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 2007

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **United Kingdom**
Reporting Year: **2007**
Institutions and laboratories involved in reporting and monitoring:

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 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 Executive Environment and Rural Affairs Department	Devolved Administration for Scotland	Overview

Food Standards Agency FSA	The Food Standards Agency is an independent government department set up by an act of parliament in 2000 to protect the public health and consumer interest in relation to food	Data on zoonotic agents in food in the UK
Health Protection Scotland HPS	Health Protection Scotland established by Scottish Executive to strengthen and coordinate health protection in Scotland. HPS was formed on 11 November 2004	
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[1]. 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 2007. 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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[1] 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:

Official National Statistics - 1st June 2007 Agricultural Census (annual) and Gallus gallus breeding flock data from National Control Programme implementation. Cattle data for Great Britain only and sourced from the Rapid Analysis and Detection of Animal-Related Risk (RADAR) system of surveillance information management.
The RADAR system captures and processes data from a range of sources including the British Cattle Movement Services' (BCMS) Cattle Tracing System (CTS). 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 Great Britain to be traceable for disease control purposes. CTS records births, deaths and all movements of cattle as well as breed types and gender. RADAR takes this information and processes it so that population statistics can be derived and analysed.

Dates the figures relate to and the content of the figures:

The figures given relate to census data as at 1st June 2007. The Cattle population data for Great Britain derived from RADAR as of 28th May 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 (Dir. 99/ 2003/ EC and Reg. 2160/ 2003/ EC)

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

Cattle data:
From the cattle breed recorded on an animal's passport, RADAR categorises the animal to a purpose (beef or dairy or dual purpose).
The figures given in the table are for cattle numbers in Great Britain only. The Cattle Tracing System (CTS) database does not capture data at ‘herd’ level, so no data is available for herd numbers in Great Britain. Premises 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 2007. These agricultural premises include markets, holding centres and abattoirs.
Slaughter figures are calculated as the number of deaths occurring at premises classified as ‘slaughterhouse MP & cold store’ or ‘slaughterhouse red meat’ by CTS. The slaughter figures are for the whole 2007 calendar year.
Calves are defined as animals less than or equal to 12 months of age
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 (Dir. 99/ 2003/ EC and Reg. 2160/ 2003/ EC)

National evaluation of the numbers of susceptible population and trends in these figures:

In 2007, the number of cattle in the UK decreased by approximately 2.6%. Total sheep and lambs also fell in 2007 by 2.2%. The size of the sheep breeding flock continued the decline seen over the past 3 years. From June 2006 to June 2007 the breeding flock fell by 3%. Lambs fell by 1%. The total number of pigs in 2007 decreased by 2.2% compared with 2006. The pig breeding herd continued to decline and is currently 537,000. This is a 4% decrease on numbers at June 2006.
The layer flock numbers fell by 5.2% in 2007, with an even more dramatic reduction in growing pullet numbers by 7.2% for the year compared to 2006. There was also a decrease in broilers in 2007 showing a reduction of 1.7% compared with 2006.
(Source for above Agricultural Census data June 2007)

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

Table Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks	Year*	Number of slaughtered animals	Year*	Livestock numbers (live animals)	Year*	Number of holdings	Year*
Cattle (bovine animals)	dairy cows and heifers (1)			287093		2393260			
	meat production animals (2)			1761878		5661267			
	others (3)			201228		354937			
	calves (under 1 year) (4)			67029		2469397			
	in total (5)			2296284		8998377		79760	
Deer	farmed - in total					30000			
Gallus gallus (fowl)	parent breeding flocks for egg production line	101							
	grandparent breeding flocks for egg production line	79							
	breeding flocks, unspecified - in total	214							
	elite breeding flocks for egg production line	4							
	grandparent breeding flocks for meat production line	120							
	parent breeding flocks for meat production line	1055							
	breeding flocks for meat production line - in total	1235				8226000			
	laying hens (6)	8000				36257000			
	elite breeding flocks for meat production line	60							
	broilers					108753000			
	breeding flocks for egg production line - in total	184				2316000			
	in total			798000000					
Goats	in total					95000			
Pigs	breeding animals					537000			
	fattening pigs					4292000			
	in total					4834000			
Sheep	animals under 1 year (lambs)					16855000			
	animals over 1 year (7)					17090000			
	in total					33946000			
Solipeds, domestic	horses - in total					384000			
Turkeys	in total (8)					3832000			
Poultry, unspecified	in total (9)					6322000			

(1): Great Britain only
(2): Great Britain only. All meat producing animals in total including calves
(3): Great Britain only. Including male dairy cattle over 1 year old, dual purpose animals and unknown purpose/ breed

(4): Great Britain only. All calves (dairy, beef and dual purpose)
(5): Great Britain only
(6): Includes growing pullets (from day old to point of lay) and laying flock (production stage).
(7): Includes breeding ewes, rams and other sheep over 1 year old
(8): England, Wales and Northern Ireland only
(9): Incuding ducks, geese and other unspecified poulty

Footnote

Animal numbers data for the UK based on Annual Agricultural Census 1st June 2007 for all except the cattle data. Cattle data for Great Britain only. Cattle data sourced from RADAR. These figures have been sourced from the Cattle tracing System (CTS) in England and Wales and survey data in Scotland. In CTS, the breed of the cattle is used to identify a breed purpose.

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

Salmonellas have been recognised as important pathogens and 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.

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

There was a decrease in the number of cases of human salmonellosis in 2007 (13,213) compared to 2006 (14,060), and S. Enteritidis and S. Typhimurium remain the two most common serotypes. There has been an overall trend of reduction of reports over recent years.
Only 1 positive incident of Salmonella of one of the Top-5 serovars was discovered in adult breeding flocks in 2007. This was a positive result for S. Typhimurium in a parent Broiler Breeder (Meat Production Line) flock. In Great Britain, across both Egg production and Meat production line categories, 1395 flocks were subject to testing during the year. 11 positive incidents (all tested Salmonella types) with 1 positive incident from the Top 5 Salmonellae of public health significance as designated by the legislation: S. Enteritidis, S. Typhimurium, S. Infantis, S. Hadar and S. Virchow, were detected in this number of flocks providing estimated prevalence values of 0.79% and 0.07% respectively. In Northern Ireland, 223 breeding flocks were tested. There were 20 isolations of Salmonella in total, with no isolations of S. Enteritidis, S. Typhimurium or the other 3 important serotypes. This results in estimated prevalence values for the whole of the UK of 0.06% for the 5 Salmonellae of public health significance and for all Salmonella species of 0.5%
Results from routine monitoring for Salmonella in animals indicated that there was an increase in the number of reported incidents of Salmonella in cattle and pigs, with an increase in reported incidents in sheep. There was also an increase in reports of Salmonella in poultry in general in 2007. In chickens the most common serotype reported in 2007 was S. Mbandaka. In cattle the most frequently isolated serotypes were S. Dublin and S. Typhimurium in the UK in 2007. As in previous years, the most common serovar in sheep in the UK in 2007 was S. enterica subspecies diarizonae serovar 61:k:1,5,7 and in pigs S. Typhimurium and S. Derby. The most commonly isolated serovar from ducks and geese in 2007 was S. Indiana and in turkeys it was S. Derby.
Two baseline surveys for Salmonella prevalence were carried out in 2007 - one in slaughter pigs (Decision 2006/ 668/ EC) and one in turkey flocks (2006/ 666/ EC)
Food:
A three year Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA) study (November 2004 to October 2007) to provide surveillance data on the pathogens Salmonella and Campylobacter: surveillance of these pathogens in raw whole chicken on retail sale. Results for 2007 are not available to report.
The results of three food surveys conducted during 2007 have been published:
- Study to determine the level of Salmonella contamination of fresh herbs at retail - a total of 3757 fresh herbs were examined, of which 0.5% (18) were contaminated with Salmonella spp.

- Study to determine the level of Salmonella contamination of salad vegetables and sauces from kebab take-aways. A total of 1213 and 1208 salad and sauce samples, respectively from 1277 premises were examined between June and July 2007. Of 1213 salad samples, one (0.1%) was contaminated with Salmonella spp. (S. Kentucky). Of 1208 sauce samples. one (0.1%) was contaminated with Salmonella spp. (S. Agbeni).
- Study to determine the level of Salmonella contamination of dried seeds at retail.During October – February 2008, 2589 dried seeds samples were examined, of which 0.8% (21) were contaminated with Salmonella spp. The isolates comprised 14 serotypes, of which S. Drypool was the predominant type (22%).

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

Food
The UK government undertakes national microbiological food surveillance. The priorities of these surveys are closely linked to a strategy to reduce the level of foodborne disease. Surveys are carried out regularly on a variety of foods and processes to gather data on the possible effects of processing changes on pathogens and to monitor high-risk foods linked to human cases/ outbreaks and the emergence of new pathogens. In addition to national surveillance Wales, Scotland and Northern Ireland also have separate microbiological food surveillance programmes within their own regions.
The UK government also collates returns from all UK food authorities on official food enforcement activities in line with Regulation (EC) No 882/ 2004 on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in this report.
Antimicrobial sensitivity
The surveillance programme for antimicrobial resistance in farm animals in the UK can be divided into three broad areas, providing different and complementary information. The first of these is the surveillance programme for antimicrobial resistance in bacteria recovered from animals after slaughter for human consumption. No survey was carried out in 2007. The Veterinary Laboratories Agency (VLA) Salmonella surveillance programme and a similar programme in Northern Ireland, is the second and captures data from incidents reported under statute (the Zoonoses Order 1989). Salmonella isolates from new incidents of infection with this organism in farm animals are examined. The third programe covers England and Wales and comprises a national antimicrobial sensitivity database introduced to the network of 14 VLA regional laboratories throughout England and Wales in 1998 and which collects data from all of the sensitivity tests that are performed on clinical samples. Isolates were also obtained for testing from the surveys of slaughter pigs and turkeys which were carried out during the year. There is a need to ensure that an alert system is in place to rapidly identify emergent resistance at the earliest opportunity. This is best achieved both by surveillance of herds with clinical disease problems, where the organisms are likely to be under greatest selective pressure having been subjected to treatment and by the surveillance of livestock at the point of slaughter.

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.
England and Wales:
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 which has fallen from over 15,000 reports in 1997 to 1973 reports in 2006 in England and Wales. This is a slight increase on the 1902 PT4 isolates reported in 2005. There has also been a pronounced downward trend in the incidence of S. Typhimurium which has declined from 6554 cases in 1995 to 1485 cases in 2006. During this period the incidence of S. Typhimurium DT104 also fell from 3646 to 290 cases per year in England and Wales. This subtype frequently exhibits resistance to a number of antibiotics.
Scotland:
Laboratory reports of Salmonellosis increased from 2015 in 1986 to 3349 in 1997. Since then the numbers have declined. In 2006 1035 cases were reported, a reduction compared to the 1127 cases reported in 2005 and the 1143 cases reported in 2004.
Northern Ireland:
The number of reports of Salmonella received in 2006 was 203, an increase on the 175 reported in 2005, which was the lowest annual reported since 1993. Reports of S. Enteritidis have decreased slightly each year between 2002 and 2005 with 83 reports being received in 2005 (98 in 2002).

Results of the investigation

There were 13,213 reported cases of salmonellosis in humans in 2007, 52.5% of which were S. Enteritidis infections and 13.6% were S. Typhimurium infections. Of the Salmonella reports received in 2007, 2776 (21%) were thought to have been acquired outside the UK.
England and Wales:
The incidence of Salmonellosis has been declining since 1997 when a total of 31,480 laboratory confirmed cases were reported to national surveillance. In 2007, the annual total was 12,029, of which 54% were due to S. Enteritidis. In comparison to 2006, this is an overall decrease in the number of cases and a reduction in the number of cases due to S. Enteritidis (12,822 cases of which 56% were due to S. Enteritidis in 2006). There were 1691 PT4 cases. S. Typhimurium remains the second most commonly isolated serotype in humans accounting for 13% of all laboratory confirmed cases of Salmonellosis recorded in 2007 in England and Wales.
Scotland:
In 2007, 1030 cases were reported, a very small reduction on the 1035 cases reported in 2006. S. Enteritidis accounted for 42% and S. Typhimurium for 21% of all cases. S. Enteritdis PT 4 was the most commonly isolated serotype (103 isolates), while PT 21 was the second most common (73 isolates). Of the S. Typhimurium isolates, DT2 was most commonly detected (42 isolates).
Northern Ireland:
The number of reports of Salmonella received in 2007 was 154, a reduction on the 203 reported in 2006. 47 of these or 31% were S. Enteritidis infection and 40 (26%) were S. Typhimuirum infections.

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.

Table Salmonella in humans - Species/ serotype distribution

Salmonella	Cases 13213	Cases Inc. 0	Autochthon cases 10320	Autochthon Inc. 0	Imported cases 2776	Imported Inc. 0	Unknown status 117
S. Enteritidis	6941		5682		1225		34
S. Typhimurium	1796		1430		331		35
Salmonella spp., unspecified	4476		3208		1220		48

Footnote

Incidence per 100,000 based on UK population of 60,587,300 in 2007.

Table Salmonella in humans - Age distribution

Age Distribution	S. Enteritidis			S. Typhimurium			Salmonella spp.		
	All	M	F	All	M	F	All	M	F
<1 year	186	101	77	79	38	32	666	334	281
1 to 4 years	829	361	386	231	124	97	1510	688	703
5 to 14 years	871	426	412	212	110	94	1366	686	623
15 to 24 years	1037	506	498	291	130	148	1876	860	950
25 to 44 years	1772	840	892	407	192	207	3373	1561	1734
45 to 64 years	1557	773	748	364	173	180	2909	1378	1461
65 years and older	655	266	370	201	98	99	1438	608	789
Age unknown	34	16	15	11	6	4	75	35	28
Total :	6941	3289	3398	1796	871	861	13213	6150	6569

Footnote

Some cases are gender unknown

Table Salmonella in humans - Seasonal distribution

Month	S. Enteritidis	S. Typhimurium	Salmonella spp.
	Cases	Cases	Cases
January	587	134	1117
February	274	107	674
March	287	103	729
April	378	92	793
May	359	126	836
June	590	158	1095
July	861	153	1395
August	926	212	1581
September	940	208	1577
October	910	175	1553
November	593	163	1169
December	236	165	694
not known	0	0	0
Total :	6941	1796	13213

2.1.3. Salmonella in foodstuffs

A. Salmonella spp. in eggs and egg products

Monitoring system

Type of specimen taken

Eggs at retail

Other: Egg shell and contents tested separately

Results of the investigation

No results to report in 2007

B. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At retail

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.
There are no results to report for 2007

Frequency of the sampling

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At retail

Fresh meat

Diagnostic/ analytical methods used

At retail

Other: HPA Standard Microbiological Food Method for detection of Salmonella spp. which is based on the British Standard method BS EN 6579 Microbiological examination of food and animal feeding stuffs - Horizontal method for the detection of Salmonella spp. London: British Standards Institution (BSI) 2002

Results of the investigation

No results to report for 2007

C. Salmonella spp. in turkey meat and products thereof

Results of the investigation

No results to report in 2007.

D. Salmonella spp. in pig meat and products thereof

Results of the investigation

No results to report in 2007.

E. Salmonella spp. in bovine meat and products thereof

Results of the investigation

No results to report in 2007.

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Agona	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Senftenberg
Fruits and vegetables										
precut										
ready-to-eat (1)	HPA/ LACORS study	single	100g	1213	1		0	0	1	
Sauce and dressings										
- at catering - Surveillance (2)	HPA/ LACORS study	single	100ml	1208	1		0	0	1	
Seeds, dried										
- at retail - Surveillance	HPA/ LACORS study	single	100g	3735	23		0	0	23	
Spices and herbs										
fresh										
- at retail - Surveillance	HPA/ LACORS study	single	100g	3760	18		0	0	19	

(1) : Salad samples
(2) : Ready-to-eat sauces

Footnote

The fresh spices and herbs at retail survey - 18 samples detected as positive and in total 19 serovars isolated (1 sample more than 1 serovar isolated).

2.1.4. Salmonella in animals

A. Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens

Monitoring system

Sampling strategy

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

In Great Britain (England, Wales, Scotland) Directive 99/ 2003 and Regulation 2160/ 2003 is implemented by the Zoonoses Order, 1989, and by the Control of Salmonella in Poultry Order 2007
Directive Directive 99/ 2003 and Regulation 2160/ 2003 is implemented in Northern Ireland through the Poultry Breeding Flocks and Hatcheries order (Northern Ireland) 2007 and the Zoonoses Order (Northern Ireland) 1991.

Laying hens flocks

In layer flocks all isolations of Salmonella must be reported to the Competent authority (under the Zoonoses Order 1989 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].
In Great Britain holdings of layer flocks where S. Enteritidis and S. Typhimurium have been isolated are given advice on Salmonella control and a visit to carry out an epidemiological enquiry as appropriate.
The National Control Programme for Salmonella in laying flocks of Gallus gallus will be put in place from the beginning of 2008.

Frequency of the sampling

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

Other: Sampled by the operator on the day of arrival (within 72 hours of age).

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

Other: Sampled by operator at 4 weeks and 2 weeks before moving to laying phase.

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

Every 2 weeks during the production period, with 3 official tests carried out per year. weeks

Laying hens: Day-old chicks

Other: No official sampling. Voluntary operator monitoring can consist of hatchery debris, chick box liners, dead on arrival chicks etc

Laying hens: Rearing period

Other: No official sampling.

Laying hens: Production period

Other: No official sampling.

Laying hens: Before slaughter at farm

Other: No official sampling

Laying hens: At slaughter

Other: No official sampling

Eggs at packing centre (flock based approach)

Other: No official sampling

Type of specimen taken

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

Other: NCP samples as per Directive. Samples comprising the following from each hatchery supplying the chicks: chick box liners (one liner per 500 chicks to maximum 10 liners) and all chicks dead on arrival (up to 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

Other: NCP samples as per Directive. Samples include a minmum of 2 pairs of boot swabs or a composite faeces sample. Other voluntary operator monitoring can include boot swabs, dust samples etc.

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

Other: Official samples as per Directive. Samples are 5 pairs of boot swabs per flockor 2 composite faeces samples of at least 150g.

Laying hens: Day-old chicks

Other: No official sampling. Cull chicks, meconium, private samples may be fluff, environmental samples and others, used as monitoring of parent layer breeder.

Laying hens: Rearing period

Other: No official sampling. Voluntary operator sampling can consist of boot swabs, litter samples, dust etc

Laying hens: Production period

Other: No official sampling. Voluntary operator sampling can consist of boot swabs, litter samples, dust etc

Laying hens: Before slaughter at farm

Other: No official sampling

Laying hens: At slaughter

Other: No official sampling.

Eggs at packing centre (flock based approach)

Other: No official sampling.

Methods of sampling (description of sampling techniques)

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

Samples taken by operators are sent to authorised laboratory for examination. Isolates are sent to the NRL for serotyping and phage typing and priority is given to any isolate culture result Group B or Group D.

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

Samples taken by operators are sent to authorised laboratory for examination. Isolates sent to NRL for serotyping and phage typing (as priority if a Group B or Group D has been cultured).

Breeding flocks: Production period

Samples taken by operators are sent to authorised laboratory for examination. Isolates sent to NRL for serotyping and phage typing as priority if a Group B or Group D has been cultured. Official samples taken are sent or delivered same day to National Reference Laboratory for culture.

Laying hens: Day-old chicks

No official sampling carried out in 2007. Samples taken by operators for routine monitoring purposes are sent to authorised laboratory for examination.

Laying hens: Rearing period

As above

Laying hens: Production period

As above

Laying hens: Before slaughter at farm

As above

Laying hens: At slaughter

As above. There were no national abattoir surveys carried out in 2007

Eggs at packing centre (flock based approach)

No official sampling carried out at the hatchery in 2007. Samples taken by operators for routine monitoring purposes are sent to authorised laboratory for examination. Isolates sent to NRL for serotyping and phage typing as priority if a Group B or Group D has been cultured.

