not moving to slaughter became compulsory in England and Wales in March and May 2006 respectively. In Scotland there is both pre- and post-movement testing.
Number of animals with suspicious lesions: cattle carcasses that presented with suspect tuberculous lesions at commercial slaughter (i.e. excludes cattle compulsorily slaughtered as skin or interferon gamma test reactors).
Number of animals detected positive: cattle carcasses with suspect TB lesions at routine slaughter from which Mycobacterium bovis was isolated. Excludes tuberculin and gamma interferon test reactors.

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

	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	26287	1599025	0	0	412	78238	673	76759	1985	174685			23217	1269343
Total : [1)]	26287	1599025	0	0	412	78238	673	76759	1985	174685	0	0	23217	1269343
Total - 1	26780	1647300	0	0	344	60193	771	86570	2087	167387			23578	1333150

Comments:

[1)] N.A.

Footnote:

Total number of herds based on the number of cattle herds presenting cattle for a TB herd test during the last 4 years. Total number of animals based on the average number of cattle presented at TB herd tests over the last 4 years.

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 cattle herds within Great Britain achieved Officially Brucellosis Free (OBF) status on 1 October 1985. As this status was maintained up to 1989, Great Britain moved to biennial testing in accordance with Directive 64/432/EC in 1989. GB achieved regional freedom in 1996.

Northern Ireland:
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; infection was largely resolved in two of the areas but between-herd spread continued in Counties Down and Armagh. In 2007 there was a reduction in herd incidence. During 2008, there was a very slight increase in the herd incidence, however the overall number of positive animals showed a decline. A reduction in herd incidence and positive animal incidence was seen in 2009.

Other Brucella species UK:
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 2009, 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

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

Great Britain - England, Wales, Scotland:
Cases of brucellosis in humans are usually recorded associated with infection acquired outside Great Britain.

Northern Ireland
In Northern Ireland cases of brucellosis are associated with infection in cattle. From 1986 to 1997 there were no reported cases of brucellosis in humans. During 1998 one case was reported in a member of a family whose cattle herd was also confirmed with Brucella abortus. Between 1999 and 2004, during the peak of the brucellosis outbreak in Northern Irish cattle herds, there were 101 reported cases of human brucellosis, 80 of which were thought to have been acquired occupationally.

Additional information

During 2009, 1973 dogs for export were tested. Serology of 276 alpacas, 56 llamas, 271 deer, 100 camels, all for import/export requirements, yeilded negative results. Brucella ceti was isolated from 7 marine mammals and Brucella pinnipedialis from one marine mammal during the year.

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 (National Health Service, Health Protection Agency and National Public Health Service for Wales) and Health Protection Scotland and Health Protection 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.

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

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.

2.6.3 Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Free regions

Great Britain is officially free of infection from Brucella abortus, Brucella melitensis, Brucella ovis and Brucella suis.

The situation in Northern Ireland is described separately. Northern Ireland does not have Officially Free status for Brucella abortus.

Monitoring system

Sampling strategy

Great Britain - England, Wales, Scoland:
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 2009 was monthly 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 Agency of any abortions or premature calvings that take place in their herd under Article 10 of the Brucellosis (England) Order 2000 and its equivalents 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.

Frequency of the sampling

See sampling strategy

Type of specimen taken

Blood, milk, organ/tissues 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

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 giving positive results to the indirect ELISA are also subjected to the serum agglutination test and complement fixation test.

Herd restrictions which stop the movement of animals off the premises, except under the authority of a licence, 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 licence, 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 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 2009, approved laboratories tested 149952 bulk milk samples from 11800 herds as part of the national surveillance programme. Routine monitoring of cattle abortions and premature calvings was carried out with 6691 cases investigated during the year. 16426 animals were tested serologically with no animals detected as positive. Overall, there were no cases of brucellosis in cattle detected during 2009.

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 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.

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 2009, surveillance for brucellosis was provided by the National Sheep and Goat Survey. 522 blood samples from 111 goat herds in Great Britain and 169 samples from 32 goat herds in Northern Ireland were tested, all with negative results. In addition, in Great Britain, samples from 19 goat abortions were investigated. All were negative on test for brucellosis.

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

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

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

Monitoring system

Sampling strategy

During 2009, 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.

Frequency of the sampling

Annual survey

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 the 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 the year 2009, surveillance for brucellosis was provided by the National Sheep and Goat survey. In Great Britain, 20999 blood samples from 1380 flocks were tested, all with negative results. In Northern Ireland, 3877 animals in 204 flocks were tested, all with negative results.

In addition, in the UK, samples from 2184 sheep abortions were investigated. 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. Testing also carried out on pigs for export

Results of the investigation

During 2009, 2610 pigs (for AI and export) were blood tested, all with negative results.

21 pig foetuses were tested in Scotland during the yeart - 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

Surveillance system:
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 (BR) 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. Animals with SAT readings of ≥ 102 iu may be taken as reactors, as may animals with CFT readings of ≥ 20iu and those with iELISA positive results, again depending on significant risk factors.

Cattle being slaughtered at Over 48 Months Scheme slaughter plants are routinely blood sampled. 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 . Pre-movement testing of BR eligible cattle was introduced in December 2004.

Notification of Abortions:
Herd keepers and veterinary surgeons are required under the Brucellosis Control Order (Northern Ireland) 2004 to notify a Divisional Veterinary Office if any bovine animal has had an abortion. (This 2004 Control Order replaced the 1972 Control Order on 1st October, 2004). 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

Other: blood, milk, tissues/organ____

Case definition

Culture and isolation of the organism.

Vaccination policy

Vaccination policy: Vaccination of animals is not allowed.

Control program/mechanisms

The control program/strategies in place

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 former is used to administer between-herd movement of cattle, captured in real-time using a permit system and terminals located in markets and abattoirs. The latter facilitates management of herd-level and animal-level tests, with 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 all cattle older than 48 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.

Measures in case of the positive findings or single cases

Measures in case of positive findings:
Herd restrictions, which stop the movement of animals onto and off the premises, except under the authority of a licence issued by the Department, 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 is paid with no upper limit. 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 2009, 23135 herds were checked. In total 76 herds were positive, with 71 new herds positive during the period. Overall 888898 animals were tested individually and 116 animals were detected as positive.

Further disease statistics on brucellosis are available from the DARD web site on a monthly and quarterly basis (http://www.dardni.gov.uk/index/dard-statistics/animal-disease-statistics.htm).

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 its lowest point in October 2005 (0.34%). Subsequently, the rise in herd incidence since October 2005 peaked in October 2006 (0.6%) and then stayed relatively level until autumn 2007 when there was another rise in incidence. The annual herd incidence at December 2008 was 0.87% while the annual animal incidence was 0.038%. However the annual herd incidence has now fallen to 0.35% in December 2009 and the annual animal incidence fell to 0.012% in the same month.

National statistics are based on a herd level Brucellosis test where number of cattle >= 0 (23,135 herds had a herd test where cattle were presented compared to 23,396 in same period of 2008). Prevalence and incidence figures were calculated using the herds which presented cattle at a herd test: of the 26,287 herds eligible for testing (946,438 cattle) within Northern Ireland that were actively monitored for Brucellosis by blood or bulk milk sampling, there were 71 new breakdown herds over the last 12 month period (for the year 2009) and 116 Brucella reactor animals. The vast majority of confirmed breakdowns occurred in a specific disease hotspot areas.

Pre-movement testing was introduced in December 2004. In 2009, 7 Brucella reactors were detected from 181348 animal tests.

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 unit	Units tested	Total units positive for Brucella	B. abortus	B. melitensis	B. suis	Brucella spp., unspecified	B. ceti	B. pinnipedialis
Alpacas [1)]	NRL	Animal	276	0	0	0	0	0	0	0
Camels [2)]	NRL	Animal	100	0	0	0	0	0	0	0
Deer [3)]	NRL	Animal	271	0	0	0	0	0	0	0
Dogs - pet animals - Surveillance (For export)	NRL	Animal	1973	0	0	0	0	0	0	0
Lamas [4)]	NRL	Animal	56	0	0	0	0	0	0	0
Marine mammals - wild - Clinical investigations	NRL/SAC	Animal	83	8	0	0	0	0	7	1
Pigs - at farm - Clinical investigations [5)]	SAC	Animal	21	0	0	0	0	0	0	0
Pigs - at farm - Surveillance (For export)	NRL	Animal	1111	0	0	0	0	0	0	0
Pigs - breeding animals - at AI station - Monitoring	NRL	Animal	1499	0	0	0	0	0	0	0
Solipeds, domestic - at farm - Clinical investigations	SAC	Animal	1	0	0	0	0	0	0	0
Squirrels - Clinical investigations	SAC	Animal	1	0	0	0	0	0	0	0

Comments:

[1)] Import/export testing
[2)] Import/export testing
[3)] Import/export testing
[4)] Import/export testing
[5)] Pig foetuses

Footnote:

NRL = National Reference Laboratory
SAC = Scottish Agricultural College

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

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
Northern Ireland	9128	1899400	9128	100	0	0	236	4046	0	0	0	185	0	0
United Kingdom	117000	35000000	117000	100	0	0	1491	21521	0	9	0	2019	0	0
Total : [1)]	126128	36899400	126128	100	0	0	1727	25567	0	9	0	2204	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.

In the table "United Kingdom" refers to data from Great Britain - England, Scotland and Wales.

"Number of animals examined microbiologically" refers to aborted sheep or goat foetuses examined microbiologically for Brucella.

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

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	84515	8394000	84515	100	0	0	1179	16426	0	11800	149952	0	6691	0	0	62	0	0	0	0	0
Total : [1)]	84515	8394000	84515	100	0	0	1179	16426	0	11800	149952	0	6691	0	0	62	0	0	0	0	0

Comments:

[1)] 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 2009

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

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	26287	26287	23135	76	71	20	26.32	88.01	.33	.31
Total : [1)]	26287	26287	23135	76	71	20	26.32	88.01	.33	.31
Total - 1	26780	26780	23396	192	177	44	22.92	87.36	.82	.76

Comments:

[1)] N.A.

Footnote:

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

Number of herds checked: herds with a herd-level brucellosis test where number of cattle exceeds 0 (20,181 herds had a herd test where cattle were presented compared to 20,328 in the same period of 2008)

Number of herds depopulated = 20 herds from 17 epidemiological units

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

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	1612813	946438	936672	888898	116	116	2227	98.97	.01
Total : [1)]	1612813	946438	936672	888898	116	116	2227	98.97	.01
Total - 1	1622541	960549	961894	908811	384	384	5372	100.14	.04

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. Denominator also an estimate based on the average herd size over the last 4 years.

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

	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	26287	946438	0	0	10	1196	63	3218	841	36358			25373	905666
Total : [1)]	26287	946438	0	0	10	1196	63	3218	841	36358	0	0	25373	905666
Total - 1	26780	960549	0	0	14	968	92	6520	808	32303			25866	920758

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.

2.7 YERSINIOSIS

2.7.1 General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

History of the disease and/or infection in the country

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

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

No animal surveys were conducted in 2009. The animal table shows number of incidents of yersiniosis detected from examination of clinical diagnostic samples in animals. The number of diagnoses was small and it is therefore difficult to comment on trends.

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

Trasmission 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.

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

A small number of cases are reported each year.

In England and Wales in 2007, there were 50 cases recorded, of which 49 were typed as Y. enterocolitica. In 2006 there were 32 reported cases of Yersinionsis, compared with 26 in 2005 and 68 in 2004. Reported cases varied between 32 and 68 between 1998 - 2003, with the highest number of reported cases during any one year being 88 cases reported in 1999.

In Scotland laboratory reports of Yersinia enterocolitica have varied between 28 and 109 since 1986. In 2007, 22 cases of yersiniosis were recorded; 19 of these infections were due to Y. enterocolitica

In Northern Ireland reports have fluctuated between 3 and 17 per annum from 1992-2006. There was 1 case of Y. enterocolitica reported in 2007.

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

The number of cases reported has remained much the same with no obvious trend.

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 2009. The last survey of pigs was conducted in 2003 and reported in 2004.

Results of the investigation

During 2009, Yersinia pseudotuberculosis was isolated in a traditional-breed pig with septicaemia and Yersinia enterocolitica, in conjunction with Brachyspira pilosicoli infection, was confirmed as the cause of diarrhoea in an 8-week old pig. There were no cases of pigs detected infected with Yersinia spp. from clinical diagnostic samples submitted to government veterinary laboratories in 2008.

The animal table shows number of incidents of yersiniosis detected from examination of clinical diagnostic samples in all animals in the UK. The number of diagnoses was small and it is therefore difficult to comment on trends.