Case definition

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

Laying hens: Day-old chicks

Isolation of a Salmonella from the layer flock will be recorded as positive. Trace back to the breeding flock which produced the day old layer chick will be conducted and the source breeding flock investigated.

Laying hens: Production period

No official testing is carried out. A report of Salmonella under the legislation is classed as positive on the monitoring database; no confirmatory testing is carried out.

Laying hens: At slaughter

No official testing is carried out. A report of Salmonella under the legislation is classed as positive on the monitoring database; no confirmatory testing is carried out.

Eggs at packing centre (flock based approach)

No official testing is carried out. A report of Salmonella under the legislation is classed as positive on the monitoring database; no confirmatory testing is carried out.

Diagnostic/ analytical methods used

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

Bacteriological method: Modified ISO 6579

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

Bacteriological method: Modified ISO 6579

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

Bacteriological method: Modified ISO 6579

Laying hens: Day-old chicks

Bacteriological method: Modified ISO 6579

Laying hens: Rearing period

Other: Varius bacteriological

Laying hens: Production period

Bacteriological method: Various bacteriological

Laying hens: Before slaughter at farm

Bacteriological method: Various bacteriological

Laying hens: At slaughter

Bacteriological method: Various bacteriological

Eggs at packing centre (flock based approach)

Other: Various

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 less used in the layer breeder sector than in the broiler breeder sector.

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 are vaccinated with a Salmonella vaccine.

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 and in the production, handling and transport of feed, as well as advice on rodent control have been published in collaboration with the industry.

Laying hens flocks

A code of good practice in the control of Salmonella in laying flocks has been published in collaboration with the industry.

Control program/ mechanisms

The control program/ strategies in place

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

Directive 99/ 2003/ EC and Regulation 2160/ 2003/ EC lay down harmonised rules for the monitoring and control of Salmonella Enteritidis and Salmonella Typhimurium in breeding flocks of domestic fowl.The Directive 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 and Wales and Northern Ireland). This implements the National Control Programme (NCP) for Breeding Flocks (of chickens – Gallus gallus) required by Article 5 of Regulation (EC) no 2160/ 2003, to meet the target for reduction in Salmonella prevalence set out in Regulation (EC) no 1003/ 2005.
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 S. Typhimurium or S. Enteritidis according to the protocol outlined above 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. If the flock is compulsorily slaughtered 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.

Laying hens flocks

There is no official control plan for Salmonella in layer flocks although there is an industry operated scheme which covers most of the national egg production. If Salmonella Enteritidis or Salmonella Typhimurium is isolated from a commercial laying flock, the premises is normally visited and advice is given on measures that can be taken to control infection on the premises and to prevent transmission of infection to subsequent flocks. The National Control Programme in laying flocks will commence in early 2008.

Measures in case of the positive findings or single cases

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

Any breeding flock found to be infected with S. Typhimurium or S. Enteritidis according to the protocol outlined above 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. If the flock is compulsorily slaughtered 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.

Laying hens flocks

If Salmonella Enteritidis or Salmonella Typhimurium is isolated from a commercial laying flock, the premises is normally visited and advice is given on measures that can be taken to control infection on the premises and to prevent transmission of infection to subsequent flocks.

Notification system in place

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 on request.
- samples (including live birds) may be taken for diagnosis
- movement restrictions and isolation requirements may be imposed
- provision for compulsory slaughter and compensation where Salmonella infection is confirmed in a breeding flock of Gallus gallus.
- compulsory cleansing and disinfection of premises and vehicles

The main provisions of the Control of Salmonella in Poultry Order 2007 are:
- registration of breeding flocks and hatcheries on a once and for all basis free of charge
- minimum flock size requiring registration 250 birds
- hatchery with a total incubator capacity of 1000 eggs or more and which is used for hatching eggs must register
- it is a requirement of the National Control Programme that owners record the movements of birds, chicks or eggs onto and off the premises
- sampling for monitoring during the rearing and production period
- the owner/ operator is required to maintain records of the dates, type of samples, flock sampled and the test results.
- monitoring of flocks using sampling regimes and bacteriological methods of sampling laid down in the legislation
- testing of samples to be carried out at authorised laboratories.

Results of the investigation

Only 1 positive incident of Salmonella of one of the Top-5 serovars was discovered in adult breeding flocks in 2007. This was a positive result for S. Typhimurium in a parent Broiler Breeder (Meat Production Line) flock. There were 184 adult layer breeder flocks tested according to the requirements of the NCP in 2007. There was only 1 isolation of Salmonella during the year across the Egg production line categories, an S. Dublin in a layer parent flock.
During 2007 there were 67 isolations of Salmonella in commercial laying flocks in the UK detected during routine monitoring/ surveillance carried out by farm business operators. Of these 31 were S. Enteritidis and 3 were S. Typhimurium. Enhanced surveillance for Salmonella in laying flocks occurred during the year in preparation for the start of the National Control Programme for Salmonella in laying flocks in 2008. Advice was given to the operators on control of Salmonella and

the codes of good practice to help control the introduction of Salmonella and its spread.

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

The levels of Salmonella Enteridis in layer breeder flocks in the UK remains at very low levels with no confirmed reports in 2007. Likewise there were no reports of S. Typhimurium, S. Infantis, S. Virchow or S. Hadar. In total the only report of a salmonella isolarted from the layer breeder line in 2007 was 1 S. Dublin isolation.
In the UK in 2006 there were no S. Enteritidis, S. Hadar, S. Infantis, or S. Virchow isolated from the breeding sector. In a non-commercial back-yard layer breeding flock there was 1 report of a S. Typhimurium DT40 isolate confirmed in a clinical diagnostic sample. Advice was given but no further action could be taken as the flock, being less than 200 chickens, did not fall within the juristiction of relevent legislation for the control of Salmonella of human health significance in breeding flocks.
In layers the total number of routine reports remains low and this coupled with the voluntary nature of the sampling makes it difficult to establish any trend.
The majority of egg production in the UK has voluntarily operated to an industry code of practice for a number of years. In addition to a number of measures the code requires vaccination of flocks against Salmonella. The indications are that the level of Salmonella on layer farms is declining, if we take into account the number of reported cases of human Salmonellosis and the results of previous and recent surveys for the presence of Salmonella in UK produced eggs.

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

Salmonella Enteritidis and Salmonella Typhimurium are the most common isolates found in humans.

B. Salmonella spp. in Gallus gallus - breeding flocks for meat production and broiler flocks

Monitoring system

Sampling strategy

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

In Great Britain (England, Wales, Scotland) Directive 99/ 2003/ EC and Regulation 2160/ 2003/ EC are implemented by the Zoonoses Order, 1989, and by the Control of Salmonella in Poultry Order 2007
Directive Directive 99/ 2003/ EC and Regulation 2160/ 2003/ EC is implemented in Northern Ireland through the Poultry Breeding Flocks and Hatcheries (Northern Ireland) Order 2007 and the Zoonoses Order (Northern Ireland) 1991.
In broiler flocks all isolations of Salmonella must be reported to the Competent authority (under the Zoonoses Order 1989 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]. Under Northern Ireland controls, any broiler flock, where birds infected with Salmonella Typhimurium or Salmonella Enteritidis are located, is restricted and the birds moved to slaughter under

licence. The breeder flock that contributed to the hatch will be traced and sampled as necessary.

Broiler flocks

In broiler flocks all isolations of Salmonella must be reported to the Competent authority (under the Zoonoses Order 1989 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]. Under Northern Ireland controls, any broiler flock, where birds infected with Salmonella Typhimurium or Salmonella Enteritidis are located, is restricted and the birds moved to slaughter under licence. The breeder flock that contributed to the hatch will be traced and sampled as necessary.
In Great Britain holdings of broiler flocks where S. Enteritidis and S. Typhimurium have been isolated are given advice on Salmonella control and a visit to carry out an epidemiological enquiry as appropriate.
The National Control Programme for Salmonella in broiler flocks of Gallus gallus will be put in place in 2009.

Frequency of the sampling

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

Other: sampled by the operator on the day of arrival (within 72 hours age).

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

Other: Sampled by operator at 4 weeks age and 2 weeks before moving to the laying phase.

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

Every 2 weeks during the production period, with 3 official tests carried out per year weeks

Broiler flocks: Day-old chicks

Other: No offical sampling. Voluntary operator monitoring on farm and at hatchery.

Broiler flocks: Rearing period

Other: No official sampling

Broiler flocks: Before slaughter at farm

Other: No official sampling but private samling common 1 - 2 weeks before slaughter

Broiler flocks: At slaughter (flock based approach)

Other: No official sampling, private sampling may take place

Type of specimen taken

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

Other: NCP samples as per Directive. Samples comprising the following from each hatchery supplying the chicks: chick box liners (one liner per 500 chicks to maximum 10 liners) and all chicks dead on arrival (up to maximum of 60). Operator voluntary extra sampling can include hatchery debris, hatchery fluff, dust etc.

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

Other: NCP samples are per Directive. Samples include a minimum of 2 pairs of boot swabs per flock or a composite faeces sample. Private voluntary samples may be boot swabs, dust, litter etc.

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

Other: NCP and official samples as per Directive. Samples are 5 pairs of boot swabs per flock or 2 composite faeces samples of at least 150g.

Broiler flocks: Day-old chicks

Other: No offical sampling or NCP. Voluntary private operator monitoring can consist of hatchery debris, chick box liners, dead on arrival chicks, meconium etc.

Broiler flocks: Rearing period

Other: No official or NCP sampling. Private samples, range of types but faeces, boot swabs, litter common

Broiler flocks: Before slaughter at farm

Other: No official or NCP sampling. Private samples, boot swabs, litter common.

Broiler flocks: At slaughter (flock based approach)

Other: Private samples, neck skin common

Methods of sampling (description of sampling techniques)

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

Samples taken by operators are sent to authorised laboratory for examination. Isolates sent to NRL for serotyping and phage typing as priority if a Group B or Group D has been cultured.

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

As above

Breeding flocks: Production period

Samples taken by operators are sent to authorised laboratory for examination. Isolates sent to NRL for serotyping and phage typing as priority if a Group B or Group D has been cultured. Official samples taken are sent or delivered same day to National Reference Laboratory for culture.

Broiler flocks: Day-old chicks

No official sampling carried out in 2007. Samples taken by operators for routine monitoring purposes are sent to authorised laboratory for examination.

Broiler flocks: Rearing period

As above

Broiler flocks: Before slaughter at farm

As above

Broiler flocks: At slaughter (flock based approach)

As above

Case definition

Broiler flocks: Before slaughter at farm

An isolation reported under the Zoonoses Order is recorded as positive. No confirmation testing is carried out as no official action is taken.

Diagnostic/ analytical methods used

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

Bacteriological method: Modified ISO 6579:2002

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

Other: Modified ISO 6579:2002

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

Other: Modified ISO 6579:2002

Broiler flocks: Day-old chicks

Other: Modified ISO 6579:2002

Broiler flocks: Rearing period

Bacteriological method: Various methods may be used

Broiler flocks: Before slaughter at farm

Bacteriological method: Various methods may be used

Broiler flocks: At slaughter (flock based approach)

Bacteriological method: Various methods 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. In practice they tend to be used at the parent level.

Broiler flocks

There are no restrictions on the use of Salmonella vaccines which have a Marketing Authorisation. It is believed that vaccination of broiler flocks is rare.

Other preventive measures than vaccination in place

Broiler flocks

Codes of good practice in the contol 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 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 Enteritidis and Salmonella Typhimurium in breeding flocks of domestic fowl. The Directive was implemented in the UK through the Control of Salmonella in Poultry Order (England) 2007 (and equivalent legislation in Scotland and Wales and Northern Ireland). This implements the National Control Programme (NCP) for Breeding Flocks (of chickens – Gallus gallus) required by Article 5 of Regulation (EC) no 2160/ 2003, to meet the target for reduction in Salmonella prevalence set out in Regulation (EC) no 1003/ 2005.
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 S. Typhimurium or S. Enteritidis according to the protocol outlined above 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. If the flock is compulsorily slaughtered 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.

Broiler flocks

There is no official control plan for Salmonella in broiler flocks. If Salmonella Enteritidis or Salmonella Typhimurium is isolated from a commercial laying flock, the premises is normally visited and advice is given on measures that can be taken to control infection on the premises and to prevent transmission of infection to subsequent flocks. When broiler flocks are found to be infected advice on the control of infection is given to the company involved and a proportion of premises which have had positive birds is visited.

Measures in case of the positive findings or single cases

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

As outlined in the control plan above.

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

As in control plan

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

As in control plan

Broiler flocks: Day-old chicks

The suspicion of Salmonella Enteritidis or Salmonella Typhimurium in day old broiler chicks would lead to an investigation of the supply flock(s) as described above.

Broiler flocks: Rearing period

There is no official control plan for Salmonella in broiler flocks. If Salmonella Enteritidis or Salmonella Typhimurium is isolated from a commercial broiler flock, the premises is normally visited and advice is given on measures that can be taken to control infection on the premises and to prevent transmission of infection to subsequent flocks. When broiler flocks are found to be infected advice on the control of infection is given to the company involved and a proportion

of premises which have had positive birds is visited.

Notification system in place

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 on request.
- samples (including live birds) may be taken for diagnosis
- movement restrictions and isolation requirements may be imposed
- provision for compulsory slaughter and compensation where salmonella infection is confirmed in a breeding flock of Gallus gallus.
- compulsory cleansing and disinfection of premises and vehicles.

The main provisions of the Control of Salmonella in Poultry Order 2007 are:
- registration of breeding flocks and hatcheries on a once and for all basis free of charge
- minimum flock size requiring registration 250 birds
- hatchery with a total incubator capacity of 1000 eggs or more and which is used for hatching eggs must register
- it is a requirement of the NCP that owners record the movements of birds, chicks or eggs onto and off the premises
- sampling for monitoring during the rearing and production period
- the owner/ operator is required to maintain records of the dates, type of samples, flock sampled and the test results.
- monitoring of flocks using sampling regimes and bacteriological methods of sampling laid down in the legislation

Results of the investigation

Only 1 positive incident of Salmonella of one of the Top-5 serovars was discovered in adult breeding flocks in 2007. This was a positive result for S. Typhimurium in a parent Broiler Breeder (Meat Production Line) flock. There were 1444 adult broiler breeder flocks (elite, grandparent and parent) tested according to the requirements of the NCP in 2007. There were 30 isolation of Salmonella during the year across the meat production line categories. These were S. Yoruba (2), S. Anatum (1), 4,12:D:- (3), S. Agama (2), S. Mbandanka (17), S. Give (1), S. Muenster (1), S. Poona (1), S. Tenessee (1) and S. Typhimurium (1).

Reports of Salmonella in broilers is normally from samples taken by the industry before slaughter when the birds are 3 to 4 weeks old. During 2007 there were 82 isolations of Salmonella in commercial broiler flocks in the UK detected during routine monitoring/ surveillance carried out by farm business operators. Of these 7 were S. Enteritidis and 1 was S. Typhimurium

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

The prevalence of S. Enteritidis and S. Typhimurium in breeding flocks in meat production remains at very low levels.

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

The common serotypes found associated with broilers are not commonly reported in cases of human salmonellosis.

C. 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)

In England, Wales and Scotland (GB) all isolations of Salmonella must be reported - 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]

Meat production flocks

As for breeding birds all Salmonella isolates must be reported.

Frequency of the sampling

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

Other: Voluntary

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

Other: Voluntary

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

Other: Voluntary

Meat production flocks: Day-old chicks

Other: Voluntary

Meat production flocks: Rearing period

Other: Voluntary

Meat production flocks: Before slaughter at farm

Other: Voluntary

Meat production flocks: At slaughter (flock based approach)

Other: Voluntary

Type of specimen taken

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

Other: Voluntary

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

Other: Voluntary

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

Other: Voluntary

Meat production flocks: Day-old chicks

Other: Voluntary

Meat production flocks: Rearing period

Other: Voluntary

Meat production flocks: Before slaughter at farm

Other: Voluntary

Meat production flocks: At slaughter (flock based approach)

Other: Voluntary

Methods of sampling (description of sampling techniques)

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

No official sampling undertaken. Voluntary sampling.

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

No official sampling undertaken. Voluntary sampling.

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

Case definition

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

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

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Meat production flocks: Day-old chicks

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Meat production flocks: Rearing period

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Meat production flocks: Before slaughter at farm

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Meat production flocks: At slaughter (flock based approach)

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Diagnostic/ analytical methods used

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

Bacteriological method: Various may be used

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

Bacteriological method: Various may be used

Meat production flocks: Day-old chicks

Bacteriological method: Various may be used

Meat production flocks: Rearing period

Bacteriological method: Various may be used

Meat production flocks: Before slaughter at farm

Bacteriological method: Various may be used

Meat production flocks: At slaughter (flock based approach)

Bacteriological method: Various may be used

Case definition

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.

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 92/ 117, but there is no official Salmonella control programme for turkeys.

Meat production flocks

Producers are encouraged to monitor, but there is no official sampling.

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 if the Salmonella is of public health significance.

Notification system in place

All isolations of Salmonella must be reported 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]

Results of the investigation

All laboratories report the isolation of Salmonella but the number of samples examined which are negative is not reported and therefore not known. Most of the samples in turkeys are taken for monitoring purposes but diagnostic samples are also included.
There were 114 reported incidents of Salmonella in turkeys in Great Britain in 2007, detected as a result of voluntary monitoring. The most commonly reported serotypes 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 the year.
From October 2006 to September 2007, the baseline Study on the Prevalence of Salmonella in Turkey Flocks of in the EU was carried out in accordance with Commission Decision 2006/ 666 and Technical Specification SANCO/ 2083/ 2006. 317 fattening turkey holdings were sampled. Twelve different Salmonella serovars were isolated from the 113 Salmonella positive fattening turkey holdings, giving a prevalence of 35.6%. Some holding had more than one serovar associated with them. Of the five Salmonella serovars considered of public health importance by the EU, only Salmonella Typhimurium was isolated from fattening turkey holdings in the UK. Salmonella serovars Enteritidis, Hadar, Infantis and Virchow were not isolated from any fattening turkey holdings. Salmonella Typhimurium was isolated from 16 of the 317 fattening turkey holdings sampled in the UK to give a prevalence of 5.0%. The most common phagetypes were DT 104 and DT135. Salmonella serovars other than Enteritidis and Typhimurium were isolated from 100 of the 317 holdings sampled in the UK to give a prevalence of 31.5%. (Note that a holding may have had more than one Salmonella serovar isolated from it.)
Breeding turkeys on each of the 29 eligible holdings in the UK were sampled for the survey, resulting in a total of 116 flocks sampled. Four different Salmonella serovars were isolated from the five Salmonella positive breeding turkey holdings (4 S. Kottbus, 2 S. Heidelberg, 2 S. Derby and 1 S. Typhimurium. Of the five Salmonella serovars considered of public health importance by the EU, only Salmonella Typhimurium was isolated from one breeding turkey holding in the UK. Salmonella serovars Enteritidis, Hadar, Infantis and Virchow were not isolated from any breeding turkey holdings.

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

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).
Reports of Salmonella in turkeys decreased by 39% in 2006, compared with 2005. Compared with 2005, the number of reports of S. Derby, S. Kottbus, S Newport and S. Indiana fell by 32.5%, 36%, 58% and 61.5% respectively, while reports of S. Virchow doubled from 5 to 10. In 2005 the two most commonly isolated serovars were S. Derby and S. Kottbus (20% and 15% of total reports). There was an increase in the number of reports of S. Typhimurium with 37 reports in 2006 compared with 24 in 2005 and 37 incidents in 2004. There were two reports of Salmonella Rissen during 2005, similar to 2004 when it had been first recorded in turkeys, but none in 2006.
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.

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.

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

Monitoring system

Sampling strategy

Breeding flocks

The monitoring system is the same as for other species which are not breeding flocks of Gallus gallus. There is no official control plan for the control of Salmonella in any of geese sectors.

Diagnostic/ analytical methods used

Breeding flocks: Day-old chicks

Bacteriological method: Various

Breeding flocks: Rearing period

Bacteriological method: Various

Breeding flocks: Production period

Bacteriological method: Various

Meat production flocks: Day-old chicks

Bacteriological method: Various

Meat production flocks: Rearing period

Bacteriological method: Various

Meat production flocks: Before slaughter at farm

Bacteriological method: Various

Meat production flocks: At slaughter (flock based approach)

Bacteriological method: Various

Notification system in place

All Salmonellas isolated from geese must be reported to the Competent Authority.

Results of the investigation

Submission of samples from geese is most likely to be for diagnostic purposes. The results of testing in 2007 are combined with ducks into 1 category. There was only 1 isolation of Salmonella reported from geese during the year in Great Britain - S. Indiana.

E. Salmonella spp. in ducks - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

Breeding flocks

In England, Wales and Scotland (GB) all isolations of Salmonella must be reported - 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]

Meat production flocks

As for breeding birds all Salmonella isolates must be reported.

Frequency of the sampling

Breeding flocks: Day-old chicks

Other: No official sampling undertaken. Voluntary sampling.

Breeding flocks: Rearing period

Other: No official sampling undertaken. Voluntary sampling.

Breeding flocks: Production period

Other: No official sampling undertaken. Voluntary sampling.

Meat production flocks: Day-old chicks

Other: No official sampling undertaken. Voluntary sampling.

Meat production flocks: Rearing period

Other: No official sampling undertaken. Voluntary sampling.

Meat production flocks: Before slaughter at farm

Other: No official sampling undertaken. Voluntary sampling.

Meat production flocks: At slaughter (flock based approach)

Other: No official sampling undertaken. Voluntary sampling.

Type of specimen taken

Breeding flocks: Day-old chicks

Other: No official sampling undertaken. Voluntary sampling.

Breeding flocks: Rearing period

Other: No official sampling undertaken. Voluntary sampling.

Breeding flocks: Production period

Other: No official sampling undertaken. Voluntary sampling.

Meat production flocks: Day-old chicks

Other: No official sampling undertaken. Voluntary sampling.

Meat production flocks: Rearing period

Other: No official sampling undertaken. Voluntary sampling.

Meat production flocks: Before slaughter at farm

Other: No official sampling undertaken. Voluntary sampling.

Meat production flocks: At slaughter (flock based approach)

Other: No official sampling undertaken. Voluntary sampling.

Case definition

Breeding flocks: Day-old chicks

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

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Breeding flocks: Production period

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Meat production flocks: Day-old chicks

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Meat production flocks: Rearing period

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Meat production flocks: Before slaughter at farm

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Meat production flocks: At slaughter (flock based approach)

Reports of Salmonella isolates under the relevant legislation are classed as positive.

Diagnostic/ analytical methods used

Breeding flocks: Day-old chicks

Bacteriological method: Various methods may be used

Breeding flocks: Rearing period

Bacteriological method: Various methods may be used

Breeding flocks: Production period

Bacteriological method: Various methods may be used

Meat production flocks: Day-old chicks

Bacteriological method: Various methods may be used

Meat production flocks: Rearing period

Bacteriological method: Various methods may be used

Meat production flocks: Before slaughter at farm

Bacteriological method: Various methods may be used

Meat production flocks: At slaughter (flock based approach)

Bacteriological method: 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.

Other preventive measures than vaccination in place

Breeding flocks

Breeding flocks are encouraged to monitor in the same way as Gallus gallus under Directive 92/ 117, but there is no official Salmonella control programme for ducks and geese.

Meat production flocks

Producers are encouraged to monitor, 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 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.
In Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991]

Results of the investigation

There were 363 reports of Salmonella isolations from ducks in Great Britain in 2007. As in previous years, the most frequently isolated serovar was S. Indiana (150 isolations or 41% of total incidents), with S. Hadar detected in 29 incidents (8.0%). There were 10 incidents of S. Enteritidis (2.7%) and 4 incidents of S. Typhimurium (1.1%) reported during 2007.
There were no reports of isolations of Salmonella from ducks in Northern Ireland during the year.

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

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 pigs

Monitoring system

Sampling strategy

Breeding herds

In the UK, all isolations of Salmonella must be reported. Almost 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.
During 2007 the baseline study on the prevalence of Salmonella in slaughter pigs sampled in abattoirs (Commission Decision 2006/ 68/ EC) was carried out between October 2006 and September 2007. The survey sampled 660 pigs at 18 UK abattoris which together represented at least 80% of the slaughtered fattening pig population in the UK. Lymph node samples, carcass swabs and meat juice samples were taken. Sampling was equally distributed between months to cover the different seasons.

Frequency of the sampling

Breeding herds

Other: Voluntary sampling.

Multiplying herds

Other: Voluntary sampling.

Fattening herds at farm

Other: Voluntary sampling.

Fattening herds at slaughterhouse (herd based approach)

Other: Voluntary sampling.

Type of specimen taken

Breeding herds

Other: Voluntary sampling.

Multiplying herds

Other: Voluntary sampling.

Fattening herds at farm

Other: Voluntary sampling.

Fattening herds at slaughterhouse (herd based approach)

Other: Voluntary sampling.

Methods of sampling (description of sampling techniques)

Breeding herds

Voluntary sampling.

Multiplying herds

Voluntary sampling.

Fattening herds at farm

Voluntary sampling.

Fattening herds at slaughterhouse (herd based approach)

Voluntary sampling.
During the baseline study samples were collected by government officials from the Department of Agriculture and Rural Development, Northern Ireland and by officials from the Meat Hygiene Service in Great Britain.

Case definition

Breeding herds

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 holding within a 30 day period.

Diagnostic/ analytical methods used

Breeding herds

Other: various

Multiplying herds

Other: various

Fattening herds at farm

Other: various

Fattening herds at slaughterhouse (herd based approach)

Serological method: 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

In Great Britain the Meat and Livestock Commission with the British Pig Executive has been developing a Zoonoses Action Plan for the monitoring of Salmonella in pigs. This is based on a meat-juice ELISA test at slaughterhouse and classing the farms into differnt levels for subsequent investigation of advisory visits. Northern Ireland has a similar programme operating in all slaughter plants. Funding of the montoring is initially through the industry with government support.

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

Results of the investigation

There were 226 reports of Salmonella in pigs in 2007. S. Typhimurium remained 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.
Baseline study on the prevalence of Salmonella in slaughter pigs sampled in abattoirs: Salmonella was isolated from 21.8% (139/ 639) of the ileo-caecal lymph node samples and 15.1% (97/ 641) of the

carcass swabs. The meat juice samples yielded a seroprevalence of 25.5% (163/ 640). Overall, 31.4% (201/ 641) of pigs showed evidence of current Salmonella infection or contamination, testing positive on carcass swabs or lymph node samples. The prevalence of Salmonella in pigs varied considerably between abattoirs. Only the results of the ileo-caecal sample testing are included in the report tables

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

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. 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 types of S. Typhimurium during 2006 were DT193 and .

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.

Additional information

Codes of good practice for the prevention and control of salmonella in pig herds on farm have been published and widely circulated to pig producers in the UK.

G. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

Salmonella isolated in a laboratory from cattle must be reported to the competent authority and the isolate provided on request (Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991). Over 90% of the isolates from cattle are from samples taken for diagnostic purposes.

Frequency of the sampling

Animals at farm

Other: Over 90% voluntary samples taken by veterianarian for diagnostic purposes

Type of specimen taken

Animals at farm

Other: Usually faeces or from organs at post mortem

Methods of sampling (description of sampling techniques)

Animals at farm

Voluntary samples usually taken by a veterinarian for diagnostic purposes

Animals at slaughter (herd based approach)

A national survey of cattle in Great Britain arriving for slaughter at the abattoir was carried out in 2003.

Case definition

Animals at farm

Culture and isolation of Salmonella from sample taken from the animal, or associated with its environment. 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

Bacteriological method: Various

Animals at slaughter (herd based approach)

Bacteriological method: 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 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 Salmonellas isolated from cattle must be reported to the competent authority

Results of the investigation

During 2007 there were 857 reports of Salmonella isolated from cattle in the UK. The most

commonly reported serotypes were S. Dublin (558 isolations making up 65% of total incidents), S. Typhimurium (102 isolations making up 12% of total incidents) and S. Anatum (38 isolations, 4% of total incidents). There were 5 reports of S. Enteritidis in UK cattle during the year (PT 13, 11, 14b, 8, No PT).
A considerable increase in incidents due to S. Mbandaka has been recorded this year.There were 5 reports of S. Butantan during 2007. This is an increase on the 4 cases reported during 2006, which was the first time this serotype has been reported in cattle in the UK.

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

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. In 2007, Salmonella Dublin continued to be the serovar involved in the greatest number of incidents of salmonellosis in cattle, although there has been a decrease in incidents due to this serovar as a proportion of diagnosed submissions. The relative proportions of S. Dublin and S. Typhimurium have changed in recent years. Data for the whole of 2007 also indicate a marked decrease of salmonellosis Typhimurium, with 102 incidents this year (compared with 145 in 2006).
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 serotype recorded in the diagnostic samples taken. Salmonella Dublin is seldom isolated in samples from man.

Table Salmonella in breeding flocks of Gallus gallus (Part A)

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Mbandaka	S. Agona	S. Montevideo	S. Heidelberg	S. Binza	S. 4,12:d:-	S. Dublin	S. Give	S. Muenster	S. Poona	S. Tennessee	S. Anatum	S. Yoruba	S. Thompson	S. Enteritidis	S. Typhimurium
Gallus gallus (fowl)																				
elite breeding flocks for egg production line																				
during production period	NRL	flock	4	0																
grandparent breeding flocks for egg production line																				
during production period	NRL	flock	79	0																
parent breeding flocks for egg production line																				
during production period	NRL	flock	101	1							1									
elite breeding flocks for meat production line																				
during production period	NRL	flock	60	0																
grandparent breeding flocks for meat production line																				
during production period	NRL	flock	120	1	1															
parent breeding flocks for meat production line																				

during production period	NRL	flock	1055	10	1					3						1	2			1
parent breeding flocks, unspecified																				
during production period (1)	NRL	flock	214	19	15							1	1	1	1					

(1) : total units tested includes 5 flocks producing hatching eggs for vaccine production. None of these flocks were detected as positive

Footnote

Table details testing of adult breeding flocks across broiler breeder and layer breeder lines in fulfilment of the requirements of the National Control Programme and monitoring of the achievement of the EU designated target for breeding flocks

Table Salmonella in breeding flocks of Gallus gallus (Part B)

	S. Hadar	S. Infantis	S. Virchow	Salmonella spp., unspecified	S. Agama
Gallus gallus (fowl)					
elite breeding flocks for egg production line					
during production period					
grandparent breeding flocks for egg production line					
during production period					
parent breeding flocks for egg production line					
during production period					
elite breeding flocks for meat production line					
during production period					
grandparent breeding flocks for meat production line					
during production period					
parent breeding flocks for meat production line					
during production period					2
parent breeding flocks, unspecified					

during production period (1)					

(1) : total units tested includes 5 flocks producing hatching eggs for vaccine production. None of these flocks were detected as positive

Footnote

Table details testing of adult breeding flocks across broiler breeder and layer breeder lines in fulfilment of the requirements of the National Control Programme and monitoring of the achievement of the EU designated target for breeding flocks

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
laying hens (1)	NRL	flock		67	31	3	33
broilers (2)	NRL	flock		82	7	1	74
unspecified (3)	NRL	single		77	2	2	73
Ducks	NRL	flock		364	10	4	350
Geese	NRL	flock		1	0	0	1
Turkeys	NRL	flock		114	0	12	102
- at farm - Survey (6)	NRL	flock	433	139	0	17	122
Pet animals, all (5)	NRL	animal		1	0	1	0

(1) : All laying hens, excluding breeding flocks
(2) : All broiler production flocks, ie excluding breeding flocks.
(3) : Isolates from Gallus gallus, including hatchery samples, rearing flocks, environmental samples, post cleansing and disinfection etc
(4) : Northern Ireland
(5) : Pet poultry
(6) : Salmonella baseline survey in breeding and fattening turkey flocks

Footnote

For routine Salmonella monitoring, only positive cases (ie where Salmonella is detected) are reported. Negative findings are not reported and hence data on the total number of units tested is unavailable.
A total of 433 breeding and fattening turkey flocks were sampled and results analysed for the Salmonella baseline survey.
In the table "Gallus gallus unspecified" refers to isolates from Gallus gallus, including hatchery samples, breeder rearing flocks, environmental samples, post cleansing and disinfection etc

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Pheasants	NRL	animal		21	2	5	14
Partridges	NRL	animal		18	0	2	16

Footnote

Isolates from Great Britain only.
Mainly clincal isolates.
All laboratories report the isolation of Salmonella. Units tested are not known because the laboratories do not report negative results unless as part of an official control program or survey.
NRL is National Reference Laboratory.

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Cattle (bovine animals) (1)	NRL	animal		857	5	102	750
calves (under 1 year) (3)	NRL	animal		213	1	24	188
adult cattle over 2 years (4)	NRL	animal		313	3	49	261
Sheep	NRL	animal		197	2	13	182
Goats	NRL	animal		1	0	0	1
Pigs	NRL	animal		226	0	158	68
fattening pigs (2)	NRL	animal	639	139	2	85	52
Solipeds, domestic	NRL	animal		62	5	39	18
Other animals	NRL	animal		28	5	6	17
Deer	NRL	animal		2			2

(1) : UK data
(2) : The Salmonella baseline survey in slaughter pigs. Only the ileo-caecal sample test results are reported in the table
(3) : Great Britain data only
(4) : Great Britain data only

Footnote

In the table "Other Animals" refers to isolates from Northern Ireland from non-defined miscellaneous animal species.
NRL is National Reference Laboratory. Mainly clinical isolates.
All laboratories report the isolation of Salmonella. Units tested are not known because the laboratory does not report negative results, unless as part of an official control programme or survey.

2.1.5. Salmonella in feedingstuffs

A. Salmonella spp. in feed - all feedingstuffs

History of the disease and/ or infection in the country

Great Britain:
In Great Britain the isolation of Salmonella spp. from animal feedingstuffs are reportable under the Zoonoses Order 1989. Imported animal protein destined for feed production in Great Britain is tested according to a risk assessment of the import.
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

Salmonella was most commonly reported from cereals/ vegetable feed materials during the manufacturing process and most reports were from samples of rape and soya. The most common serotype reported was S. Agona and S. Rissen. A wide range of other serotypes were reported. In soya S. Agona was most commonly found (15 isolations).
In 2007 there was one isolations of S. Typhimurium reported from compound finished pig feed. Salmonella Typhimurium was also isolated on 5 other raw feed materials, once from ricebran and 4 times in unspecified raw feed ingredients.
S. Enteritidis was not isolated from any feed ingredients during 2007.
S. Infantis was isolated on 2 occasions - once in rape feed material and once from unspecified raw ingredients.
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. The most common Salmonella serovars reported in feed or feed materials in 2007 (S. Agona and S. Rissen) are seldom found in humans. 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.

Additional information

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.

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Derby	S. Meleagridis	S. Oranienburg	S. Poona	S. Rissen	S. Rubislaw	S. Schwarzengrund	S. Senftenberg	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of marine animal origin	NRL	batch	500g		11	2	1	1	2	1	2	1	1	0	0	
fish meal																

Footnote

Samples taken by operator as part of HACCP, total units tested not known. Salmonella isolates sent to NRL for serotyping. 500g sample recommended but may vary.

Table Salmonella in other feed matter (Part A)

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Eimsbuettel	S. Thompson	Other serotypes	S. Africana	S. Agama	S. Agona	S. Anatum	S. Leiden	S. Liverpool	S. Mbandaka	S. Molade	S. Montevideo	S. Newport	S. Odozi	S. Orion
Feed material of cereal grain origin																				
wheat derived	NRL	batch	500g		3			1							1					
rice derived																				
(Ricebran)	NRL	batch	500g		2															
Feed material of oil seed or fruit origin																				
rape seed derived	NRL	batch	500g		16	1		1			1									
palm kernel derived	NRL	batch	500g		2															
soya (bean) derived	NRL	batch	500g		47			6			15	3			3					
sunflower seed derived	NRL	batch	500g		9			1			4									
other oil seeds derived (1)	NRL	batch	500g		3															
Other feed material																				
(Unspecified) (2)	NRL	batch	500g		69		1	5	1	3	4	1	1	2	2	1	4	3	1	2
All feedingstuffs (3)	NRL	batch	500g		81															

(1) : Cocoa

(2) : Non specified other raw ingredients
(3) : Data for Northern Ireland - 81 isolations of Salmonella from non-specified feedstuffs (2 of these S. Typhimurium)

Footnote

"Other serotypes" include 4:G:S (1 from wheat derived feed); 7:GMS (1 from rape seed derived feed); 16:Z4,Z24:- (1 from soya derived feed); 4:G:S (5 from soya derived feed); 0:6:7:H:Z10 (1 from sunflower seed derived feed); Y:10:- (1 from unspecified ingredients); 42:Z4,Z23:- (1 from unspecified ingredients); 44:Z10:- (1 from unspecified ingredients); 4,5,12:I:- (1 from unspecified ingredients).
Total units tested not known. Isolates of Salmonella are serotyped at NRL.
The weight of sample recommended is 500g but operators may take more or less.

Table Salmonella in other feed matter (Part B)

	S. Rissen	S. Senftenberg	S. Kentucky	S. Schwarzengrund	S. Infantis	S. Livingstone	S. Tennessee	S. Javiana	S. Yoruba	S. Kottbus	S. Aberdeen	S. group E	S. group C	S. Stanleyville	S. Stockholm	S. 3,19:-:-	S. Cubana	S. Bareilly	S. Derby	S. Isangi
Feed material of cereal grain origin																				
wheat derived																				
rice derived																				
(Ricebran)								1												
Feed material of oil seed or fruit origin																				
rape seed derived	8				1	1	3													
palm kernel derived			1	1																
soya (bean) derived	3	4	1	1		1	1				1	1				4	2			
sunflower seed derived		1																		
other oil seeds derived (1)													1	1	1					
Other feed material																				
(Unspecified) (2)	1	3	2		1	2			1	1			1	2	1	1		1	2	1
All feedingstuffs (3)																				

(1) : Cocoa
(2) : Non specified other raw ingredients
(3) : Data for Northern Ireland - 81 isolations of Salmonella from non-specified feedstuffs (2 of these S. Typhimurium)

Footnote

"Other serotypes" include 4:G:S (1 from wheat derived feed); 7:GMS (1 from rape seed derived feed); 16:Z4,Z24:- (1 from soya derived feed); 4:G:S (5 from soya

derived feed); 0:6:7:H:Z10 (1 from sunflower seed derived feed); Y:10:- (1 from unspecified ingredients); 42:Z4,Z23:- (1 from unspecified ingredients); 44:Z10:- (1 from unspecified ingredients); 4,5,12:I:- (1 from unspecified ingredients).
Total units tested not known. Isolates of Salmonella are serotyped at NRL.
The weight of sample recommended is 500g but operators may take more or less.