Table Yersinia in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia	Y. enterocolitica	Y. pseudotuberculosis	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - Y. enterocolitica, unspecified
Antelopes - Clinical investigations [1)]	VLA/AFBI	Animal	5	5	2	3	0			2
Birds - Clinical investigations (Miscellaneous species) [2)]	VLA/AFBI	Animal	5	5	0	5	0			0
Cattle (bovine animals) - at farm - Clinical investigations	VLA/AFBI	Animal	3	3	2	1	0			2
Goats - at farm - Clinical investigations	VLA/AFBI	Animal	4	4	0	4	0			0
Pigs - at farm - Clinical investigations	VLA/AFBI	Animal	2	2	1	1	0			1
Sheep - at farm - Clinical investigations	VLA/AFBI	Animal	12	12	0	10	2			0
Water buffalos - Clinical investigations	VLA/AFBI	Animal	1	1	0	1	0			0

Comments:

[1)] Includes sitatunga (1), roe deer (1), waterbuck (1), red deer (1), reindeer (1),

[2)] Includes Gouldian Finch (1), Purple Crested Turaco (1), African Grey Parrot (1), Blue Canary (1), Montserrat Oriole (1)

Footnote:

VLA = Veterinary Laboratories Agency in Great Britain
AFBI = Agri-fod and Biosciences Institute in Northern Ireland

Diagnoses made from clinical diagnostic material submitted to government veterinary laboratories. The total units tested are not known because the laboratory does not report negative results, unless part of an official control programme or survey. The numbers recorded are numbers of incidents. There may be more than one diagnosis in the same incident

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:
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. One case, believed to have been acquired overseas, was recorded in 2001. No cases were recorded in 2002 - 2009.

Animals:
There was no evidence to indicate that trichinellosis exists in the UK domesticated pig population or in horses in 2009. 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.

National evaluation of the recent situation, the trends and sources 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 2009. The last recorded outbreak in the UK, albeit involving imported food, was of eight cases reported in 2000.

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 the pig, wild boar and horse carcasses that are tested annually. This view is supported by an ongoing annual survey of wildlife.

Pigs horses and wild boar are routinely monitored for the presence of Trichinella. In 2009, 198,331 breeding sows and boars, 466,410 fattening pigs raised in contained housing and 310,940 raised with outdoor access at some period, 5136 horses, 1011 wild boar and 159 feral wild boar muscle samples were examined for Trichinella in Great Britain. In Northern Ireland, 10,026 breeding sows and boars, 199 outdoor reared pigs and 950,328 fattening pig muscle samples were examined. All samples were negative.

An ongoing survey of Trichinella in foxes is carried out by the Food Standards Agency (FSA) in the United Kingdom. 494 samples from Great Britain and 170 samples from Northern Ireland were examined from January 2009 to December 2009. In addition other wildlife, 3 seals from Great Britain and 67 badgers from Northern Ireland were tested. One fox from Northern Ireland tested positive for T. spiralis. All other 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 zoonotic disease caused by ingestion of raw meat containing larvae of the nematode of the Trichinella spp. Four species of Trichinella are found in Europe. 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).

The finding of a positive T. spiralis in one fox in Northern Ireland in 2009 is not considered to pose a risk to human health.

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 are undertaken by laboratories in the slaughterhouse or at the regional government laboratories. A laboratory quality assurance programme is 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 (National Health Service, Health Protection Agency and National Public Health Service for Wales, Health Protection Scotland and Health Protection Agency, Communicable Disease Surveillance Centre Northern Ireland).

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. One case, believed to have been acquired overseas, was recorded in 2001. No cases were recorded from 2002 to 2009.

Results of the investigation

No human cases of Trichinellosis were recorded in 2009.

2.8.3 Trichinella in animals

A. Trichinella in horses

Monitoring system

Sampling strategy

Surveillance system:
Regulation (EC) 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

Each carcase

Type of specimen taken

As per legislation.

Case definition

Isolation of parasite.

Diagnostic/analytical methods used

As per legislation

Results of the investigation including the origin of the positive animals

A total of 5136 samples were tested in 2009, all in Great Britain and none in Northern Ireland. 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

No Trichinella was reported in any samples examined in 2009.

B. Trichinella in pigs

Monitoring system

Sampling strategy

General

Surveillance system:
Regulation (EC) 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. 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. Carcases 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.

Frequency of the sampling

General

As per the legislation

Case definition

General

Isolation of the parasite

Diagnostic/analytical methods used

General

From January 2006, testing for Trichinella spiralis, by the EU muscle digest method, was extended to the domestic slaughter of all boars, sows, farmed wild boar processed in a slaughterhouse and feral wild boar processed through an Approved Game Handling Establishment.

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: 1,416,738 tested with 0 positive (Northern Ireland: 950,328 tested, 0 positive and Great Britain: 466,410 tested, 0 positive)

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

Overall for the UK: 311,139 tested, 0 positive (Northern Ireland: 199 tested, 0 positive and Great Britain: 310,940 tested, 0 positive).

For wild boar - farmed and feral:
Farmed wild boars - UK: 1011 tested, 0 positive
Feral wild boars - UK: 159 tested, 0 positive.

Breeding sows and boars

Overall for the UK: 208,357 tested, 0 positive (Northern Ireland: 10,026 tested, 0 positive and Great Britain: 198,331 tested, 0 positive)

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

There is no evidence to indicate that Trichinella exists in pigs in the UK, as shown by the negative results from the large proportion of carcasses that are tested annually.

Pigs and horses are routinely monitored for the presence of Trichinella at the slaughterhouse. There was no evidence to indicate that trichinellosis exists in the UK domesticated pig population or in horses in 2009. 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.

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 2009. 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 unit	Units tested	Total units positive for Trichinella	T. spiralis	Trichinella spp., unspecified
Foxes [1)]	FSA	Animal	664	1	1	0
Pigs - breeding animals - unspecified - sows and boars [2)]	FSA	Animal	208357	0	0	0
Pigs - fattening pigs - not raised under controlled housing conditions in integrated production system [3)]	FSA	Animal	311139	0	0	0
Pigs - fattening pigs - raised under controlled housing conditions in integrated production system [4)]	FSA	Animal	1416738	0	0	0
Solipeds, domestic - horses [5)]	FSA	Animal	5136	0	0	0
Wild boars - farmed [6)]	FSA	Animal	1011	0	0	0
Wild boars - wild [7)]	FSA	Animal	159	0	0	0
Badgers - wild [8)]	FSA	Animal	67	0	0	0
Seals - wild [9)]	FSA	Animal	3	0	0	0

Comments:

[1)] Surveillance - post mortem examination. 10g sample size
[2)] Sampling stage at slaughterhouse. Sample size 1g
[3)] Sampling stage at slaughterhouse. Sample size 1g
[4)] Sampling stage at slaughterhouse. Sample size 1g
[5)] Sampling stage at slaughterhouse.
[6)] Sampling stage at slaughterhouse.
[7)] Hunted animals and testing at approved game handling establishments
[8)] Surveillance - post mortem examination. 5g sample size
[9)] Surveillance - post mortem examination

Table Trichinella in animals

Footnote:

The Food Standards Agency (FSA) Meat Hygiene Service reports 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 data from both sources are combined in the table. The Food Standards Agency collates the data for the UK.