Table Salmonella in other feed matter (Part C)

	S. Johannesburg	S. Ajiobo	S. Bredeney	S. Chomedy	S. Kedougou	S. Minnesota	S. Muenster	S. Stourbridge	S. Oslo	S. Winston	S. 4,12:-:-	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Nchanga	S. group B	S. group G	S. Indiana	S. enterica subsp. enterica - rough
Feed material of cereal grain origin																			
wheat derived				1															
rice derived																			
(Ricebran)													1						
Feed material of oil seed or fruit origin																			
rape seed derived																			
palm kernel derived																			
soya (bean) derived											1								
sunflower seed derived																1	1	1	
other oil seeds derived (1)																			
Other feed material																			
(Unspecified) (2)	1	1	1		4	1	1	1	1	1	1		2		1			1	1
All feedingstuffs (3)													2	79					

(1) : Cocoa
(2) : Non specified other raw ingredients
(3) : Data for Northern Ireland - 81 isolations of Salmonella from non-specified feedstuffs (2 of these S. Typhimurium)

Footnote

"Other serotypes" include 4:G:S (1 from wheat derived feed); 7:GMS (1 from rape seed derived feed); 16:Z4,Z24:- (1 from soya derived feed); 4:G:S (5 from soya derived feed); 0:6:7:H:Z10 (1 from sunflower seed derived feed); Y:10:- (1 from unspecified ingredients); 42:Z4,Z23:- (1 from unspecified ingredients); 44:Z10:- (1 from unspecified ingredients); 4,5,12:I:- (1 from unspecified ingredients).
Total units tested not known. Isolates of Salmonella are serotyped at NRL.
The weight of sample recommended is 500g but operators may take more or less.

Table Salmonella in compound feedingstuffs (Part A)

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Agona	S. Cerro	S. Kedougou	Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. 3,19:-:-	S. 4,12:-:-	S. Havana	S. Ouakam	S. Ohio	S. Rissen	S. Yoruba	S. Manhattan
Compound feedingstuffs for cattle																				
process control (1)	NRL	batch	500g		1				1											
Compound feedingstuffs for pigs																				
process control	NRL	batch	500g		4	1	1	1		1										
Compound feedingstuffs for poultry (non specified)																				
process control (2)	NRL	batch	500g		14	1			1				1	1	1	2	2	1	1	1

(1) : Type 15:Y:-
(2) : Type 0:10:H:Y

Footnote

Table contains data for Great Britain - England, Wales and Scotland only.
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 HACCP.
Total number of units tested are not known. Salmonella isolates are serotyped at the NRL.

Table Salmonella in compound feedingstuffs (Part B)

	S. Meleagridis	S. Thompson
Compound feedingstuffs for cattle		
process control (1)		
Compound feedingstuffs for pigs		
process control		
Compound feedingstuffs for poultry (non specified)		
process control (2)	1	1

(1) : Type 15:Y:-
(2) : Type 0:10:H:Y

Footnote

Table contains data for Great Britain - England, Wales and Scotland only.
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 HACCP.
Total number of units tested are not known. Salmonella isolates are serotyped at the NRL.

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 (Part A)

Serovars		Sheep and goats - at farm		Ducks		Cattle (bovine animals) - at farm		Pigs - fattening pigs - baseline survey		Turkeys - Survey (baseline survey)		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Deer		Turkeys		Solipeds, domestic - at farm	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=																								
Number of isolates serotyped	N=	0	198	364	0	0	0	139	0	139	0	0	857	0	226	257	0	0	39	0	2	114	0	0	62
Number of isolates per type																									
S. Adelaide													1												
S. Agama			7					1		2			10			16						1			5
S. Agona													1			9			1			1			
S. Ajiobo													1			1						1			1
S. Anatum			1					2		1			38		4	1									2
S. Anatum var. 15													1												
S. Berta													1												
S. Bovismorbificans								1							4	1									
S. Braenderup																									
S. Bredeney																									
S. Butantan													5												
S. Carno													1												
S. Coeln								1																	

S. Derby		1	1				28		15			1		27	1			2			37			1
S. Dublin		20										558		1	1									
S. Duesseldorf												1												
S. Durham		2										4			1									
S. Eboko												1												
S. Enteritidis		2	10				2					5			40			2						5
S. Give			17				1					1			3									
S. Goldcoast							1					3		3										
S. Hadar			29																					
S. Havana			2											1	4			1						
S. Heidelberg			1						2					1	1									
S. Indiana			151						10						1			1			3			
S. Infantis															1									
S. Kedougou			15				3		11			2		4	14						14			
S. Kentucky												1			5									
S. Kimuenza												3												
S. Kottbus			2						67			14			3			2			25			2
S. Livingstone			6												25			1						
S. Lomita												1												
S. London							4					3		6										
S. Mbandaka			36									29			53									
S. Montevideo		16										19			2						2			1
S. Muenster															6									
S. Newport		3							4			13		1	1						7			6
S. Ohio			1									7			6									
S. Orion			32															5						
S. Orion var. 15,34															1									
S. Panama							1																	
S. Paratyphi B																								
S. Poona															5									
S. Reading							5							3						2				
S. Rissen																		2						

S. Saintpaul								2											1				
S. Schwarzengrund		1									1												
S. Senftenberg			10					3					1	17			1			9			
S. Sinstorf											1												
S. Stanley																							
S. Stendal																							
S. Stourbridge		2						1															
S. Tennessee														1									
S. Thompson											1			2									
S. Typhimurium		13	4				85	17			102		158	6			7			12			39
S. Virchow														3									
S. Yoruba														2									
S. 13,23:i:-								4															
S. 4,5,12:i:-							4																
Salmonella spp. (1)		1															1			1			
S. enterica subsp. diarizonae (2)		128									2		1										
S. Gallinarum														6									
Not typeable (3)		1	5								23		8	7			1						
Salmonella spp., unspecified (4)													1	1									
S. enterica subsp. enterica, rough (5)											2		2	5									
S. Binza			42											5			12						

(1) : Including one isolate S. Arizona
(2) : 61:K:1,5,7; 61:K:1,5; 61:-:1,5; 61:K:1,5,7; 18:K:1,5,7 and 61:-:1,5,7
(3) : Structure only
(4) : Unknown or unnamed
(5) : O Rough:G,P:-;
O Rough:Z10:E,N,Z15 and O Rough:L,V:1,6; O Rough:G,S,T:- and O Rough:G,M:-

Footnote

(*) M : Monitoring, C : Clinical
In the table "Other Poultry" refers to game birds (pheasants and partridge).
In the table "Other Animals" refers to isolates from Northern Ireland from non-defined miscellaneous animal species.

Most isolates in cattle, sheep, goats and pigs and all in horses are from clinical diagnostic samples.
Monitoring (survey) samples from pigs are isolates derived from the Salmonella baseline survey in slaughter pigs. Only the ileo-caecal sample test results are reported in the table.
Samples from chickens (Gallus gallus), turkeys, ducks and geese are mainly taken by industry for monitoring.
Survey samples from turkeys are isolates derived from the Salmonella baseline survey in turkey fattening and breeding flocks.
In the table "ducks" refers to ducks and geese. However, all isolations of Salmonella were from ducks except for one isolation of S. Indiana from geese.
All Salmonellas are reportable to the competent authority.

Table Salmonella serovars in animals (Part B)

Serovars		Other animals	
Sources of isolates (*)		M	C
Number of isolates in the laboratory	N=		
Number of isolates serotyped	N=	3	25
Number of isolates per type			
S. Adelaide			
S. Agama			
S. Agona			
S. Ajiobo			
S. Anatum			
S. Anatum var. 15			
S. Berta			
S. Bovismorbificans			1
S. Braenderup			
S. Bredeney			
S. Butantan			
S. Carno			
S. Coeln			
S. Derby			
S. Dublin			6
S. Duesseldorf			
S. Durham			
S. Eboko			
S. Enteritidis		3	2

S. Give			
S. Goldcoast			
S. Hadar			
S. Havana			
S. Heidelberg			
S. Indiana			
S. Infantis			
S. Kedougou			
S. Kentucky			
S. Kimuenza			
S. Kottbus			1
S. Livingstone			
S. Lomita			
S. London			
S. Mbandaka			
S. Montevideo			
S. Muenster			
S. Newport			
S. Ohio			
S. Orion			
S. Orion var. 15,34			
S. Panama			
S. Paratyphi B			1
S. Poona			
S. Reading			
S. Rissen			
S. Saintpaul			
S. Schwarzengrund			
S. Senftenberg			1
S. Sinstorf			
S. Stanley			
S. Stendal			1

S. Stourbridge		
S. Tennessee		
S. Thompson		
S. Typhimurium		6
S. Virchow		
S. Yoruba		
S. 13,23:i:-		
S. 4,5,12:i:-		
Salmonella spp. (1)		5
S. enterica subsp. diarizonae (2)		
S. Gallinarum		
Not typeable (3)		
Salmonella spp., unspecified (4)		1
S. enterica subsp. enterica, rough (5)		
S. Binza		

(1) : Including one isolate S. Arizona
(2) : 61:K:1,5,7; 61:K:1,5; 61:-:1,5; 61:K:1,5,7; 18:K:1,5,7 and 61:-:1,5,7
(3) : Structure only
(4) : Unknown or unnamed
(5) : O Rough:G,P:-;
O Rough:Z10:E,N,Z15 and O Rough:L,V:1,6; O Rough:G,S,T:- and O Rough:G,M:-

Footnote

(*) M : Monitoring, C : Clinical
In the table "Other Poultry" refers to game birds (pheasants and partridge).
In the table "Other Animals" refers to isolates from Northern Ireland from non-defined miscellaneous animal species.
Most isolates in cattle, sheep, goats and pigs and all in horses are from clinical diagnostic samples.
Monitoring (survey) samples from pigs are isolates derived from the Salmonella baseline survey in slaughter pigs. Only the ileo-caecal sample test results are reported in the table.
Samples from chickens (Gallus gallus), turkeys, ducks and geese are mainly taken by industry for monitoring.
Survey samples from turkeys are isolates derived from the Salmonella baseline survey in turkey fattening and breeding flocks.
In the table "ducks" refers to ducks and geese. However, all isolations of Salmonella were from ducks except for one isolation of S. Indiana from geese.
All Salmonellas are reportable to the competent authority.

Table Salmonella serovars in food

Serovars	Ready-to-eat salads - at catering - Surveillance		Sauce and dressings - at catering - Surveillance		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin		Spices and herbs - fresh - at retail - Surveillance		Seeds, dried - at retail - Surveillance	
Sources of isolates (*)	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory N=	1		1												19		23	
Number of isolates serotyped N=	1	0	1	0	0	0	0	0	0	0	0	0	0	0	19	0	23	0
Number of isolates per type																		
S. Agbeni	0		1												0		0	
S. Agona	0		0												2		3	
S. Anatum	0		0												1		0	
S. Bergen	0		0												0		1	
S. Chittagong	0		0												0		1	
S. Durban	0		0												1		0	
S. Javiana	0		0												1		0	
S. Kentucky	1		0												0		0	
S. Mgulani	0		0												1		0	
S. Montevideo	0		0												1		1	

S. Newport	0		0											1		1	
S. Schwarzengrund	0		0											0		1	
S. Sculcoates	0		0											0		1	
S. Senftenberg	0		0											8		1	
S. Tennessee	0		0											0		1	
S. Virchow	0		0											2		2	
S. Binza	0		0											0		1	
S. Drypool	0		0											0		5	
S. 3,10: y:-	0		0											0		1	
S. II 16: g,t:z42	0		0											1		0	
S. 47:z4z23:-	0		0											0		3	

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Enteritidis phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Solipeds, domestic - at farm		Pigs - fattening pigs - baseline survey		Sheep and goats - at farm		Ducks	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=																
Number of isolates phagetyped	N=	0	5	0	0	40	0	0	2	0	5	2	0	0	2	10	0
Number of isolates per type																	
PT 1						5											
PT 4						13											
PT 6						2										1	
PT 8			1			10					2					3	
PT 14b			1														
Not typable						2									1	1	
PT 13a									2			1			1		
PT 35						4											
PT 12											1						
PT 23						1										2	
PT 7						2											
4b												1					
PT 5a						1											

PT 9b															3	
PT 13		2														
PT 11		1								2						

Footnote

(*) M : Monitoring, C : Clinical
Table contains data from the UK. In Northern Ireland, not all Salmonella isolates are phage typed. In Great Britain, all isolates are phage typed.
Isolates from cattle and pigs are mainly from diagnostic samples.
Monitoring samples from pigs are isolates derived from the Salmonella baseline survey in slaughter pigs. Only the ileo-caecal sample test results are reported in the table.
Other Poultry refers to game birds (pheasants and partridge)
In the table "ducks" refers to ducks and geese.

Table Salmonella Enteritidis phagetypes in humans

Phagetype	humans	
Sources of isolates (*)	M	C
Number of isolates in the laboratory N=		
Number of isolates phagetyped N=	0	6941
Number of isolates per type		
PT 1		856
PT 4		1797
PT 5		11
PT 6		317
PT 8		1370
PT 14b		525
PT 21		426
Not typable		25
PT 1b		1
PT 3		24
PT 13a		43
PT 2		15
PT 35		23
PT 56		54
PT 6a		140
PT 12		312
PT 31		4
PT 22		12
Other		630
PT 5a		32
PT 5c		54
PT 29		14
PT 34		14
PT 1e		71
PT 47		19
PT 24		1
PT 15		43
PT 13		12
PT 11		57
RDNC		38
PT 43		1

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in animals

Phagetype		Turkeys		Ducks		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Sheep and goats - at farm		Other animals		Solipeds, domestic - at farm		Pigs - fattening pigs - baseline survey	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=																				
Number of isolates phagetyped	N=	12	0	4	0	0	102	0	136	6	0	0	7	0	13	0	6	0	39	85	0
Number of isolates per type																					
DT 7							2												1		
DT 8				1						2			1								
DT 12							3		1												
DT 104		12					44		8	1					10				10	4	
DT 104b							6		2						1		1		3	8	
DT 120							1														
DT 193							14		30	1			1		1				2	20	
DT 208																				2	
U 302							11		7										2	9	
Not typable				1			10		4	2									1	7	
DT 40																			1		
DT 41							1						1						1		
DT RDNC																				2	

DT 193a																			
U 310																	2		
DT 194								1										1	
DT 195											3						1		
DT 15a								1											
DT 85																		1	
DT 99			2																
DT 135						5											3		
U 288 (1)						1		77									1	28	
other (2)															1				
DT 1						1											1		
DT 2						3					1				3				
DT 56 var.								1					1				9		
DT 56															1			2	
DT 170b								2											
DT 153																	1		
U 309								1											
DT 143								1											
56a																		1	

(1) : DT U288 and DT U288 var
(2) : unknown

Footnote

(*) M : Monitoring, C : Clinical
Table contains data from the UK. In Northern Ireland, not all Salmonella isolates are phage typed. In Great Britain, all isolates are phage typed.
Isolates from cattle and pigs are mainly from diagnostic samples.
Monitoring samples from pigs are isolates derived from the Salmonella baseline survey in slaughter pigs. Only the ileo-caecal sample test results are reported in the table
In the table "Other Poultry" refers to game birds (pheasants and partridge)
In the table "ducks" refers to ducks and geese
In the table "Other Animals" refers to isolates from Northern Ireland from non-defined miscellaneous animal species.

Table Salmonella Typhimurium phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=										
Number of isolates phagetyped	N=	0	0	0	0	0	0	0	0	0	0

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in humans

Phagetype		humans	
Sources of isolates (*)		M	C
Number of isolates in the laboratory	N=	0	1796
Number of isolates phagetyped	N=	0	1796
Number of isolates per type			
DT 8			64
DT 12			13
DT 66			1
DT 104			204
DT 104b			48
DT 120			146
DT 193			160
DT 208			1
U 302			35
Not typable			33
DT 40			13
DT 41			33
DT 132			1
U 311			41
DT 10			1
DT 110			1
DT 3			3
DT 135			26
U 288			40
other			686
1			2
DT 1			25
DT 2			42
DT 141			1
DT 12a			1
DT 56 var.			6
U 313			66
DT 56			22
DT 161			1
DT 131			1
DT 136			23
RDNC			51
DT 203			1
U 307			4

Footnote

(*) M : Monitoring, C : Clinical

2.1.7. Antimicrobial resistance in Salmonella isolates

Antimicrobial resistance is the ability of certain microorganisms to survive or grow in the presence of a given concentration of antimicrobial agent that usually would kill or inhibit the microorganism species in question. Antimicrobial resistant Salmonella strains may be transferred from animals or foodstuffs to humans.

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 2007 for antimicrobial resistance were from these isolates.

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

VLA historical standards based on British Society for Antimicrobial Chemotherapy standard method.
Antimicrobials used were
Tetracycline, Chloramphenicol, Ampicillin, Ceftazidime, Cefotaxime, Ciprofloxacin, Nalidixic acid, Trimethoprim / Sulfonamide, Sulfonamide, Streptomycin, Gentamicin, Neomycin (Kanamycin in Northern Ireland).

Breakpoints used in testing

Testing was performed using the disc diffusion method of the British Society for Antimicrobial Chemotherapy (BSAC). For ceftazidime, cefotaxime and ciprofloxacin, BSAC breakpoints were used (27, 29 and 19mm respectively). For other antimicrobials the historical VLA veterinary breakpoint of 13mm was used.

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 human public 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 is given to the farmer

Notification system in place

All Salmonellas isolated in a veterinary laboratory must be reported to the competent authority. Isolates are requested by the NRL and serotyping and antimicrobial sensitivity testing is carried out at the NRL.

Results of the investigation

In England and Wales in 2007, 592 Salmonella isolates were tested from cattle. 82.8% were fully sensitive. Seven S. Enteritidis isolates were recovered from cattle in England and Wales for testing in 2007 and four of these isolates were resistant to ampicillin only; the remaining isolates were fully-susceptible. For S. Typhimurium in cattle in England and Wales 86 isolates were available for testing and 16.3% were fully sensitive. 47.7% of S. Typhimurium isolates showed resistance to more than 4 antimicrobials. There were 33 S. Typhimurium DT104 isolates tested and 29 had the pentaresistant ACSSuT pattern of resistance frequently associated with DT104; there were no DT104 isolates with this pattern plus additional resistance from cattle. Resistance to nalidixic acid was detected in 3.5% of S. Typhimurium isolates from cattle. Resistance to cefotaxime, ceftazidime or ciprofloxacin 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. In previous years, a proportion of S. Typhimurium DT104 isolates from cattle have usually shown resistance to trimethoprim/ sulphonamides; resistance to trimethoprim/ sulphonamide was not detected in 2007 in S. Typhimurium DT104 isolates from cattle.
In England and Wales in 2007, 592 Salmonella isolates were tested from cattle. 82.8% were fully sensitive, compared to 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 needs to be noted however that the isolates reported here were mainly clinical isolates.

B. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Frequency of the sampling

In England, Wales and Scotland (Great Britain) all isolations of Salmonella must be reported under the Zoonoses Order 1989.
In Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991]
There is no official sampling of pigs. 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)

Mainly voluntary private sampling.
Isolates from the Salmonella baseline survey of slaughter pigs were also tested in 2007

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

VLA historical standards based on British Society for Antimicrobial Chemotherapy standard method used for testing isolates from England and Wales. In Northern Ireland NCCLS is used.
Antimicrobials used were
Tetracycline, Chloramphenicol, Ampicillin, Ceftazidime, Cefotaxime, Ciprofloxacin, Nalidixic acid, Trimethoprim / Sulfonamide, Sulfonamide, Streptomycin, Gentamicin, Neomycin (Kanamycin in Northern Ireland).

Breakpoints used in testing

Testing was performed using the disc diffusion method of the British Society for Antimicrobial Chemotherapy (BSAC). For ceftazidime, cefotaxime and ciprofloxacin, BSAC breakpoints were used (27, 29 and 19mm respectively). For other antimicrobials the historical VLA veterinary breakpojnt of 13mm was used.
For the Salmonella baseline survey of slaughter pigs, 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 2007, 1306 Salmonella isolates were tested from pigs. 10.8% were fully sensitive, a slight decline from the figure of 11.7% observed in 2006. The contribution of S. Typhimurium to the total number of Salmonella isolates tested influences the fully-susceptible figure because this serotype commonly demonstrates antimicrobial resistance. In 2007, the next most prevalent named serotypes in pigs (Derby and Kedougou) commonly showed resistance to tetracyclines (S. Derby) or to tetracyclines, sulphonamide and trimethoprim/ sulphonamides (S. Kedougou). Together with S. Typhimurium, these three serotypes accounted for 85% of the Salmonella isolates examined from pigs in 2007.
There were nine isolates of S. Enteritidis available for testing and these were fully-susceptible to the panel of antimicrobials tested. For S. Typhimurium in pigs, 792 isolates were available for testing and 1.4% were fully sensitive, lower than the figures observed in 2005 and 2006 when 12.9% and 2.7% respectively were fully sensitive. This decline in the numbers of S. Typhimurium isolates showing full-susceptibility was mainly accounted for by a reduction in the numbers of fully-susceptible DT 193 isolates from 26.9% in 2005 to 4.9% in 2006 and to 0% in 2007. 69.2% of S.Typhimurium isolates showed resistance to more than 4 antimicrobials in 2007. A total of 22 S. Typhimurium DT 104 isolates were examined from pigs and 17 of these were pentaresistant ACSSuT, whilst four were ACSSuT with additional resistance to trimethoprim/ sulphonamides. Two of the isolates with ACSSuT and trimethoprim/ sulphonamide resistance also showed resistance to furazolidone. Resistance to ciprofloxacin was observed in three isolates of S. Typhimurium; these three isolates were all U288. Ciprofloxacin resistance was not detected in other Salmonella serotypes from pigs in monitoring performed under the Zoonoses Order in 2007.
Considering the Salmonella isolates recovered from the baseline survey of pigs in 2007, two S. Enteritidis isolates were examined and both of these were fully-susceptible to the antimicrobials tested, supporting the findings from the Zoonoses Order monitoring. Resistance to cefotaxime or ceftazidime was not detected in any Salmonella isolates from pigs in the baseline survey; ciprofloxacin resistance was detected in S. Typhimurium (4% prevalence; n=97) and in S. Derby (6% prevalence; n= 35).

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 and isolates from turkeys tend to be more resistant than isolates from chickens. No resistance to cefotaxime or ceftazidime was detected in Salmonella isolates from pigs in 2007. A very low prevalence of resistance to ciprofloxacin was detected in S. Typhimurium U288 isolates from pigs in Zoonoses Order monitoring. Since 2005, there has been a decline in the proportion of isolates of S. Typhimurium which are fully-susceptible to the panel of antimicrobials tested.

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

source of infection)

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

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

In England, Wales and Scotland (Great Britain) all isolations of Salmonella must be reported under the Zoonoses Order 1989.
In Northern Ireland all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, [Zoonoses Order (Northern Ireland) 1991]
The isolates tested for antimicrobial resistance in laying hens and broilers (gallus gallus) were from these isolates. Isolates from the Salmonella baseline study of turkeys were also tested in 2007

Type of specimen taken

In poultry over 75% of the isolates were derived from private samples taken for montitoring purposes on farm.

Methods of sampling (description of sampling techniques)

Mainly voluntary private sampling.
Isolates from the baseline study of turkeys were also tested in 2007

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

VLA historical standards based on British Society for Antimicrobial Chemotherapy standard method.
Antimicrobials used were
Tetracycline, Chloramphenicol, Ampicillin, Ceftazidime, Cefotaxime, Ciprofloxacin, Nalidixic acid, Trimethoprim / Sulfonamide, Sulfonamide, Streptomycin, Gentamicin, Neomycin

(Kanamycin in Northern Ireland).

Breakpoints used in testing

Testing was performed using the disc diffusion method of the British Society for Antimicrobial Chemotherapy (BSAC). For ceftazidime, cefotaxime and ciprofloxacin, BSAC breakpoints were used (27, 29 and 19mm respectively). For other antimicrobials the historical VLA veterinary breakpojnt of 13mm was used.
For the baseline survey of turkeys, the antimicrobial susceptibility testing methods described in SANCO / 431/ 2007 were used. These methods use epidemiological cut-off values derived by EUCAST.

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 human public 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 is given to the farmer

Results of the investigation

Considering monitoring performed under the Zoonoses Order in England and Wales in 2007, 419 Salmonella isolates were tested from poultry (Gallus gallus), including 124 isolates from broilers and 174 from layers. 77.3% of the isolates were fully sensitive. For S. Enteritidis 136 isolates were tested and 122 (89.7%) were fully sensitive. S. Enteritidis isolates from layers (n=123) were mostly (94.3%) fully sensitive, with low numbers resistant to ampicillin (3.3%), streptomycin (0.8%), sulphonamides (4.1%) and tetracyclines (4.1%). No S. Enteritidis isolates from layers were resistant to nalidixic acid. There were only 9 isolates of S. Enteritidis from broilers and 5 of these were resistant to nalidixic acid and belonged to phage type 1. For S. Typhimurium in Gallus gallus 10 isolates were available for testing (seven from layers and one from broilers) and two isolates were fully sensitive. Three of these S. Typhimurium isolates were resistant to more than 4 antimicrobials.
In England and Wales 216 Salmonella isolates were tested from turkeys under Zoonoses Order monitoring in 2007 and 25% were fully sensitive. There were no S. Enteritidis isolates recovered from this species. For S. Typhimurium in turkeys, 24 isolates were available for testing and 20.8% of these were fully sensitive. 62.5% showed resistance to more than 4 antimicrobials. A total of 11 S. Typhimurium DT104 isolates from turkeys were examined and 10 possessed the typical ACSSuT pattern of pentavalent resistance associated with DT104; all 11 isolates were resistant to nalidixic acid.
In addition to monitoring under the Zoonoses Order, the baseline study of turkeys was also completed in 2007 and 173 isolates recovered in that study were examined for antimicrobial susceptibility. These 173 isolates were selected from the total number of available isolates for antimicrobial susceptibility testing by serotype and phage type, ensuring that different types were represented. There were no S. Enteritidis isolates recovered from turkeys. No resistance was detected to the third generation cephalosporins cefotaxime or ceftazidime. Resistance to both ciprofloxacin and nalidixic acid was

detected in S. Typhimurium (n=30; 27% resistant), S. Kottbus (n=73; 5% resistant) and also in other serotypes (Senftenberg, Indiana and Newport).

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

During 2007, no resistance to cefotaxime or ceftazidime was detected in Salmonella isolates from poultry. However 2 isolates with the antigenic structure O rough:G,S,T:-from fowl (Gallus gallus) were resistant to ciprofloxacin. This is an important finding since fluoroquinolones are important antimicrobials in the treatment of salmonellosis in humans. Resistance to ciprofloxacin was also detected in Salmonella isolates from turkeys.
The percentage of fully-susceptible Salmonella isolates from Gallus gallus increased in 2007.

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

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

D. Antimicrobial resistance in Salmonella in foodstuff derived from cattle

Results of the investigation

No results to report in 2007.

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Results of the investigation

No results to report in 2007.

F. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

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 for 2007

Table Antimicrobial susceptibility testing in S. Anatum

n = Number of resistant isolates	S. Anatum	
	Cattle (bovine animals)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		36
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	36	0
Streptomycin	36	1
Amphenicols		
Chloramphenicol	36	1
Cephalosporins		
Cefotaxim	36	0
Ceftazidim	36	0
Fluoroquinolones		
Ciprofloxacin	36	0
Fully sensitive	36	33
Penicillins		
Ampicillin	36	2
Quinolones		
Nalidixic acid	36	0
Resistant to 1 antimicrobial	36	2
Resistant to 2 antimicrobials	36	0
Resistant to 3 antimicrobials	36	0
Resistant to 4 antimicrobials	36	0
Resistant to >4 antimicrobials	36	1
Sulfonamides		
Sulfonamide	36	1
Tetracyclines		
Tetracyclin	36	3
Trimethoprim + sulfonamides		

Footnote

Bovine samples - random selection of clinical diagnostic sample isolates selected for monitoring programme. Disc diffusion test

Table Antimicrobial susceptibility testing in S. Derby

n = Number of resistant isolates	S. Derby					
	Pigs		**Turkeys**		**Pigs - fattening pigs - at slaughterhouse - Survey**	
Isolates out of a monitoring programme	yes		yes		no	
Number of isolates available in the laboratory	264		50		35	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides						
Gentamicin	264	0	50	0	35	0
Streptomycin	264	45	50	49	35	5
Amphenicols						
Chloramphenicol	264	12	50	0	35	1
Cephalosporins						
Cefotaxim	264	0	50	0	35	0
Ceftazidim	264	0	50	0	35	0
Fluoroquinolones						
Ciprofloxacin	264	0	50	0	35	2
Fully sensitive			50	1	35	10
Penicillins						
Ampicillin	264	30	50	1	35	0
Quinolones						
Nalidixic acid	264	6	50	0	35	2
Resistant to 1 antimicrobial			50	0	35	10
Resistant to 2 antimicrobials			50	0	35	1
Resistant to 3 antimicrobials			50	48	35	11
Resistant to 4 antimicrobials			50	0	35	2
Resistant to >4 antimicrobials			50	1	35	1
Sulfonamides						
Sulfonamide	264	139	50	49	35	14
Tetracyclines						
Tetracyclin	264	240	50	49	35	25
Trimethoprim					35	9

Footnote

Slaughter pigs - broth microdilution MIC performed for samples from Salmonella baseline survey in fattening pigs
Turkey and pig routine surveillance samples - random selection of clinical diagnostic sample isolates selected for monitoring programme. Disc diffusion test

Table Antimicrobial susceptibility testing in S. Dublin

n = Number of resistant isolates	S. Dublin	
	Cattle (bovine animals)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		346
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	346	0
Streptomycin	346	3
Amphenicols		
Chloramphenicol	346	0
Cephalosporins		
Cefotaxim	346	0
Ceftazidim	346	0
Fluoroquinolones		
Ciprofloxacin	346	0
Fully sensitive	346	341
Penicillins		
Ampicillin	346	1
Quinolones		
Nalidixic acid	346	0
Resistant to 1 antimicrobial	346	5
Resistant to 2 antimicrobials	346	0
Resistant to 3 antimicrobials	346	0
Resistant to 4 antimicrobials	346	0
Resistant to >4 antimicrobials	346	0
Sulfonamides		
Sulfonamide	346	0
Tetracyclines		
Tetracyclin	346	1
Trimethoprim + sulfonamides		

Footnote

Bovine samples - random selection of clinical diagnostic sample isolates selected for monitoring programme. Disc diffusion test

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

	S. Enteritidis
	Gallus gallus (fowl)
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	120

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																													
				<=6	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Aminoglycosides																																	
Gentamicin	13	120	0																	1	1	8	10	26	28	23	11	7	3	1		1	
Streptomycin	13	116	3		3														1	1	14	22	24	27	13	5	2		1	1	1	1	
Amphenicols																																	
Chloramphenicol	13	116	0											4	2	1		3	3	8	12	10	15	17	17	8	5	5	2	2			2
Cephalosporins																																	
Cefotaxim	29	120	0																									2	2	5	3	7	101
Ceftazidim	27	120	0																												1		119
Fluoroquinolones																																	
Ciprofloxacin	19	120	0															2	1	2						2	2	3	8	10	17	19	54
Penicillins																																	
Ampicillin	13	120	5	2	3										1						2		2		5	13	12	16	19	17	13	8	7
Quinolones																																	
Nalidixic acid	13	120	5		4	1															1	4	3	4	24	21	30	15	10	2			1
Sulfonamides																																	
Sulfonamide	13	120	6	1	5												1		1	2	3	3	4	4	11	12	8	10	8	6	5	4	32
Tetracyclines																																	
Tetracyclin	13	120	5	4	1															1	4	3	8	5	18	25	24	14	7	4	1	1	

Table Antimicrobial susceptibility testing of S.Enteritidis in animals

n = Number of resistant isolates	S. Enteritidis													
	Pigs - fattening pigs - at slaughterhou - Survey		**Cattle (bovine animals)**		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**		**Gallus gallus (fowl) - laying hens**		**Gallus gallus (fowl) - broilers**	
Isolates out of a monitoring programme		no		no		yes						yes		yes
Number of isolates available in the laboratory		2		7		9						123		9
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides														
Gentamicin	2	0	7	0	9	0					123	0	9	0
Streptomycin	2	0	7	0	9	0					123	1	9	2
Amphenicols														
Chloramphenicol	2	0	7	0	9	0					123	0	9	0
Cephalosporins														
Cefotaxim	2	0	7	0	9	0					123	0	9	0
Ceftazidim	2	0	7	0	9	0					123	0	9	0
Fluoroquinolones														
Ciprofloxacin	2	0	7	0	9	0					123	0	9	0
Fully sensitive	2	2	7	3	9	9					123	116	9	2
Penicillins														
Ampicillin	2	0	7	4	9	0					123	4	9	1
Quinolones														
Nalidixic acid	2	0	7	0	9	0					123	0	9	5
Resistant to 1 antimicrobial	2	0	7	4	9	0					123	3	9	6
Resistant to 2 antimicrobials	2	0	7	0	9	0					123	0	9	0
Resistant to 3 antimicrobials	2	0	7	0	9	0					123	4	9	1
Resistant to 4 antimicrobials	2	0	7	0	9	0					123	0	9	0
Resistant to >4 antimicrobials	2	0	7	0	9	0					123	0	9	0
Sulfonamides														
Sulfonamide	2	0	7	0	9	0					123	5	9	1
Tetracyclines														
Tetracyclin	2	0	7	0	9	0					123	5	9	0
Trimethoprim	2	0												
Trimethoprim + sulfonamides					9	0					123	0	9	0

Footnote

Laying hens - disc diffusion test performed Broilers - disc diffusion test performed Slaughter pigs - broth microdilution MIC test performed for samples from Salmonella baseline survey in fattening pigs Bovine amd pig routine surveillance samples - random selection of clinical diagnostic sample isolates selected for monitoring programme. Disc diffusion test

Table Antimicrobial susceptibility testing in S. Kottbus

n = Number of resistant isolates	S. Kottbus			
	Turkeys - unspecified - at farm - Survey		**Turkeys**	
Isolates out of a monitoring programme	no		yes	
Number of isolates available in the laboratory	73		53	
Antimicrobials:	**N**	**n**	**N**	**n**
Aminoglycosides				
Gentamicin	73	0	53	0
Streptomycin	73	1	53	0
Amphenicols				
Chloramphenicol	73	1	53	0
Cephalosporins				
Cefotaxim	73	0	53	0
Ceftazidim	73	0	53	0
Fluoroquinolones				
Ciprofloxacin	73	4	53	0
Fully sensitive	73	60	53	41
Penicillins				
Ampicillin	73	11	53	7
Quinolones				
Nalidixic acid	73	4	53	4
Resistant to 1 antimicrobial	73	6	53	9
Resistant to 2 antimicrobials	73	2	53	0
Resistant to 3 antimicrobials	73	0	53	1
Resistant to 4 antimicrobials	73	2	53	1
Resistant to >4 antimicrobials	73	3	53	1
Sulfonamides				
Sulfonamide	73	4	53	2
Tetracyclines				
Tetracyclin	73	10	53	7
Trimethoprim	73	3		

Footnote

Turkeys - broth microdilution MIC performed for samples from Salmonella baseline survey in turkeys Turkey routine surveillance samples - random selection of clinical diagnostic sample isolates selected for monitoring programme. Disc diffusion test

Table Antimicrobial susceptibility testing in S. Livingstone

n = Number of resistant isolates	S. Livingstone	
	Gallus gallus (fowl) - broilers	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		36
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	36	1
Streptomycin	36	1
Amphenicols		
Chloramphenicol	36	1
Cephalosporins		
Cefotaxim	36	0
Ceftazidim	36	0
Fluoroquinolones		
Ciprofloxacin	36	0
Fully sensitive	36	31
Penicillins		
Ampicillin	36	1
Quinolones		
Nalidixic acid	36	0
Resistant to 1 antimicrobial	36	1
Resistant to 2 antimicrobials	36	1
Resistant to 3 antimicrobials	36	2
Resistant to 4 antimicrobials	36	1
Resistant to >4 antimicrobials	36	0
Sulfonamides		
Sulfonamide	36	3
Tetracyclines		
Tetracyclin	36	2

Footnote

Broilers - disc diffusion test performed Turkeys - broth microdilution test performed. Samples from Salmonella baseline survey in turkeys

Table Antimicrobial susceptibility testing in S. Senftenberg

n = Number of resistant isolates	S. Senftenberg			
	Gallus gallus (fowl) - broilers		**Gallus gallus (fowl) - laying hens**	
Isolates out of a monitoring programme	yes		yes	
Number of isolates available in the laboratory	18		9	
Antimicrobials:	**N**	**n**	**N**	**n**
Aminoglycosides				
Gentamicin	18	0	9	0
Streptomycin	18	0	9	0
Amphenicols				
Chloramphenicol	18	7	9	0
Cephalosporins				
Cefotaxim	18	0	9	0
Ceftazidim	18	0	9	0
Fluoroquinolones				
Ciprofloxacin	18	0	9	0
Fully sensitive	18	9	9	9
Penicillins				
Ampicillin	18	1	9	0
Quinolones				
Nalidixic acid	18	1	9	0
Resistant to 1 antimicrobial	18	9	9	0
Resistant to 2 antimicrobials	18	0	9	0
Resistant to 3 antimicrobials	18	0	9	0
Resistant to 4 antimicrobials	18	0	9	0
Resistant to >4 antimicrobials	18	0	9	0
Sulfonamides				
Sulfonamide	18	0	9	0
Tetracyclines				
Tetracyclin	18	0	9	0

Table Antimicrobial susceptibility testing of S. Typhimurium in Cattle (bovine animals) - at farm - quantitative data [Diffusion method]

	S. Typhimurium
	Cattle (bovine animals) - at farm
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	87

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																													
				<=6	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Aminoglycosides																																	
Gentamicin	13	87	0															1	1	2	8	14	22	19	10	6	2	1	1				
Streptomycin	13	85	57	1	11	3	6	9	11	10	6	3	2	1		1	5	8	1	4	2	1											
Amphenicols																																	
Chloramphenicol	13	85	45	4	36	2	3									2	2		4	5	7	9	3	2	3	1		1			1		
Cephalosporins																																	
Cefotaxim	29	87	0																											1			86
Ceftazidim	27	87	0																						1	2	2	1	5	9	14	53
Fluoroquinolones																																	
Ciprofloxacin	19	87	0																1	1		1			1		3	6	6	9	22	14	23
Penicillins																																	
Ampicillin	13	87	57	7	38	9	1	2																1	1	5	7	6	4	3	3		
Quinolones																																	
Nalidixic acid	13	87	3	1		1					1										2	3	3	1	13	29	17	12	2	1		1	
Sulfonamides																																	
Sulfonamide	13	87	68	8	55	2	3					1									2	2	1	1	1	4	1	1		1		1	3
Tetracyclines																																	
Tetracyclin	13	87	60	16	24	7	12		1									1	2	1	2	1		1	7	8	1	1	1	1			
Trimethoprim + sulfonamides																																	
Trimethoprim + Sulfonamide	13	87	4	1	3															1				1	2	2	4	14	16	16	9	2	16