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 restricted geographical areas in Scotland and in England and Wales. E. multilocularis is not known to be present in the UK.

Humans:
The incidence in humans is highest in mid-Wales. In England and Wales in humans, voluntary reports fluctuated between 5 and 26 per annum from 1989 to 1996 when 44 were recorded, the highest total in recent years. Laboratory reports totalled 14 in 1997, a large fall from 1996. In Scotland reports of cases are infrequent, averaging less than 1 per year. Overall, recently, there have been on average 8 - 15 cases reported annually in the UK.

Animals:
In Great Britain, Echinococcosis (hydatid disease) 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 inspector or Official Veterinarian. Findings at post mortem are recorded centrally by region in England, Wales and Scotland. No cases of hydatidosis have been detected in Northern Ireland in the last decade. The last cases recorded were from imported Alpacas over 10 years ago.

Meat inspection in all licensed slaughterhouses is carried out by Official Veterinarians in the Food Standards Agency in Great Britain. 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 is not known to be present in animals in the UK.

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

During 2008 more than 18.3 million cattle and sheep carcases were inspected, of these 87,393 positive results were obtained, amounting to less than 0.5% of the carcases inspected. 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.

Recent actions taken to control the zoonoses

The Welsh Assembly Government has funded a 10 year disease eradication programme to control hydatid disease in Wales. This programme is based on an education programme and dog deworming campaign.

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

In England and Wales for 1984-1990 only in a circumscribed area of mid Wales was the incidence higher than 1/100,000/year and in other areas was less than 0.25/100,000. Voluntary reports fluctuated between 5 and 26 per annum from 1989 to 1996 when 44 were recorded, the highest total in recent years. Laboratory reports totalled 14 in 1997, a large fall from 1996. In Scotland Echinococcus granulosus is present in restricted geographical areas and reports of cases are infrequent, averaging less than 1 per year. Overall, recently, there have been on average 8 - 15 cases reported annually in the UK.

2.9.3 Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals) - at slaughterhouse - Monitoring (Meat inspection)	FSA	Animal	341057	1471	0	0	1471

Footnote:

FSA = Food Standards Agency.

Data for Great Britain only. Incomplete data for 2009

Routine visual meat inspection for hydatidosis (Echinococcus granulosus).

E. multilocularis has never been detected in the UK

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 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

Northern Ireland:
Toxoplasmosis was diagnosed in 43 cases of foetopathy in sheep during 2009. There were no confirmed diagnoses in goats.

Great Britain (England, Scotland and Wales): Toxoplasmosis remained the second most common cause of abortions in sheep in Great Britain during the year and accounted for 23.1% of all incidents of foetopathy in sheep and goats diagnosed in 2009, compared to 22.9% in 2008 and 29.3% diagnosed in 2007.

Toxoplasmosis was confirmed in 204 incidents recorded in 2009 in clinical diagnotic samples from sheep and in one case in goats. In 2008 there were 201 recorded diagnoses of toxoplasmosis causing foetopathy in sheep and none in goats and there were 376 incidents from sheep and 5 in goats in 2007.

Investigations of sudden deaths in meerkats in a safari park identified systemic toxoplasmosis which is a recognised problem in this species.

Serological examinations for Toxoplasma gondii using the latex agglutination test (LAT) are undertaken by the Veterinary Laboratories Agency (VLA) on sera submitted to regional diagnostic laboratories. In sheep in 2009, 321 (44%) of 732 sera tested were positive for T.gondii (compared with 110 (49%) of 223 sera in 2008 and 228 (44%) of 649 sera in 2007). In pigs, 1 (10%) of 10 sera was positive in 2009. There was also serological evidence of infection with Toxoplasma gondii recorded in reindeer, alpacas and goats during the year. These findings provide a summary of the serological status of samples submitted for diagnosis, monitoring and screening purposes during 2009 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.

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.

Additional information

The figures recorded in the table arising from clinical investigations are the number of incidents recorded in 2009. 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.

The table also includes a summary of the results of serological examination of samples submitted to regional diagnostic laboratories. The figures recorded in the table for 2009 provide an overview of the serological status of samples submitted for diagnosis, monitoring and screening purposes but do not constitute a structured survey.

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.

Case definition

As described above.

History of the disease and/or infection in the country

In England and Wales there were 94 voluntary reports in 2006, compared with 102 in 2005. There were 106 cases of toxoplasmosis were reported under the surveillance system in 2007. 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.

In Scotland laboratory reports have varied between 10 and 47 since 1986 with 33 in 2006 and 44 in 2007. In Northern Ireland there were no cases reported in 2006, compared to 2 cases in 2005.

In Northern Ireland there were 2 cases reported during 2007, compared to none in 2006 and 2 in 2005.

Results of the investigation

Data on reports of toxoplasmosis is not yet available for England and Wales for 2008.

There were 48 cases recorded in Scotland during 2008.

No cases were reported in Northern Ireland in 2008.

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

The Health Protection Agency, in collaboration with the National Public Health Service for Wales (NPHSW), is reviewing the number of cases of toxoplasmosis diagnosed by the Toxoplasma Reference Unit (TRU) in Swansea. A total of 667 cases were diagnosed by TRU over the 12 month period July 2005 to June 2006, compared with an average of 117 cases reported annually to the HPA by NHS laboratories. This would suggest that the decrease in the incidence of toxoplasmosis in the UK during the mid-1990s may have been due to changes in reporting arrangements. Comparison of numbers of reference unit reports between the early 1990s and the present provides no evidence to support a significant reduction over this period.

More detailed analysis of the data provided by TRU reveals that 185 of the 667 cases identified were in patients either classed as known HIV positive, or considered to be at high risk for HIV infection (based

upon indication by the referring laboratory).