United Kingdom 2007

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates

S. Typhimurium

	Turkeys - unspecified - at farm - Survey		Pigs - fattening pigs - at slaughterhouse - Survey		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys		Gallus gallus (fowl) - laying hens		Gallus gallus (fowl) - broilers	
Isolates out of a monitoring programme	no		no		no		yes				yes		yes		yes	
Number of isolates available in the laboratory	30		97		86		792				24		7		1	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides																
Gentamicin	30	0	97	0	86	0	792	14			24	0	7	0	1	0
Streptomycin	30	18	97	67	86	57	792	628			24	14	7	4	1	0
Amphenicols																
Chloramphenicol	30	19	97	58	86	45	792	518			24	17	7	3	1	0
Cephalosporins																
Cefotaxim	30	0	97	0	86	0	792	0			24	0	7	0	1	0
Ceftazidim	30	0	97	0	86	0	792	0			24	0	7	0	1	0
Fluoroquinolones																
Ciprofloxacin	30	8	97	4	86	0	792	3			24	0	7	0	1	0
Fully sensitive	30	7	97	7	86	14	792	11			24	5	7	0	1	1
Penicillins																
Ampicillin	30	20	97	71	86	57	792	709			24	15	7	6	1	0
Quinolones																
Nalidixic acid	30	8	97	4	86	3	792	28			24	11	7	1	1	0
Resistant to 1 antimicrobial	30	2	97	9	86	3	792	21			24	1	7	0	1	0
Resistant to 2 antimicrobials	30	2	97	4	86	12	792	12			24	1	7	3	1	0
Resistant to 3 antimicrobials	30	1	97	4	86	3	792	28			24	2	7	0	1	0

Resistant to 4 antimicrobials	30	1	97	15	86	13	792	172			24	0	7	1	1	0
Resistant to >4 antimicrobials	30	17	97	58	86	41	792	548			24	15	7	3	1	0
Sulfonamides																
Sulfonamide	30	21	97	81	86	68	792	761			24	19	7	7	1	0
Tetracyclines																
Tetracyclin	30	20	97	79	86	60	792	726			24	18	7	4	1	0
Trimethoprim	30	1	97	54												
Trimethoprim + sulfonamides							792	597			24	0	7	0	1	0

Footnote

Laying hens - disc diffusion test performed Broilers - disc diffusion test performed Turkeys - broth microdilution MIC performed for samples from Salmonella baseline survey in turkeys Slaughter pigs - broth microdilution MIC performed for samples from Salmonella baseline survey in fattening pigs Bovine, pig and turkey routine surveillance samples - random selection of clinical diagnostic sample isolates selected for monitoring programme. Disc diffusion test

Table Antimicrobial susceptibility testing of Salmonella in animals

n = Number of resistant isolates	Salmonella spp.											
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**		**Gallus gallus (fowl) - laying hens**		**Gallus gallus (fowl) - broilers**	
Isolates out of a monitoring programme			yes									
Number of isolates available in the laboratory			50									
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides												
Gentamicin			50	0								
Streptomycin			50	3								
Amphenicols												
Chloramphenicol			50	1								
Cephalosporins												
Cefotaxim			50	0								
Ceftazidim			50	0								
Fluoroquinolones												
Ciprofloxacin			50	0								
Fully sensitive			50	6								
Penicillins												
Ampicillin			50	1								
Quinolones												
Nalidixic acid			50	4								
Resistant to 1 antimicrobial			50	2								
Resistant to 2 antimicrobials			50	7								
Resistant to 3 antimicrobials			50	29								
Resistant to 4 antimicrobials			50	5								
Resistant to >4 antimicrobials			50	1								
Sulfonamides												
Sulfonamide			50	42								
Tetracyclines												
Tetracyclin			50	40								

Footnote

S. Kedougou isolates from pig routine surveillance samples - random selection of clinical diagnostic sample isolates selected for monitoring programme. Disc diffusion test

Table Antimicrobial susceptibility testing in Other serotypes

n = Number of resistant isolates	Other serotypes							
	Turkeys - unspecified - at farm - Survey		**Pigs - fattening pigs - at slaughterhouse - Survey**		**Pigs**		**Turkeys**	
Isolates out of a monitoring programme	no		no					
Number of isolates available in the laboratory	70		35					
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides								
Gentamicin	70	0	35	0				
Streptomycin	70	28	35	5				
Amphenicols								
Chloramphenicol	70	1	35	1				
Cephalosporins								
Cefotaxim	70	0	35	0				
Ceftazidim	70	0	35	0				
Fluoroquinolones								
Ciprofloxacin	70	9	35	0				
Fully sensitive	70	12	35	16				
Penicillins								
Ampicillin	70	10	35	5				
Quinolones								
Nalidixic acid	70	9	35	0				
Resistant to 1 antimicrobial	70	3	35	5				
Resistant to 2 antimicrobials	70	19	35	1				
Resistant to 3 antimicrobials	70	27	35	7				
Resistant to 4 antimicrobials	70	5	35	4				
Resistant to >4 antimicrobials	70	4	35	2				
Sulfonamides								
Sulfonamide	70	50	35	14				
Tetracyclines								
Tetracyclin	70	47	35	18				
Trimethoprim	70	11	35	12				

Footnote

Turkeys - broth microdilution MIC performed on samples from Salmonella baseline survey in turkeys Slaughter pigs - broth microdilution MIC performed on samples from Salmonella baseline survey in fattening pigs

Table Breakpoints for antibiotic resistance testing in Animals

Test Method Used

Disc diffusion

Broth dilution

Standards used for testing

EUCAST/ EFSA

VLA

BSAC

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	EUCAST/ VLA	16		16			10	13		13
Florfenicol	EUCAST	16		16						
Tetracyclines										
Tetracyclin	EUCAST/ VLA	8		8			10	13		13
Fluoroquinolones										
Ciprofloxacin	EUCAST/ BSAC	0.06		0.06			1	19		19
Enrofloxacin										
Quinolones										
Nalidixic acid	EUCAST/ VLA	16		16			30	13		13
Trimethoprim	EUCAST	2		2						
Sulfonamides										
Sulfonamide	EUCAST/ VLA	256		256			300	13		13
Aminoglycosides										
Streptomycin	EUCAST/ VLA	32		32			25	13		13
Gentamicin	EUCAST/ VLA	2		2			10	13		13
Neomycin	VLA						10	13		13
Kanamycin	EUCAST	4		4						
Trimethoprim + sulfonamides										
Trimethoprim + Sulfonamide	VLA						25	13		13
Cephalosporins										
Cefotaxim	EUCAST/ BSAC	0.5		0.5			30	29		29
Ceftazidim	EUCAST/ BSAC	2		2			30	27		27
3rd generation cephalosporins										
Penicillins										
Ampicillin	EUCAST/ VLA	4		4			10	13		13

Footnote

Standard for breakpoint broth dilution is EUCAST/ EFSA
Standard for breakpoint disc diffusion is VLA for tetracycline, chloramphenicol, ampicillin, nalidixic acid, sulphonamide/ TMP, sulphonamide, streptomicin, gentamicin and neomycin
Standard for breakpoint disc diffusion is BSAC for cefotaxime, ceftazidime and ciprofloxacin

Table Breakpoints for antibiotic resistance testing in Feedingstuff

Test Method Used

Disc diffusion

Broth dilution

Standards used for testing

EUCAST/ EFSA

VLA

BSAC

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	EUCAST/ VLA	16		16			10	13		13
Florfenicol	EUCAST	16		16						
Tetracyclines										
Tetracyclin	EUCAST/ VLA	8		8			10	13		13
Fluoroquinolones										
Ciprofloxacin	EUCAST/ BSAC	0.06		0.06			1	19		19
Enrofloxacin										
Quinolones										
Nalidixic acid	EUCAST/ VLA	16		16			30	13		13
Trimethoprim	EUCAST	2		2						
Sulfonamides										
Sulfonamide	EUCAST/ VLA	256		256			300	13		13
Aminoglycosides										
Streptomycin	EUCAST/ VLA	32		32			25	13		13
Gentamicin	EUCAST/ VLA	2		2			10	13		13
Neomycin	VLA						10	13		13
Kanamycin	EUCAST	4		4						
Trimethoprim + sulfonamides										
Trimethoprim + Sulfonamide										
Cephalosporins										
Cefotaxim	EUCAST/ BSAC	0.5		0.5			30	29		29
Ceftazidim	EUCAST/ BSAC	2		2			30	27		27
3rd generation cephalosporins										
Penicillins										
Ampicillin	EUCAST/ VLA	4		4			10	13		13

Footnote

Standard for breakpoint broth dilution is EUCAST/ EFSA
Standard for breakpoint disc diffusion is VLA for tetracycline, chloramphenicol, ampicillin, nalidixic acid, sulphonamide/ TMP, sulphonamide, streptomicin, gentamicin and neomycin
Standard for breakpoint disc diffusion is BSAC for cefotaxime, ceftazidime and ciprofloxacin

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. In 2007 there was again a slight increase in human cases compared to 2006, although still less than the peak reached in 1998 of over 65,000 cases

Campylobacter is the most commmonly isolated bacterial gastrointestinal pathogen. 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

In the UK as a whole there were 57,590 cases reported in humans in 2007. This is an increase on the number of cases reported in 2006 (52126).

England and Wales:

Following the routine introduction of selective isolation media, the number of isolates rose steadily to peak with 58,059 cases reported in 1998. Since then the general trend in incidence has been downwards. In 2004 42,251 reports were received, however in 2005 that figure rose to 44,400 reports and increased again in 2006 to 46,339 reports. In 2007 there was a further increase by 5175 cases compared to 2006, with a total of 51,514 cases reported for the year

Scotland:

In 2007 there were 5194 laboratory reports of Campylobacter in Scotland, which is an increase of 7% on the previous year's total of 4857. In recent years laboratory confirmations have decreased from the 2000 peak of 6482, with 4558 recorded in 2005 and 4365 in 2004. Campylobacter has remained the most frequently reported gastrointestinal pathogen reported from humans in Scotland.

Northern Ireland:

Since 1991 Campylobacter infection has been the most commonly reported cause of bacterial food poisoning in Northern Ireland. Reports increased during the last decade to a high of 1001 in 2000, before falling over the next three years by 12% to 743 in 2003. Reported cases increased in 2005 by 5% with 890 reports and again by 4% in 2006 to 930 reports. There was a decrease in Campylobacter cases in 2007, with a total of 882 cases reported during the year. There were 52 imported cases during the year.

Food:

No data on food surveys for Campylobacter was available for 2007.

Animals:

No specific national studies were conducted in animals in 2007. In total there were 32 incidents of thermophillic campylobacters detected in cattle, 214 in sheep and 2 in pigs from clinical diagnostic samples submitted during the year.

Clinical diagnostic samples from Great Britain, submitted to the Veterinary Laboratories Agency during the year, were 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 isolations 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. In 2007 there was again a slight increase in human cases compared to 2006, although still less than the peak reached in 1998 of over 65,000 cases.
Campylobacter is the most commmonly isolated bacterial gastrointestinal pathogen. A proportion of Campylobacter isolates are speciated and indicate that Campylobacter jejuni accounts for the majority, followed by Campylobacter coli.
England and Wales:
Following the routine introduction of selective isolation media, the number of isolates rose steadily to peak with 58,059 cases reported in 1998. Since then the general trend in incidence has been downwards. In 2004, 42,251 reports were received, however in 2005 that figure rose to 44,400 reports and increased again in 2006 to 46,339 reports.
Scotland:
In recent years laboratory confirmations have decreased from the 2000 peak of 6482, with 4365 in 2004. In 2006 there were 4857 cases of Campylobacter in Scotland, denoting a nominal increase from 2005 when 4581 cases were recorded. Campylobacter has remained the most frequently reported gastrointestinal pathogen reported from humans in Scotland.
Northern Ireland:
Since 1991 Campylobacter infection has been the most commonly reported cause of bacterial food poisoning in Northern Ireland. Reports increased during the last decade to a high of 1001 in 2000, before falling over the next three years by 12% to 743 in 2003. Reported cases increased in 2005 by 5% to 890 reports and again by 4% in 2006 to 930 reports.

Results of the investigation

In the UK as a whole there were 57,590 cases reported in humans in 2007. This is an increase on the number of cases reported in 2006 (52,126).

England and Wales:
There were 51,514 cases of Campylobacter infection in 2007. Just under half of all of the reports received in 2007 (45%) came in the four months from June to September (a finding comparable to 2006). There were 705 imported cases during the year
Speciation is done only for a proportion of cases chosen at random from isolates from England and Wales. In 2007, 493 cases (as a representative sample) were speciated giving a ratio of 66.3% C. jejuni to 33.7% C. coli isolates.
Scotland:
In 2007 there were 5194 laboratory reports of Campylobacter in Scotland, which is an increase of 7% on the previous year's total of 4857. There were 36 imported cases in Scotland during the year. Campylobacter has remained the most frequently reported gastrointestinal pathogen reported from humans in Scotland.
Northern Ireland
There was a decrease in Campylobacter cases in 2007, with a total of 882 cases reported during the year. There were 52 imported cases during the year. 4 isolates were speciated: 3 were C. jejuni and 1 was C. 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. 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. 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.
No specific national studies were conducted in animals in 2007. Isolates obtained from a statistically based survey of cattle and pigs arriving at abattoirs in Great Britain was conducted in 2003 and has been reported in the 2004 report.

Table Campylobacter in humans - Species/ serotype distribution

Campylobacter	Cases 57590	Cases Inc. 95	Autochthon cases 55967	Autochthon Inc. 0	Imported cases 793	Imported Inc. 0	Unknown status 830
C. coli	167	0.3	163		4		0
C. jejuni	330	0.7	320		7		3
C. upsaliensis	0						0
Campylobacter spp., unspecified	57093	94	55484		782		827

Footnote

Speciation is done only for a proportion of cases chosen at random from isolates from England and Wales (as a representative sample). In Northern Ireland, 4 isolates were speciated. In total in 2007, 497 cases were speciated giving a ratio of 66.4% C. jejuni to 33.6% C. coli isolates.
In Northern Ireland, 4 isolates were speciated: 3 were C. jejuni and 1 was C. coli.
UK population 60,587,300. Incidence calculated per 100,000 population

Table Campylobacter in humans - Age distribution

Age Distribution	C. coli			C. jejuni			Campylobacter spp., unspecified		
	All	M	F	All	M	F	All	M	F
<1 year	3	1	1	7	3	4	857	480	353
1 to 4 years	13	10	3	28	18	9	2957	1697	1177
5 to 14 years	12	7	5	25	14	10	3010	1810	1146
15 to 24 years	20	14	6	34	17	15	6610	3432	3095
25 to 44 years	49	24	25	89	44	41	16730	8470	8078
45 to 64 years	47	24	23	91	44	47	17597	9351	8139
65 years and older	18	7	11	54	34	20	8844	4515	4283
Age unknown	5	1	0	2	0	0	985	434	482
Total :	167	88	74	330	174	146	57590	30189	26753

Footnote

Speciation is done only for a proportion of cases chosen at random from isolates from England and Wales (as a representative sample). In Northern Ireland, 4 isolates were speciated. In total in 2007, 497 cases were speciated giving a ratio of 66.4% C. jejuni to 33.6% C. coli isolates.

Table Campylobacter in humans - Seasonal distribution

Month	C. coli	C. jejuni	C. upsaliensis	Campylobacter spp., unspecified
	Cases	Cases	Cases	Cases
January	1	18		3199
February	1	14		2911
March	1	13		3173
April	4	20		3375
May	2	24		5278
June	1	41		7076
July	7	38		6923
August	65	37		6590
September	69	36		5504
October	16	40		5853
November	0	32		4493
December	0	17		3215
not known	0			0
Total :	167	330	0	57590

Footnote

Only a proportion of isolates are speciated and this indicates that for 2007 over 66% were C. jejuni.

2.2.3. Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Sampling strategy

At retail

LACORS/ HPA Coordinated Local Authority Sentinel Surveillance of Pathogens (CLASSP)
A three year Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA) study (November 2004 to October 2007), which is designed to provide surveillance data on the pathogens Salmonella and Campylobacter. Part A covers the surveillance of these pathogens in raw whole chicken on retail sale.
The enrichment method used was based on the Food and Drugs Administration Campylobacter method (Hunt JM, Abeyta C and Tran T. Campylobacter. In: US FDA Bacteriological Analytical Manual, 8th edition, current through revision A, 1998). Food treatments, such as heating, freezing or chilling can cause sub-lethal injury to Campylobacter spp., resulting in increased sensitivity to some antibiotics and lowered resistance to elevated incubation temperatures. The FDA enrichment culture method uses Bolton broth which allows resuscitation and recovery of injured organisms. This medium will be specified in the new version of ISO 10272.
All samples were tested for the presence or absence of Campylobacter and a selection of isolates speciated and screened for antimicrobial resistance.

Frequency of the sampling

At retail

Other: Specific studies ongoing in 2007

Type of specimen taken

At retail

Other: fresh refrigerated poultry meat

Definition of positive finding

At retail

Isolation of the organism from the sample. In the first study The enrichment method used was based on the Food and Drugs Administration Campylobacter method (Hunt JM, Abeyta C and Tran T. Campylobacter. In: US FDA Bacteriological Analytical Manual, 8th edition, current through revision A, 1998). Food treatments, such as heating, freezing or chilling can cause sub-lethal injury to Campylobacter spp., resulting in increased sensitivity to some antibiotics and lowered resistance to elevated incubation temperatures. The FDA enrichment culture method uses Bolton broth which

allows resuscitation and recovery of injured organisms. This medium will be specified in the new version of ISO 10272.

Diagnostic/ analytical methods used

At retail

Bacteriological method: ISO 10272:1995

Control program/ mechanisms

Recent actions taken to control the zoonoses

Food Standards Agency has continued the campaign directed at broiler production and based on intensified biosecurity measures.

Results of the investigation

LACORS/ HPA Coordinated Local Authority Sentinel Surveillance of Pathogens (CLASSP)
A three year Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA) study (November 2004 to October 2007), which is designed to provide surveillance data on the pathogens Salmonella and Campylobacter.
Results are not yet available for 2007

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.

2.2.4. Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

No national surveys were carried out in poultry on farm in 2007.

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for thermophilic Campylobacter spp.	C. hyointestinalis	C. jejuni	C. coli	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified	C. sputorum - C. sputorum subsp. bubulus
Cattle (bovine animals)	VLA	animal		32	1	5				23	3
Sheep	VLA	animal		214	1	19	11			183	
Pigs	NRL	animal		2						2	

Footnote

Table contains data from the UK.
Data from clinical sample submissions. Units tested are not known because the laboratory does not report negative results, unless as part of an official control programme or survey.
In Great Britain, 84% of submissions in 2007 were ovine and bovine abortion investigations. In cattle and in sheep 18% and 11% were thermophilic campylobacters respectively

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 2007.
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 pigs

Sampling strategy used in monitoring

Frequency of the sampling

Last survey was conducted in 2003 and the results were reported in 2004.

C. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

No surveys were conducted in 2007.

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

Results of the investigation

No surveys were conducted in 2007.

E. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived

from pigs

Sampling strategy used in monitoring

Frequency of the sampling

No surveys were conducted in 2007.

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

Sampling strategy used in monitoring

Frequency of the sampling

The isolates were derived from the study on whole chicken part of the three year Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA) study (November 2004 to October 2007), designed to provide surveillance data on the pathogens Salmonella and Campylobacter. Part A covers the surveillance of these pathogens in raw whole chicken on retail sale.

Laboratory methodology used for identification of the microbial isolates

The enrichment method used was based on the Food and Drugs Administration Campylobacter method (Hunt JM, Abeyta C and Tran T. Campylobacter. In: US FDA Bacteriological Analytical Manual, 8th edition, current through revision A, 1998). Food treatments, such as heating, freezing or chilling can cause sub-lethal injury to Campylobacter spp., resulting in increased sensitivity to some antibiotics and lowered resistance to elevated incubation temperatures. The FDA enrichment culture method uses Bolton broth which allows resuscitation and recovery of injured organisms. This medium will be specified in the new version of ISO 10272

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Tetractycline, Ampicillin, Ciprofloxacin, Nalidixic acid, Gentamycin, Erythromycin.