2.10.3 Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
Goats [1)]	VLA/AFBI	Animal	1	1	1
Sheep [2)]	VLA/AFBI	Animal	247	247	247
Alpacas - Surveillance (Unstructured survey) [3)]	VLA	Animal	10	1	1
Goats - Surveillance (Unstructured survey) [4)]	VLA	Animal	9	2	2
Pigs - Surveillance (Unstructured survey) [5)]	VLA	Animal	10	1	1
Reindeers - Surveillance (Unstructured survey) [6)]	VLA	Animal	2	1	1
Sheep - Surveillance (Unstructured survey) [7)]	VLA	Animal	732	321	321
Zoo animals, all (Meerkat) [8)]	VLA/AFBI	Animal	1	1	1

Comments:

[1)] Clinical investigations - at farm. Total number of units tested not known.
[2)] Clinical investigations - at farm. Total number of units tested not known
[3)] Serum samples submitted to Regional Laboratories. Does not constitute a structured survey. Great Britain only.
[4)] Serum samples submitted to Regional Laboratories. Does not constitute a structured survey. Great Britain only.
[5)] Serum samples submitted to Regional Laboratories. Does not constitute a structured survey. Great Britain only.
[6)] Serum samples submitted to Regional Laboratories. Does not constitute a structured survey. Great Britain only.
[7)] Serum samples submitted to Regional Laboratories. Does not constitute a structured survey. Great Britain only
[8)] Clinical investigations. Total number of units tested not known

Footnote:

Clinical diagnostic samples submitted by private veterinary surgeons to the Veterinary Laboratories Agency (VLA) and Agri-food and Biosciences Institute (AFBI) in 2009. Total units tested are not known because the laboratories do not report negative results.
The table shows the number of incidents of toxoplasma foetopathy diagnosed in sheep and goats in the UK in 2009. There was also systemic toxoplasmosis identified during an investigation into sudden deaths in meerkats at a safari park.
Serological investigations for Toxoplasma gondii using the latext agglutination test (LAT) are undertaken by the VLA in Great Britain on serum samples submitted to Regional laboratories. The findings in the above table provide a summary of the serological status of samples submitted for diagnosis, monitoring and screening purposes during the year but do not constitue a structured survey. Positive samples recorded in the table have LAT titres of 1/64 or greater and indicate a history of exposure to the parasite

2.11 RABIES

2.11.1 General evaluation of the national situation

A. Rabies general evaluation

History of the disease and/or infection in the country

The United Kingdom is recognised as having rabies free status by the O.I.E.

Human rabies is extremely rare in the UK. The last indigenous human death from classical rabies occurred in 1902. Since 1902, there have been 26 reported cases of human rabies in the UK. Of these, 25 resulted from infection whilst abroad. There was one report 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 was in 1922. In total, nine bats have tested positive for live European Bat Lyssavirus during the passive surveillance programme in Great Britain 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 one human case of classical rabies reported in Northern Ireland in the 2008 annual report. Infection was acquired overseas by a patient who spent time working at an animal sanctuary in South Africa. This was a fatal case and the patient died in early 2009.

Animals:
In 2009, 9 cats, 14 dogs and two foxes, were submitted for laboratory testing. All these samples tested negative for rabies.

The Veterinary Laboratories Agency (VLA) 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 VLA tested 5,838 bats for Lyssavirus and in that time, only four cases tested positive for live EBLV. 859 bats were tested during 2006 with one testing positive. In 2007, 1204 bats were submitted for testing under the passive surveillance programme and 2 were suspect cases, making a total of 1206 bats tested during the year, with one positive EBLV2 detected. During 2008, 1308 bats were tested with 2 positive EBLV2 bats detected.

This general passive surveillance programme in bats continued during 2009 with 1095 bats tested during the year. A single bat submitted from West Lothian, Scotland was tested positives for European Bat Lyssavirus 2.

A three year active surveillance programme for testing bats for EBLV in England and Scotland took place between 2003-2006. The species targeted were Daubenton's bats in Northern England and Scotland, and Serotines in Southern England. Natterer's and Pipistrelle's bats were also tested in small numbers as non -target species. This survey identified one (of 273 examined) Serotine bat (Eptesicus serotinus) from

southern England to be antibody positive for EBLV1 in 2004. Results indicated a low seroprevalence estimate of EBLV-2 in Britain's Daubenton's bats of about 2%. All oral swabs tested were negative.

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

European Bat Lyssavirus (EBLVs) are related to the classical rabies virus. They 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. EBLV 2 is found mainly 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. Defra's revised Contingency Plan for Exotic Animal Diseases was laid before Parliament in December 2008. A Rabies Disease Control Strategy is currently being drafted.

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) of 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. Since 1902 there have been 26 reported cases of human rabies in the UK. Of these, twenty-five resulted from infection contracted whilst abroad. 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. One case of classical rabies was reported in 2005. The patient had suffered a dog bite whilst on holiday in Goa. No further medical attention was sought until the case presented with clinical symptoms back in the UK. The patient died after admission to hospital.

Results of the investigation

There was one human case of classical rabies reported in the 2008 annual report. Infection was acquired overseas by a patient who spent time working at an animal sanctuary in South Africa. This was a fatal case and the patient died in early 2009.

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

2.11.3 Lyssavirus (rabies) in animals

A. Rabies in dogs

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 state veterinary service Animal Health 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 serological or histological tests or virus isolation reveals the presence of the rabies virus in the animal's tissues.

Diagnostic/analytical methods used

A number of tests may be used including FAT, Mouse innoculation test, histology, PCR.

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.

Results of the investigation

In 2009, 9 cats, 14 dogs and 2 foxes, were submitted for laboratory testing. All tests yielded negative results.

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 dogs, cats and ferrets 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.

During 2009, 7,128 cats, 89,376 dogs and 55 ferrets successfully entered the UK under the Scheme. In total, 662,499 pet animals have entered the UK under PETS since 2000 (ferrets have only been able to enter under the Scheme since July 2004). There have been no cases of imported rabies in the UK in animals that have used PETS.

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

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Lyssavirus, unspecified	Classical rabies virus (genotype 1)	European Bat Lyssavirus - unspecified	European Bat Lyssavirus 1 (EBL 1)	European Bat Lyssavirus 2 (EBL 2)
Raccoons - wild	NRL	Animal	1	0	0	0	0	0	0
Bats - wild - Surveillance [1)]	NRL	Animal	1095	1	0	0	0	0	1
Cats - Monitoring (At quarantine)	NRL	Animal	9	0	0	0	0	0	0
Dogs - Monitoring (At quarantine)	NRL	Animal	14	0	0	0	0	0	0
Foxes - wild - Monitoring	NRL	Animal	2	0	0	0	0	0	0
Rabbits	NRL	Animal	1	0	0	0	0	0	0
Zoo animals, all [2)]	NRL	Animal	5	0	0	0	0	0	0

Comments:

[1)] Passive surveillance programme

[2)] Mongoose (1), red kangaroo (2), primates (2)

Footnote:

NRL = National Reference Laboratory

2.12 Q-FEVER

2.12.1 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

Although Q fever cases in humans are generally considered sporadic, a number of outbreaks have been reported. Most recently, these included an outbreak in Cheltenham in 2007 (32 confirmed cases), thought to be due to wind-borne spread from a farm source, and an outbreak at a meat processing plant in Scotland in 2006 (142 cases), thought to be caused by airborne transmission from a sheep lairage.

Overall, in the 10 year period from January 1999 to December 2008, a total of 1667 cases of Q fever (including acute, chronic and past infections) were reported in the UK. Of these, 1126 were considered "new diagnoses". This corresponds to an overall UK mean
annual incidence rate of 0.18 cases per 100,000 population/year. Mean annual incidence rates during this period were substantially higher in Northern Ireland
(1.17 per 100,000/year) than in England and Wales (0.14 per 100,000/year) and Scotland (0.37 per 100,000/year).

The regional distribution of human cases is similar to the distribution and density of sheep populations, with the majority of cases reported from South West England, Wales, Scotland and Northern Ireland (although there were fewer human cases than might be expected in the northern regions of England).

Between 1999 and 2008, only one death directly attributable to Q fever infection was reported, although a second death that was possibly attributable to Q fever infection was also reported during this period.

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 birth products 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, which may be produced during birth 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 an ongoing outbreak of Q fever 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 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, DARD, 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).

2.12.2 Coxiella (Q-fever) in animals

A. C. burnetii in animal

Monitoring system

Sampling strategy

Government funded scanning surveillance programmes are delivered by the Veterinary Laboratories Agency (VLA), 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.

During 2009/2010, a seroprevalence study was carried out to establish the background level of Q fever infection in sheep and goats in Great Britain. Blood samples collected from approximately 6000 sheep and 500 goats during the 2008 routine Brucella screening programme were screened for this study.

Frequency of the sampling

Clinical diagnostic samples submitted by private veterinarians during disease investigations. Usually submissions received in abortion investigations.

Type of specimen taken

Other: tissue samples/cotyledons submitted for clinical diagnosis.
Blood samples used for the national prevalence survey

Diagnostic/analytical methods used

MZN staining, CF test, ELISA and PCR

Vaccination policy

Vaccination for Q fever infection is not currently utalised 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, DARD, 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.

Results of the investigation

There were 3 incidents of Q fever infection reported in 2009, following examination of clinical diagnostic samples submitted by private veterinary surgeons to government veterinary diagnostic laboratories

following detection of abortion in a herd/flock. 2 incidents were in cattle and 1 in goats - overall 3 farm premises involved. One of the cattle cases was an imported animal. The number of animal-level tests conducted (as recorded in the table) are the "diagnosable submissions" (i.e. abortion products submitted for diagnosis of cause of abortion and subjected to MZN stained smear examination, CF testing or PCR testing for Q fever). These incidents were all reported in Great Britain - there were no recorded incidents of Q fever diagnosis in Northern Ireland during the year.

The national survey for C. burnetii in sheep and goats in Great Britain included 5791 sheep and 522 goats tested using a newly validated ELISA test. For sheep, in total 53 animals tested positive for Q-fever, in 37 flocks. Therefore the animal prevalence is 0.915%; assuming a test sensitivity of 88% the true mean animal prevalence is 1.04% (95% confidence interval (CI): 0.909 – 1.17%); however, this estimate does not take into account clustering within herds. Flock prevalence was 9.66%. For goats, in total four animals in four flocks tested positive for Q-fever. Therefore animal prevalence is 0.781%; assuming a test sensitivity of 88% the true mean animal prevalence is 0.887% (95% confidence interval (CI): 0.482 – 1.29%); however, again this estimate does not take into account clustering within flocks. Flock prevalence was 2.82%. These results are preliminary results as the survey findings are still under analysis.

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

Through the general scanning surveillance carried out during 2008, 5 cases were identified in Great Britain (2 cattle, 2 sheep, 1 goat), 4 in 2007 and 7 in 2006.

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 unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii
Cattle (bovine animals) - at farm - Clinical investigations [1)]	VLA/AFBI	Animal	1373	2	2
Goats - at farm - Clinical investigations [2)]	VLA/AFBI	Animal	19	1	1
Goats - at farm - Survey - national survey [3)]	VLA	Herd	142	4	4
Sheep - at farm - Clinical investigations [4)]	VLA/AFBI	Animal	1709	0	0
Sheep - at farm - Survey - national survey [5)]	VLA	Flock	383	37	37

Comments:

[1)] 874 herds tested in total. 2 positive herds detected.
[2)] 15 herds tested in total. 1 positive herd detected
[3)] Seroprevalence survey. In total 522 animals tested.
[4)] 816 flocks tested in total. No positive flocks detected
[5)] Seroprevalence survey. 5791 animals in total tested

Footnote:

Clinical diagnostic samples submitted by private veterinary surgeons to the Veterinary Laboratories Agency (VLA), the Scottish Agricultural College (SAC) and the Agri-food and Biosciences Institute (AFBI)in 2009. Total units tested are the number of samples subjected to testing for Q fever, usually as part of abortion investigations.

A survey of seroprevalence of C. burnetii in sheep and goats in Great Britain was carried out in 2009/2010, using a newly validated ELISA test. The results are still under analysis so the results presented are preliminary results only. For sheep, 53 animals in 37 flocks tested positive for C. burnetii (flock prevalence of 9.66%). For goats, four animals in four herds tested positive for C. burnetii (herd prevalence 2.82%).

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

A survey was carried out in 2003 on a statically based sample of cattle, sheep and pigs arriving for slaughter at abattoirs in GB to determine the prevalence of foodborne pathogens in faecal samples (see report for 2003). Isolates of commensal E. coli were used from this survey for studies of antimicrobial resistance and these results were reported in 2004. Surveys of E. coli recovered from broilers (caecal contents taken from birds at slaughter at abattoirs) and E. coli recovered from turkey farms (boot swab sampling of litter) were completed over the periods January 2008 – January 2009 and October 2006 – September 2007 respectively. These surveys were primarily designed to determine the presence (and where appropriate the prevalence) of ESBL E. coli. In addition, a number of isolates resulting from submission of diagnostic samples have been tested for antimicrobial resistance in 2009 and the results are presented in the tables.

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.
Monitoring of veterinary E. coli isolates through the enhanced surveillance system instituted in 2006 continued in 2009.

Results of the investigation

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.