Breakpoints used in testing

Health Protection Agency standards

Results of the investigation

Results for 2007 are not yet available

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 in the UK in humans have fallen from a peak in the late 1980s following advice to pregnant women to avoid ripened soft cheeses and pates.
The number of human cases of Listeria monocytogenes in 2007 was 259, similar to the 210 reported cases in 2006, 229 cases in 2005 and 236 cases in 2004.

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

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.

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

LACORS/ HPA Focused Shopping Basket Sampling of selected foods from retail premises with a focus on Listeria monocytogenes and other Listeria spp:
Although listeriosis is a rare disease in the UK, a rise in the number of listeriosis cases in the UK has occurred over the last five years in particular in people over 60 years. The reason for the increase in listeriosis is unclear. In an attempt to try and understand this increase, a 12 month study focused on ready-to-eat foods that have been linked to the recent rise and/ or from case food histories was initiated from May 2006 onwards with the aim to investigate the microbiological quality of these products.
Ready-to-eat foods (sliced meats, sandwiches, cheeses, butter, probiotic drinks, and confectionery products containing cream) were sampled based upon a Shopping Basket approach from retail premises and examined for presence and levels of Listeria spp. including Listeria monocytogenes. All L. monocytogenes isolates were subtyped.
A total of 6983 food samples (2168 sliced meats, 1088 sandwiches, 1238 hard cheese, 722 spreadable cheese, 877 butter, 364 probiotic drinks, 526 confectionery products) were examined during the 12 months' study (May 2006 to April 2007), and 2.4% (166) contained L. monocytogenes. 0.3% (21) of samples failed EC legal food safety criteria (Regulation (EC) No 2073/ 2005 (as amended)) due to L. monocytogenes in excess of 100 cfu/ g (range 1.2 x 102 – 8.0 x 105 cfu/ g) most of which were from sliced meats (17) with the remainder from sandwiches (4).

Animals:
During 2007, listeriosis was diagnosed in 132 incidences in animals in Great Britain, in all cases from clinical diagnostic samples submitted by private veterinarians to the Veterinary Laboratories Agency. This included 45 incidences in cattle, where Listeria monocytogenes was diagnosed as the cause of abortion on several occasions, usually associated with the feeding of poor quality silage. Listeria innocua was implicated in an abortion investigation in a dairy cow. In sheep and goats there were 87 incidents where listeriosis was diagnosed during 2007. Listeriosis was not disgnosed in pigs, birds or wildlife during the year. The potential link, if any, between listeriosis infection in animals and infection in humans still remains unclear.

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.

Results of the investigation

In the UK there was a total of 259 laboratory reports in 2007.
England and Wales:
There were a total of 231 cases in 2007, an increase on the 187 cases reported in 2006. There were 82 recorded deaths for the year. 28 pregnancy-associated cases were reported.
Scotland:
In 2007 there were 23 laboratory confirmed cases of listeriosis, two of which were pregnancy associated. This is an increase of 35% on the 2006 total of 17 confirmed cases. In 2007 there were three deaths, but there were also underlying conditions which may have contributed to the fatal outcome.
Northern Ireland:
There were 5 cases reported in 2007, all of which were L. monocytogenes. None of these were pregnancy-associated. There is no data available on listeria associated deaths.

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

The total number of reports for 2006 was 210, a similar level to the 232 reported in 2005 and the 236 in 2004.
In England and Wales peak infection was seen in the late 1980's. There were a total of 231 cases in 2007, an increase on the 187 cases reported in 2006 and on the 198 cases in 2005, which was down from 217 cases the previous year (2004).
In Northern Ireland from 1989 to 2004 the number of laboratory reports of listeriosis has fluctuated between 1 and 6 per annum. Likewise in Scotland Reports rose from 10 in 1986 to a peak of 40 in 1988. In 2006 there were 17 laboratory confirmed cases of listeriosis, a 47% decrease on 2005 when there were 32 cases, but much closer to the 2004 total of 15 reports.

Table Listeria in humans - Species/ serotype distribution

Listeria	Cases 259	Cases Inc. 0.43
L. monocytogenes	259	0.43
Listeria spp.		
Congenital cases	30	0.05
Deaths (1)	85	0.14

(1) : No information on deaths for Northern Ireland

Footnote

Incidence calculated per 100,000 based on total UK population of 60,587,300 in 2007

Table Listeria in humans - Age distribution

Age Distribution	L. monocytogenes			Listeria spp.		
	All	M	F	All	M	F
<1 year	16	7	9	16	7	9
1 to 4 years	0	0	0	0	0	0
5 to 14 years	2	1	1	2	1	1
15 to 24 years	5	1	4	5	1	4
25 to 44 years	25	5	20	25	5	20
45 to 64 years	68	41	27	68	41	27
65 years and older	142	82	60	142	82	60
Age unknown	1	0	1	1	0	1
Total :	259	137	122	259	137	122

Footnote

Only L. monocytogenes reported as Listeriosis

2.3.3. Listeria in foodstuffs

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	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										
hard										
made from raw or low heat-treated milk										
- at retail	HPA/ LACORS study	single	100g	1238	2	1238	2	1238	0	0
Dairy products (excluding cheeses)										
butter										
- at retail	HPA/ LACORS study	single	100g	877	0	877	0	877	0	0
probiotic drinks										
- at retail - Surveillance	HPA/ LACORS study	single	100g	364	0	364	0	364	0	0
Cheeses, made from unspecified milk or other animal milk										
spreadable										
- at retail - Surveillance	HPA/ LACORS study	single	100g	722	0	722	0	722	0	0

Footnote

Methods used:
Health Protection Agency National Standard method F19 based on BS EN ISO:11290:1997 incorporating amendment No.1:2004 Microbiological examination of food and animal feeding stuffs- Horizontal method for detection and enumeration of L.monocytogenes - Part 1: Detection Method.
and
Health Protection Agency National Standard method F19 based on BS EN ISO:11290:1998 incorporating amendment No.1:2004 Microbiological examination of food and animal feeding stuffs- Horizontal method for detection and enumeration of L.monocytogenes - Part 2: Enumeration Method.

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	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
Meat from other animal species or not specified										
meat products										
cooked, ready-to-eat										
- at retail - Surveillance	HPA/ LACORS Study	single	100g	2168	84	2168	60	2168	7	17
Other processed food products and prepared dishes										
sandwiches										
- at retail - Surveillance	HPA/ LACORS study	single	100g	1088	76	1088	63	1088	9	4
Confectionery products and pastes										
- at retail - Surveillance	HPA/ LACORS study	single	100g	526	4	526	4	526	0	0

Footnote

Methods used:
Health Protection Agency National Standard method F19 based on BS EN ISO:11290:1997 incorporating amendment No.1:2004 Microbiological examination of food and animal feeding stuffs- Horizontal method for detection and enumeration of L.monocytogenes - Part 1: Detection Method.
and
Health Protection Agency National Standard method F19 based on BS EN ISO:11290:1998 incorporating amendment No.1:2004 Microbiological examination of food and animal feeding stuffs- Horizontal method for detection and enumeration of L.monocytogenes - Part 2: Enumeration Method.

2.3.4. Listeria in animals

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria spp.	L. monocytogenes	Listeria spp., unspecified
Cattle (bovine animals)	VLA	animal		45		45
Sheep	VLA	animal		80		80
Goats	VLA	animal		7		7

Footnote

Data for Great Britain - England, Wales and Scotland only.
Diagnoses made from clinical diagnostic material submitted to the VLA. Units tested are not known because the laboratory does not report negative results.
The numbers above are numbers of incidents. There may be more than 1 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

Humans:
In UK in total in 2007 there were 1113 laboratory confirmed cases of VTEC infection, a decrease on the 1234 recorded cases in 2006. There were 1129 cases reported in 2005 and 898 in 2004. During 2007, there were 31 cases of HUS, compared to the 60 cases reported in 2006, and 38 cases of HUS reported in 2005.
In 2007, the HPA Laboratory of Enteric Pathogens confirmed 822 cases of VTEC O157 in England and Wales, a decrease on the annual total of 977 for 2006 and 938 in 2005.
In Northern Ireland there was a slight increase in the number of cases reported compared with the previous year to 54 reports (including the 16 VTEC isolates that have not yet had toxin confirmed). There were 46 reports of E. coli O 157 in 2006, 43 of which were VT positive, 49 reports of E. coli O 157 in 2005, 46 of which were VT positive and 19 in 2004, of which 18 were VT positive.
Enhanced surveillance for VTEC was initiated in Scotland in 1999 and for HUS in 2003. In 2007 there were a total of 222 cases of VTEC O157 and 20 reported cases of HUS. During 2006 there were a total of 230 cases of VTEC O157, 34 of which were from cases of HUS, and 18 cases of non-O157 VTEC. An additional case of HUS was identified on clinical signs and serology. The 34 cases of HUS seen in 2006 is the highest number of cases in Scotland since enhanced surveillance began in 2003. In 2005 there were 167 VTEC O157, and 17 of those were from cases of HUS. Reports of isolate and seropositive E.coli O157 cases fell in 2003 by 33% on the previous year, but rose again by 37% in 2004 to 210 cases.
Scotland generally reports higher rates of E.coli O157 than the rest of the UK. On average 5.3 cases per 100,000 population were reported annually from 1995 to 2004 in Scotland, rising to 9.9 cases in 1996. Most cases are sporadic, with different aetiology related to farm animals and their environment. Over 98% of E.coli O157 isolates are verotoxigenic (VT). Background incidence of E.coli O157 averages 200 to 250 cases per year in Scotland and in 2005 there were 2.9 cases per 100,000 population compared with 2.2 and 1.7 cases per 100,000 population in Northern Ireland, and England and Wales, respectively. The reports of VTEC O157 cases increased in 2007, and Scotland continued to have the highest incidence per 100,000 population in the UK with an incidence rate of 4.34 per 100,000 population.
Animals:
No formal national surveys were carried out in 2007. A survey of eligible cattle, sheep and pigs was carried out in 2003 - see report for 2003. 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. Three premises were visited and such investigations undertaken into potential human-animal contact links in 2007. In 2 of the 3 premises, isolates of VTEC with an indistinguishable PFGE profile from that found in the human cases were detected in cattle, sheep, goats, pigs and farm dogs.
As part of an enhanced surveillance programme, a total of 361 E. coli isolates were examined during 2007. Of the 347 isolates tested from animal endemic disease submissions, virulence factors with zoonotic potential were detected in 28 isolates. Overall, 14 (4.0%) of the 347 isolates from clinical disease cases in animals were VT+ compared with 20 (5.3%) of the 374 isolates examined in 2006 and 12 (5.7%) of the 210 isolates examined in 2005.

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 (i.e., individual cases not known to be associated with any other cases) 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 2007, where potential links to animal contacts were examined, several animal species in 2 out of the 3 premises investigated showed VTEC isolates with PFGE profiles inditinguishable from the human isolates from the human outbreak cases.

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.

Results of the investigation

In UK in total in 2007 there were 1113 laboratory confirmed cases of VTEC infection. Of the cases, 1084 were caused by VTEC O157. During 2007, there were 31 cases of HUS, all except one case caused by VTEC O157.
England and Wales:
In 2007, the HPA Laboratory of Enteric Pathogens confirmed 833 cases of VTEC O157 in England and Wales, including 11 cases of HUS, one an imported case. This was an decrease on the reported cases for 2006 (1003) and 2005 (932). The incidence per 100,000 population for laboratory confirmed E. coli O157 VT+ cases in 2007 was 1.6 and for laboratory confirmed HUS with VTEC O157 (VT+) cases it was 0.02.
Scotland:
Enhanced surveillance for VTEC was initiated in Scotland in 1999 and for HUS in 2003. In Scotland in 2007 there were a total of 237 cases of VTEC O157, 18 of which were from cases of HUS. Two

additional cases of HUS were identified on clinical signs, but not confirmed in the laboratory. There was 1 laboratory confirmed case of HUS with non-O157 VTEC. 222 cases of non-HUS VTEC O175 infections were identified during the year and 15 cases of non - HUS other VTEC infections were also recorded. A further 5 laboratory confirmed cases have not been included in the data tables for the year as their isolates did not possess VT genes. Scotland continued to have the highest incidence per 100,000 population in the UK with an incidence rate of 4.34 per 100,000 population for laboratory confirmed E. coli O157 VT+ cases in 2007. The incidence for laboratory confirmed HUS with VTEC O157 (VT+) was 0.33 in 2007.
Northern Ireland:
In Northern Ireland there were 54 reports of laboratory confirmed E. coli infections in 2007, 38 of these confirmed as VTEC O157 VT positive. These are provisional figures for 2007 and there are 16 isolates for which toxin information has not yet been received. The incidence per 100,000 population for laboratory confirmed E. coli O157 VT+ cases was 2.18 for 2007

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

In UK in total in 2007 there were 1113 laboratory confirmed cases of VTEC infection, a decrease on the 1234 recorded cases in 2006. There were 1129 cases reported in 2005 and 898 in 2004. Of the cases, 1108 were caused by VTEC O157, compared to 1216 in 2006. During 2007, there were 31 cases of HUS, compared to the 60 cases reported in 2006, and 38 cases of HUS reported in 2005.
In England and Wales there was a decrease in the number of reported cases for 2007 compared to 2006. In Northern Ireland there was a slight increase in the number of cases reported compared with the previous year (including the 16 VTEC isolates that have not yet had toxin confirmed). There were 46 reports of E. coli O 157 in 2006, 43 of which were VT positive, 49 reports of E. coli O 157 in 2005, 46 of which were VT positive and 19 in 2004, of which 18 were VT positive.
In Scotland in 2006 there were a total of 230 cases of VTEC O157, 34 of which were from cases of HUS, and 18 cases of non-O157 VTEC. An additional case of HUS was identified on clinical signs and serology. The 34 cases of HUS seen in 2006 is the highest number of cases in Scotland since enhanced surveillance began in 2003. In 2005 there were 167 VTEC O157, and 17 of those were from cases of HUS. Reports of isolate and seropositive E.coli O157 cases fell in 2003 by 33% on the previous year, but rose again by 37% in 2004 to 210 cases. Scotland generally reports higher rates of E.coli O157 than the rest of the UK. On average 5.3 cases per 100,000 population were reported annually from 1995 to 2004 in Scotland. Most cases are sporadic, with different aetiology related to farm animals and their environment. Over 98% of E.coli O157 isolates are verotoxigenic (VT). Background incidence of E.coli O157 averages 200 to 250 cases per year in Scotland and in 2005 there were 2.9 cases per 100,000 population compared with 2.2 and 1.7 cases per 100,000 population in Northern Ireland, and England and Wales, respectively. The reports of VTEC O157 cases increased in 2007, and Scotland continued to have the highest incidence per 100,000 population in the UK with an incidence rate of 4.34 per 100,000 population.

Relevance as zoonotic disease

While foodborne outbreaks have been well documented, many cases of VTEC O157 are sporadic (i.e., individual cases not known to be associated with any other cases) 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 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. These investigations variously involve collaboration with other organisations, including the Environmental Health departments of Local Authorities and the Health and Safety Executive. Three premises were visited and such investigations undertaken into potential human-animal contact links in 2007. In 2 of the 3 premises, isolates of VTEC with an indistinguishable PFGE profile from that found in the human cases were detected in several animal species.

Table Escherichia coli, pathogenic in humans - Age distribution

Escherichia coli, pathogenic	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
HUS (1)						
- clinical cases (2)	2		2			
- lab. confirmed cases	29		28		1	
- caused by O157 (VT+)	28		27		1	
- caused by other VTEC	1		1		0	
E.coli infect. (except HUS) (3)						
- clinical cases	0		0		0	
- laboratory confirmed (4)	1113		907		152	
- caused by 0157 (VT+)	1077		889		150	
- caused by other VTEC	20		18		2	

(1) : Great Britain data only - England, Wales and Scotland. Data on HUS not available from Northern Ireland
(2) : Clinical cases numbers not known for England and Wales. 2 clinical cases for Scotland.
(3) : Data for UK.
Including 16 cases from Northern Ireland where toxin information is not yet known
(4) : Including 16 cases from Northern Ireland where toxin information is not yet known

Footnote

Information on classification of cases as autochtonus or imported is not available for Northern Ireland

Table Escherichia coli, pathogenic in humans - Species/ serotype distribution

Age Distribution	Verotoxigenic E. coli (VTEC)			VTEC O157:H7			VTEC non-O157		
	All	M	F	All	M	F	All	M	F
<1 year	19	12	7	0	0	0	2	0	2
1 to 4 years	155	84	71	15	6	9	5	4	1
5 to 14 years	171	84	87	8	3	5	2	0	2
15 to 24 years	140	74	66	1	1	0	2	1	1
25 to 44 years	223	85	138	0	0	0	2	0	2
45 to 64 years	204	68	136	2	1	1	4	4	0
65 years and older	152	50	102	5	0	5	3	1	2
Age unknown	13	5	3	0	0	0	0	0	0
Total :	1077	462	610	31	11	20	20	10	10

Footnote

HUS cases included under VTEC O157:H7 column. All cases of HUS were O157:H7, except for 1 case in Scotland which was caused by other VTEC.
There were 20 HUS cases in Scotland (all autochtone cases). In England and Wales there were 11 cases of HUS (one imported).
There were 20 cases of non O157 infection - 15 identified in Scotland and 5 in England and Wales.
In Northern Ireland, only E coli O157 are identified as VT producing or not. Information on HUS not available.

2.4.3. Escherichia coli, pathogenic in foodstuffs

2.4.4. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

The last formal national survey in cattle, sheep, and pigs was conducted in 2003 in Great Britain, and results are in the report for 2003.
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. Three premises were visited and such investigations undertaken in 2007.
A scheme for enhancing surveillance of E. coli from diagnostic submissions to the VLA was introduced in 2005 to detect new and emerging strains of potential zoonotic importance and those associated with disease in animals. It utilises standardised case definitions, colony selection criteria and extended serotyping plus Verocell assay, Multiplex PCR and Real Time PCRs to determine the following virulence factors: Vero cytotoxins (VT), eae (intimin), cytotoxic necrotising factor (CNF), cytolethal distending toxin (CLDT), heat-stable toxin (Sta), heat-labile toxin (LT), and fimbrial adhesions. Findings are entered onto a dedicated database (Ecotest) to facilitate surveillance and monitor trends over time. Antimicrobial sensitivity testing of the isolates to detect extended-spectrum beta-lactamase (ESBL) enzymes is included

Results of the investigation

Outbreak investigations - all livestock spp:
3 premises were identified as potentially linked to 2 human disease outbreaks - 2 open farms and one small commercial farm. In the first outbreak, E. coli O157 was isolated on the premises under investigation from 17 (20.5%) of 83 faecal samples. Most positives (14) were from sheep, including lambs that had been bottle-fed by visitors (probable source). VTEC O157 PT2 VT2+ was confirmed in ewes and lambs, an adult pig and 4-6 month old calves, with indistinguishable PFGE profiles found in animals and the human cases.
In the second outbreak, the first premises investigated lead to the identification of E. coli O157 isolated from 16 (24%) of 66 faecal samples from animals. Positive samples were from sheep (10), cattle (3), horses (2) and goats (1). VTEC O157 PT38 VT2+ was isolated from each of these species. The PT differed from human cases and the premises were eliminated as the source. Extension of the investigation to a second premises resulted in the isolation of E. coli O157 from seven (24%) of 29 animal faecal samples. Positive samples were obtained from calves and their environment (5) and from faeces of two farm dogs. All seven isolates were identified as VTEC O157 PT21/ 28 VT2+, with an indistinguishable PFGE profile from that found in the human cases.