Resistance to the indicator cephalosporin cefpodoxime was detected in low numbers of E. coli isolates from clinical diagnostic samples from pigs and chickens in 2009; no resistance was detected in the isolates examined from turkeys. Resistance to cefpodoxime can be conferred by mechanisms other than ESBL or AmpC beta-lactamase production and the prevalence of ESBL E. coli in chicken and pig clinical

diagnostic samples remains low. A higher prevalence of resistance to cefotaxime was observed in E. coli from cattle than in the other farmed species in 2009 and most of the resistant isolates originated from calves. Resistance to cefotaxime may be conferred by ESBL or AmpC beta-lactamase production, or in some cases by other resistance mechanisms. Isolates resistant to the indicator cephalosporins (cefotaxime, ceftazidime or cefpodoxime) are subjected to further investigation, initially to determine whether they have a phenotype consistent with ESBL or AmpC beta-lactamase production. E. coli isolates with an AmpC phenotype are not characterised further. The final, confirmed figures for ESBL producing E. coli from animals in 2009 are not available at this stage. Previous visits to some affected farms on which ESBLs have been detected in E. coli in cattle have in some cases demonstrated links to potential human sources of infection for cattle.

The prevalence of resistance to enrofloxacin in E. coli isolates from cattle was 10% in 2009 and 2008, compared to 6.5% in 2007. Resistance to enrofloxacin was detected at a low prevalence in E. coli isolates from pigs (9%), chickens (6%) and turkeys (7%) in 2009. These figures can be compared with the figures for resistance to enrofloxacin in 2008 which were 7% (pigs), 3% (chickens) and 17% (turkeys); however, only low numbers of isolates were examined from turkeys.

Table Antimicrobial susceptibility testing of E. coli in Pigs

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	no	
Number of isolates available in the laboratory	236	
Antimicrobials:	N	n
Fluoroquinolones - Enrofloxacin	228	21
Aminoglycosides - Streptomycin	94	52
Trimethoprim + sulfonamides	236	118
Penicillins - Ampicillin	236	133
Tetracyclines - Tetracycline	236	187
Cephalosporins - Cefpodoxime	210	8

Footnote:

Data for Great Britain - England, Scotland and Wales only.
Isolates derived from clinical diagnostic samples

Table Antimicrobial susceptibility testing of E. coli in Cattle (bovine animals)

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	no	
Number of isolates available in the laboratory	1404	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	1203	593
Fluoroquinolones - Enrofloxacin	1309	135
Aminoglycosides - Streptomycin	1203	849
Trimethoprim + sulfonamides	1404	582
Penicillins - Ampicillin	1404	1068
Tetracyclines - Tetracycline	1404	1044
Cephalosporins - Cefotaxim	1201	160

Footnote:

Data for Great Britain - England, Scotland and Wales only.
Isolates derived from clinical diagnostic samples

Table Antimicrobial susceptibility testing of E. coli in Turkeys

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	no	
Number of isolates available in the laboratory	30	
Antimicrobials:	N	n
Fluoroquinolones - Enrofloxacin	30	2
Trimethoprim + sulfonamides	30	4
Penicillins - Ampicillin	30	14
Tetracyclines - Tetracycline	30	21
Cephalosporins - Cefpodoxime	30	0

Footnote:

Table reports the results of sampling for ESBL E. coli on turkey farms that was carried out during the EU baseline survey for Salmonella in turkey flocks. In total 308 fattening turkey holdings and 29 breeding turkey holdings were sampled.

Table Antimicrobial susceptibility testing of E. coli in Gallus gallus (fowl)

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	no	
Number of isolates available in the laboratory	199	
Antimicrobials:	N	n
Fluoroquinolones - Enrofloxacin	192	12
Trimethoprim + sulfonamides	199	53
Penicillins - Ampicillin	199	91
Tetracyclines - Tetracycline	199	95
Cephalosporins - Cefpodoxime	192	17

Footnote:

Survey for ESBL E.coli in the caecal contents of broilers at slaughter. 388 caecal samples tested.

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

Test Method Used
Disc diffusion

Standard methods used for testing
VLA historical standards based on British Society for Antimicrobial Chemotherapy standard

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol	VLA		13
Tetracyclines	Tetracycline	VLA		13
Fluoroquinolones	Enrofloxacin	VLA		13
Sulfonamides	Sulfonamide	VLA		13
	Sulfonamides	VLA		13
Aminoglycosides	Streptomycin	VLA		13
	Gentamicin	VLA		13
	Neomycin	VLA		13
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides	VLA		13
Cephalosporins	Cefotaxim	BSAC		29
Penicillins	Ampicillin	VLA		13

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 <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.03	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulfonamides	Sulfonamides		256	
Aminoglycosides	Streptomycin		16	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.25	
Penicillins	Ampicillin		8	

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 Enterococcus, non-pathogenic in Animals

Test Method Used	Standard methods used for testing

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

Table Cut-off values for antibiotic resistance of Enterococcus, non-pathogenic in Food

Test Method Used	Standard methods used for testing

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

Table Cut-off values for antibiotic resistance of Enterococcus, non-pathogenic in Feed

Test Method Used	Standard methods used for testing

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

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

The Health Protection Agency has operated a system of surveillance for general outbreaks of infectious intestinal disease (foodborne and non-foodborne) in England and Wales since 1992 (GSURV) and similar systems exist in Scotland and Northern Ireland.

Health Protection Agency Centre for Infections, Health Protection Scotland and Health Protection Agency Communicable Disease Surveillance Centre 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. Standardised questionnaires are then sent to the appropriate health authority/board in order to collect a minimum dataset on each outbreak. The investigating consultant is asked to complete the questionnaire when the outbreak investigation is complete. The completed questionnaires are returned to the national surveillance centre and the data entered onto a database. The following data are collected on the questionnaires:

- Health authority/board
- Date of outbreak
- Place of outbreak (hospital, restaurant, school, community etc.)
- Pathogen
- Mode of transmission (Foodborne, person to person, mixed, other)

For foodborne outbreaks:
- Food
- Evidence (microbiological, epidemiological)
- Numbers of cases, admitted to hospital, deaths

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 surveillance system from GSURV: eFOSS (HPA 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 some time 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 Specific Guidelines for 2009 Foodborne Outbreaks Reporting. 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).

The UK submitted all the foodborne outbreak data as possible outbreaks in 2007, 2008 and 2009. The reporting of only "possible" outbreaks is specifically a legal issue - publication of this information in these defined categories makes it difficult for the UK authorities to prosecute in instances where the foodborne outbreak has been reported as a "possible" outbreak as opposed to a "verified" outbreak. In addition, the legal aspects are not consistent with the criteria provided in the Guidance Document.

The UK only reports data for general outbreaks of foodborne infections. Data on household outbreaks are not included. This is because it is considered that household outbreaks will be under-ascertained by comparison with general outbreaks, not all household outbreaks involve aquiring 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.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

All UK outbreaks reported in 2009 have been classified as "possible" outbreaks so as not to legally compromise any prosecutions that might be undertaken by regulatory authorities.

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%). In total there were 3432 people affected by foodborne outbreak infections during the year (all showing symptoms but not necessarily positive microbiological isolations made). There were 111 hospitalisations and 8 deaths in total.

At the national level, there were 92 outbreaks of foodborne transmission in England and Wales reported to eFOSS in 2009, the highest number reported since 2001. There were 4 reported outbreaks in Scotland in 2009 and none in Northern Ireland.

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 Northern Ireland and Scotland in total, there were 99 people affected, 14 hospitalisations and 3 deaths. There was no information on number of cases affected, hospitalisations or deaths in England and Wales for 2008.

There were 25 possible foodborne outbreaks in 2007 in the UK. During the year, the most common causative agent identified in the outbreaks was Salmonella species (8 outbreaks). There were 387 people affected, 30 hospitalisations and 5 deaths recorded.

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

Following the implementation of measures to improve communication and data capture in England and Wales, the annual number of general foodborne outbreaks reported in 2009 increased compared to previous years. However, the number of outbreaks caused by specific pathogens mirrored reported increases in laboratory confirmed cases in 2009, the exception being Salmonella, where a decrease occurred in 2009. However, over half of the Salmonella outbreaks reported in 2009 (57%, 17/30) were caused by S. Enteritidis PT 14b which were linked to raw shell eggs imported into the UK and used in food service premises. (Reference: S. Enteritidis infections in England in 2009: national case control study report. Health Protection Report (4) 6 (12 February 2010). Available at: http://www.hpa.org.uk/hpr/archives/2010/news0610.htm#pt14b)

England and Wales:
In 76% (70/92) of the outbreaks, a food vehicle was identified. Poultry meat was most frequently identified (22/92, 24%), followed by composite/mixed foods (14/92, 15%) and crustacea & shellfish (12/92, 13%). Consumption of oysters (12/92, 13%) and poultry liver pate/parfait (9/92, 10%) were the most common specific foods identified in outbreaks during 2009. Salmonella outbreaks were most frequently linked with consumption of poultry meat (26%), composite/mixed foods (23%) and eggs (17%).From 17 norovirus outbreaks, 12 (70%) were linked to consumption of oysters (crustacea/shellfish category). 90% of Campylobacter associated food vehicles were poultry meat. VTEC O157 outbreaks were most frequently linked with red meat (57%) and in the 'other' pathogen/toxin category all outbreaks linked to consumption of finfish (all tuna) were attributed to scombrotoxin. The evidence implicating a food vehicle in these outbreaks included analytical epidemiology plus microbiological in 1% (1/92), microbiological evidence alone in 24% (22/92), analytical epidemiology alone in 11% (10/92) and descriptive epidemiology in 40% (37/92).

Scotland:
Consumption of tuna steaks was linked to a food-borne outbreak caused by scrombotoxin, with microbiological evidence (laboratory isolation of the agent in the food vehicle). Salmonella Typhimurium was linked to the consumption of burgers from a mobile retailer (descriptive epidemiological evidence). Pate was the implicated foodstuff (descriptive epidemiological evidence) in an outbreak of Campylobacter infection and duck and eggs were implicated as the foodstuff (descriptive epidemiological link) involved in an outbreak of Salmonella Typhimurium at a hotel during the year.

Relevance of the different type of places of food production and preparation in outbreaks

England and Wales:
Analysis of the data for England and Wales for 2009 indicated that foodborne outbreaks more often occurred in the food service sector (73/92, 79%), followed by institutional/residential (9/92, 10%), retail (6/92, 7%), and 'other' settings (e.g. private function and community) (3/92, 3%). Of the food service sector associated outbreaks, restaurant and takeaway premises accounted for almost two-thirds (47, 64%) of these, with the majority serving Chinese (12/47, 26%), mixed (8/47, 17%) or Indian cuisines (6/47, 13%). Specifically by pathogen, 82% (23/28), 88% (14/16), and 84% (11/13) of Salmonella, norovirus and Campylobacter outbreaks, respectively, were linked to food service premises. Escherichia coli O157 (VTEC O157) outbreaks were in the main also linked to food service (3/7, 43%) and retail premises (2/7, 29%).

Factors that contributed to the outbreak were reported in 77% (71/92) of the foodborne outbreaks. Cross contamination was the most commonly reported factor (29%, 28/98) in the outbreaks followed by inadequate heat treatment/cooking (22%, 22/98), poor storage (i.e. storage too warm or too long) (17%, 16/92), an infected food handler (10%, 10/98), poor hand-washing facilities (9%, 9/98), poor personal hygiene (7%, 8/98) and inadequate chilling (4%, 4/98). Salmonella outbreaks were most frequently caused by a cross contamination event (39%) or inadequate heat treatment of the implicated food (24%), as were Campylobacter outbreaks (46% and 46% respectively) and VTEC O157 outbreaks (29% and 43%, respectively). The main contributory factor reported for norovirus foodborne outbreaks included infected food handlers (57%).

Scotland:
In Scotland, the possible food-borne outbreaks recorded during the year occurred at the following settings: a shop (1), a mobile retailer (1), a restaurant (1) and a hotel (1).

Additional information

Evidence from reported foodborne outbreaks occurring in the UK during 2009 has shown that the majority of outbreaks were linked specifically to food service premises, and that these were related to cross

contamination in the kitchen and/or inadequate cooking of the food. The Health Protection Agency has recommended that caterers 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 Salmonella and other pathogens into the food service sector are needed in order to reduce the risk of infection.

Table Foodborne Outbreaks: summarised data

	Total number of outbreaks	Outbreaks	Human cases	Hospitalized	Deaths	Number of verified outbreaks
Bacillus	2	2	26	0	0	0
Campylobacter	14	14	321	4	0	0
Clostridium	3	3	273	0	0	0
Escherichia coli, pathogenic	7	7	76	12	0	0
Foodborne viruses	19	19	1057	5	2	0
Listeria	1	1	14	4	1	0
Other agents	9	9	127	1	1	0
Parasites	0	0	0	0	0	0
Salmonella	30	30	1227	73	4	0
Staphylococcus	3	3	64	12	0	0
Unknown	8	8	247	0	0	0
Yersinia	0	0	0	0	0	0