E. coli enhanced surveillance - all livestock species:
A total of 361 E. coli isolates were examined during 2007. Of the 347 isolates tested from animal endemic disease submissions, virulence factors with zoonotic potential were detected as follows: 5 (1.4%) were VT1+ and eae positive, 2 (0.6%) were VT1+, VT2+ and eae positive, 1 (0.3%) was VT1+ and VT2+, 2 (0.6%) were VT1+ only, 4 (1.2%) were VT2+ only and 24 (6.9%) were eae positive only. Overall, 14 (4.0%) of the 347 isolates from clinical disease cases in animals were VT+ compared with 20 (5.3%) of the 374 isolates examined in 2006 and 12 (5.7%) of the 210 isolates examined in 2005. The VTECs were isolated from cattle, sheep, goat and pigs. Twelve isolates (3.5%) contained the cytotoxic necrotizing factor (CNF) which was isolated from cattle, sheep/ goats, pigs and other species. This compared with sixteen isolates (4.3%) in 2006.

Additional information

VTEC O157 in farm dogs: farm dogs were thought to be the probable source of infection for one of the VTEC outbreaks in humans investigated during 2007 (as above) because of their close contact with the index case and with infected cattle. The dogs were individually resampled on two further occasions: VTEC O157 was not isolated again from either dog although sorbitol fermenting VT-negative E. coli O157 was coincidentally isolated from one dog on both occasions. VTEC O157 has previously been reported in dogs in association with human cases. However, it appears to be an uncommon occurrence and probably reflects temporary carriage and shedding following contact with cattle.

Table VT E. coli in animals

	Source of information	Sampling unit	Sample weight	Units tested	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC NT (Not Typeable)	Verotoxigenic E. coli (VTEC) - VTEC O103	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified	Verotoxigenic E. coli (VTEC) - VTEC O26
Cattle (bovine animals)					28	1	1	10	7		9
calves (under 1 year)	VLA	animal									
Sheep											
- at farm	VLA	animal			29			24	5		
Goats											
- at farm	VLA	animal			1			1			
Pigs	VLA	animal			11	2	2	1	6		
Solipeds, domestic	VLA	animal			2			2			
Dogs	VLA	animal			2			2			
Birds	VLA	animal			5		3		2		

Footnote

Table contains data from Great Britain - England, Wales and Scotland only.
VTEC O157 isolates from cattle, sheep, goats, horses, pigs and dogs all identified during human disease outbreak investigations undertaken during the year (3 investigations in total).
Units tested are not known because the laboratory does not report negative results.
Enhanced surveillance - 361 E. coli isolates were examined during 2007 - 14 were from clinical disease cases in animals and 347 were clinical diagnostic samples from animal endemic disease submissions which were examined as part of an enhanced surveillance programme for VTEC in animals.

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, Wales, and Scotland)
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 gradually regressed since then, and in the period between the 1985 and 2003 the total number of TB herd breakdowns ('incidents') in GB rose at an average annual rate of 16%. More recently, this annual rate of increase has slowed down although in 2007 there was an overall worsening in key epidemiological parameters relative to 2006. At the end of 2007, the United Kingdom was one of several EU Member States not officially recognized as TB free (OTF) under Directive 64/ 432/ EEC, due to the incidence of TB in its national cattle herd. Over 90% of cattle herds still retained their individual OTF status at the end of 2007 and the distribution of bovine TB incidents in GB continues to show a high degree of geographical clustering. 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. Scientific evidence suggests that in the areas of endemically high TB incidence 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. Northern Ireland did not obtain Community co-financing for its TB eradication programme in 2007.

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

Great Britain (England, Wales and Scotland) – Provisional data for 2007 collated at the end of March 2008:
At the end of 2007 approximately 3.6 per cent of British herds were under bovine TB restriction due to a bovine TB incident. Ninety one per cent of British herds were officially bovine TB-free at the end of 2007. The estimated confirmed herd incidence of bovine TB in Great Britain in 2007 was just under 4 per cent , with approximately 4.4 TB test reactors found for every 1,000 animals tested.
There was a provisional 18.2% increase in the number of new TB incidents in Great Britain in 2007 (4,172) compared to 2006 (3,531). Taking into account the overall number of tuberculin skin tests performed in unrestricted herds (56,605 in 2007, practically unchanged on 2006), this equates to a total herd incidence of TB breakdowns of 7.4%, compared to 6.2% for the previous year. The provisional average herd incidence of confirmed breakdowns for the year was 3.9% (3.6% for 2006).

Northern Ireland:
At the end of 2007 approximately 5.35% of herds in Northern Ireland were under bovine TB restriction due to a bovine TB incident. This is a reduction on the 6.23% of herds under restriction at the end of 2006. There were 1,264 new reactor herds and 7,299 reactor animals detected since the start of 2007. 89.9% of Northern Irish herds were officially bovine TB-free at the end of 2007

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. The advent of pasteurisation of virtually all the milk supply and a compulsory TB control programme in cattle has dramatically reduced the incidence of 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 milk directly to consumers undergo annual TB testing by the Animal Health Agency (AH), on the assumption that any infected cows will be identified before M. bovis colonises the udder. 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. classes as imported cases) or reactivation of long-standing latent infection contracted before the introduction of milk pasteurisation in the 1950s. Their geographical distribution does not mirror that of bovine TB in the cattle population. There are no documented instances of infection associated with eating contaminated meat.
In 2007 there were 21 (provisional) cases of M bovis in humans in UK and none were known to be directly associated with contact with infected cattle. There was no information available for the year on possible cases of re-activation.

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 cattle owner according to an average market value set by the Department on a monthly basis for each category 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. In herds with multiple reactors only a representative number of carcases will normally 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 infection with M. bovis was confirmed) tuberculin test at 60-day intervals with negative results. Any cattle moved out of an infected herd between the last clear test and the disclosure of reactors are traced forward and tested (if still alive on another holding). Cattle on holdings that are contiguous to an infected herd are also tuberculin tested. Six months after the restoration of OTF status affected herds undergo tuberculin check testing. If this test is negative, a second check 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 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 have tested negative to a TB test within 60 days prior to movement unless the herd or movement meets an exemption. Pre-movement tuberculin tests for cattle over 42 days of age became compulsory in England and Wales in March 2007. In Scotland, pre- and post-movement testing was introduced in September 2005 for cattle over 42 days of age.

Additional information

During 2007, Mycobacterium bovis was isolated from 2 sheep, 2 goats, 7 pigs, 4 alpacas, 15 llamas, 15 cats, 1 dog, and 25 deer. In Northern Ireland, 72 badgers (found dead including road traffic accidents) were tested and 12 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 Northern Ireland between 1989 and 2006 the number of reports of M. bovis has varied from 0 to 7 per year.

Results of the investigation

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. There is no information available on gender and age group of the affected cases and no information on the total M. tuberculosis cases in the region for the year.
In 2007 in Scotland there was one case of tuberculosis due to M. bovis reported, compared with 6

cases in 2006 and 4 cases in 2005.
In Northern Ireland in 2006 there were no human cases of M. bovis notified. This compares with 3 in 2006 and 5 cases in 2005.
There was no information available on classification as reactivation of previous cases for the year due to the provisional nature of the data.

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

See results of the investigations above.

Relevance as zoonotic disease

As noted above the number of cases of M. bovis has remained low. In Scotland it was noted that numbers of human cases of M.bovis have steadily declined over recent years, and that no link has been established between recently confirmed human cases and infection in animals.

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.

Table Mycobacterium in humans - Species/ serotype distribution

Mycobacterium	Cases 368	Cases Inc. 0.03	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
M. bovis	22	0.03				
M. tuberculosis (1)	346					
Reactivation of previous cases						

(1) : Scotland and Northern Ireland only

Footnote

Data on M. tuberculosis cases not available for England and Wales, therefore no incidence calculated for the UK.
Data on reactivation of previous cases, autochtone and imported cases not available.
Incidence of M. bovis per 100,000 based on population statistics for the UK reported as 60,587,300

Table Mycobacterium in humans - Age distribution

Age Distribution	M. bovis		
	All	M	F
<1 year	0	0	0
1 to 4 years	0	0	0
5 to 14 years	0	0	0
15 to 24 years	0	0	0
25 to 44 years	0	0	0
45 to 64 years	0	0	0
65 years and older	1	1	0
Age unknown	21		
Total :	22	1	0

Footnote

Provisional data for the UK
There were no cases of M. bovis in humans in Northern Ireland (provisional) and only 1 case in Scotland
There were 21 cases in England and Wales but gender and age information not available (provisional)

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.

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, last amended on 8 July 2002 by Commission Regulation 1226/ 2002.

Frequency of the sampling

Great Britain (England, Wales, and Scotland):
Compulsory tuberculin testing of cattle herds continued to take place every one to four years according to the proportion of herds in a specific area sustaining a confirmed TB breakdown over the previous 2, 4 or 6 years. At the end of 2007, 30.4 % of all cattle herds in Great Britain were on an annual tuberculin testing frequency. The remainder were tested every two (12.7%), three (0.3%), or four (56.6%) years. TB testing intervals for the whole country are reviewed every year, to ensure compliance with Annex A of Directive 64/ 432/ EEC. Interim adjustments may take place locally in response to a rising TB incidence. Furthermore, individual herds in 2-, 3- and 4-yearly testing areas are subject to routine annual testing if they present an increased public or animal health risk (e.g. producers of raw drinking milk from cows, herds owned by dealers, bull hirers).
Statutory pre-movement testing is carried out on all animals over 42 days of age moving out of 1 and 2- yearly testing
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) tuberculin

according to the procedure described in Annex B to Directive 64/ 432/ EEC. The interpretation of test results is in line with this Regulation, although a more severe interpretation is applied upon confirmation of TB in a herd. The SICCT test is the primary 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 are disclosed, they are required to be isolated and retested up to two times at 60 day intervals. If reactors are found at retest, they are 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:
In Great Britain, during 2007, the use of the gamma interferon (γ-IFN) blood test (Bovigam) to enhance the cattle testing programme continued. Since October 2006 use of the γ-IFN 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 occasionally in herds with persistent, confirmed breakdowns in high incidence areas. Overall, 30,644 γ-IFN tests were carried out in 2007 and 2,773 positive animals were identified for removal.
On 1 March 2007, statutory pre-movement tuberculin testing was extended to cattle over 42 days old moving out of a 1 or 2 yearly tested herd in England and Wales, unless the herd or movement is exempt. Lowering of the age requirement brought the pre-movement testing arrangements into line with those which had been introduced in Scotland in September 2005.

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.

Diagnostic/ analytical methods used

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 reactors are detected at test, they are removed to slaughter. Lymph node samples or lesions of tuberculosis are submitted for laboratory examination. Where lesions of tuberculosis are suspected at routine slaughter they are also submitted for laboratory examination.

Vaccination policy

Vaccination of cattle against TB is not carried out in the UK and is expressly forbidden by the domestic animal health legislation.
In Great Britain, consideration is now being given to policy options for the deployment of a vaccine against TB in cattle and/ or badgers, alongside the existing control measures.

Other preventive measures than vaccination in place

As described under control program mechanisms.
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 negative results to two consecutive herd tests in 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.
These new Orders retained the obligation to notify to Divisional Veterinary Managers (DVMs) of the Animal Health Agency of any suspicion of TB in live cattle and deer and their carcases. They also introduced a new duty to report to DVMs 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 are taken as described under control programs above.

Results of the investigation

These are decribed in the National evaluation of the recent situation, the trends and sources of infection above and in the tables.

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

United Kingdom - Great Britain:
(England, Wales and Scotland) – Provisional data for 2007 collated on 19 March 2008.
A total of 56,605 unrestricted herds in Great Britain were tested in 2007, a 0.2% decrease on the 56,722 herd tests performed in 2006. 7.5% more animals received a tuberculin test in 2007 than in the previous year (5.88 million against 5.47 million cattle). 30,644 cattle were tested by the gamma interferon (γ-IFN) blood test.
Sixty five percent of all herd tests are completed in the six-month period from November to April. Cattle herd numbers continued to decline across GB in relation to previous years (just over 86,281 herds registered at the end of 2007).
At the end of 2007 approximately 3.6 per cent of British herds were under bovine TB restriction due to a bovine TB incident (not including herds under restriction for an overdue tuberculin test). 91% of British herds were officially bovine TB-free at the end of 2007 . The estimated confirmed herd incidence of bovine TB in Great Britain in 2007 was just under 4 per cent. This figure refers to confirmed new bovine TB breakdowns as a per cent of tests on unrestricted herds in GB tested between 1st January and 31st December 2007. There was a provisional 18.2% increase in the number of new TB incidents in Great Britain in 2007 (4,172) compared to 2006 (3,531). The total new bovine TB breakdowns as a per cent of tests on unrestricted herds in the same period was 7.4%. Approximately 4.4 TB reactors were found for every 1000 animals tested.
A total of 28,200 cattle were slaughtered in 2007 for TB control purposes.
The number of cattle carcases with suspicious TB lesions detected at routine meat slaughter rose from 853 in 2006 (of which 65.6% were confirmed as M. bovis infections) to 961 in 2007 (of which 65.5% confirmed).
United Kingdom - Northern Ireland:
At the end of 2007 approximately 5.35% of herds in Northern Ireland were under bovine TB restriction due to a bovine TB incident. This is a reduction on the 6.23% of herds under restriction at the end of 2006. There were 1,264 new reactor herds and 7,299 reactor animals detected since the start of 2007. 89.9% of Northern Irish herds were officially bovine TB-free at the end of 2007. 3,181 reactor animals and animals detected with suspicious lesions at slaughter underwent histopathological examination. 554 of these were detected positive for M. bovis.

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.
In 2007 there were 22 (provisional) cases of M bovis in humans in the UK and none were known to be directly associated with contact with infected cattle.

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. Under the same order, the Animal health Agency (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 GB. 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. 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).

Methods of sampling (description of sampling techniques)

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 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 be under permanent restrictions unless de-stocked. Tuberculin testing is carried out on contiguous cattle premises.

Vaccination policy

Vaccination is not permitted.

Measures in case of the positive findings or single cases

If lesions suggestive of TB are reported 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 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 be under permanent restrictions unless de-stocked. TB testing is carried out on 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).

Results of the investigation

United Kingdom - Great Britain:
During 2007, M. bovis was cultured from 1 of 19 farmed, 4 of 7 park and 20 of 41 wild (or other) tuberculous deer carcases detected at post-mortem inspection (statutory notifications to Animal Health or Veterinary Laboratories Agency). Virtually all of the infected wild deer carcases were found in counties of southwest England and southeast Wales where there is a high incidence of bovine TB.
United Kingdom - Northern Ireland
93 deer carcasses were subject to investigation for tuberculosis in 2007 and in 8 of these M. bovis was detected.
.

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. Statutory submissions of deer carcases 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 carcase inspection and have a statutory obligation to report suspicion of disease to the local DVM.
Defra has commissioned a wild deer density and disease prevalence study to ensure that our evidence base is robust enough to inform policy decisions on possible future disease control measures for wild deer.
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 carcases or ingestion of deer meat.

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium spp.	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Sheep (1)	NRL	animal	5	3	2	0	1
Goats (2)	NRL	animal	3	2	2	0	0
Pigs (3)	NRL	animal	69	16	7	0	9
Badgers (4)	NRL	animal	72	17	12	0	5
Ferrets (5)	NRL	animal	25	0	0	0	0
Alpacas (6)	NRL	animal	9	6	4	0	2
Lamas (7)	NRL	animal	53	16	15	0	1
Cats (8)	NRL	animal	103	42	15	0	27
Dogs (9)	NRL	animal	29	4	1	0	3
Deer (10)	NRL	animal	53	27	24	0	3

(1) : Routine meat inspection at abattoirs and individual animals with suspicious lesions or clinical signs
(2) : Submission of tissue specimens from suspect tuberculous animals by state or private veterinarians
(3) : Routine meat inspection at abattoirs
(4) : Examinations of badgers found dead (including road traffic accidents)in Northern Ireland.
(5) : Submission of tissue specimens from suspect tuberculous animals by state or private veterinarians
(6) : Submission of tissue specimens from suspect tuberculous animals by state or private veterinarians
(7) : Submission of tissue specimens from suspect tuberculous animals by state or private veterinarians
(8) : Submission of tissue specimens from suspect tuberculous animals by state or private veterinarians
(9) : Submission of tissue specimens from suspect tuberculous animals by state or private veterinarians
(10) : Submission of tissue specimens from suspect tuberculous animals by state or private veterinarians

Footnote

Data for the UK - Great Britain and Northern Ireland.
NRL is National Reference Laboratory

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 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 (1)	86281	10000000	78501	90.983	2974	3.447	5	5880000	490041	961	629
NORTHERN IRELAND (2)	25187	1643458	22649	89.923	672	2.668	1	1640552	0	3181	554
Total	111468	11643458	101150	90.744	3646	3.271		7520552	490041	4142	1183

(1) : Great Britain - England, Wales and Scotland.
30.4% tested once per year, 12.7% every 2 years, 0.3% every 3 years and 56.6% every 4 years.
Number of animals submitted for histopathological examination excludes TB reactors.
(2) : Number of animals submitted for histopathological examination includes TB reactors.

Footnote

United Kingdom - Great Britain (England, Wales and Scotland):
30.4% herds tested once per year, 12.7% every 2 years, 0.3% every 3 years and 56.6% every 4 years.
961 carcasses investigated after disclosure of lesions at routine slaughter (test reactors excluded). Mycobacterium bovis was isolated from 629 of these carcasses.
Test reactors are excluded from the 961 figure.
United Kingdom - Northern Ireland:
Previous years community co-financing for TB programme received but no co-financing obtained for 2007.
Total number of herds based on the number of cattle herds presenting cattle for a TB herd test during the last four years. Total number of animals based on the June Agricultural Census.
Number of animals submitted for bacteriological/ histopathological examination includes samples from animals that were declared TB reactors. Most TB reactors are only examined by histopathological examination. Mycobacterium bovis confirmed in 554 animals (including TB test reactor animals)

(*) Legend:

In column "Interval between routine tuberculin tests" use the following numeric codes: (0) no routine tests; (1) tests once a year; (2) tests each two years; (3) tests each three years concerning 24 month-old animals; (4) tests each 4 years; (5) others (please give details).

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 (1)	300	30000		0		0	0			19	1
NORTHERN IRELAND										93	8
Total	300	30000	0	0	0	0		0	0	112	9

(1) : Great Britain - England, Wales and Scotland

Footnote

Data for UK - Great Britain and Northern Ireland. Values for number of animals and herds listed in Great Britain are approximate. No population data 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 112 animals. Confirmation of TB was obtained from 9 animals.

(*) Legend:

In column "Interval between routine tuberculin tests" use the following numeric codes: (0) no routine tests; (1) tests once a year; (2) tests each two years; (3) tests each three years concerning 24 month-old animals; (4) tests each 4 years; (5) others (please give details).

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

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 general, there has been a reduction in cattle herd incidence within the regions, particularly in the southern and western parts.
Other Brucella species UK
Brucella melitensis, B. ovis, and B. suis have never been recorded in United Kingdom.

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

There were 13 cases of brucellosis in humans in the UK in 2007, with 7 B. abortus infections, 5 B. mellitensis infections and 1 non specified Brucella spp infection reported
During the year 2007 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. In England and Wales there were 6 cases of brucellosis recorded during the year, 1 due to unspecified Brucella spp and 5 cases of B. mellitensis which were all impoted cases. In 2007 there were 2 recorded cases of brucellosis in Scotland - both B. abortus infection.
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. Five cases were female, and the remainder were male. Those affected included farmers (n=69), abattoir workers (n=6) and veterinarians (n=2).In 2005 there were 2 cases reported, both of whom were male, and one was thought to have been occupationally acquired.

During 2007 there were 5 laboratory-confirmed cases of human brucella abortus infection, all with a history of occupational exposure.

2.6.2. Brucellosis in humans

A. Brucellosis in humans

Reporting system in place for the human cases

England, Wales, Scotland
Surveillance system
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

Epidemiological history:
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 UK. Most cases occur in people who are believed to have acquired their infections overseas, mainly in Middle Eastern and Mediterranean countries.
In England and Wales, between 1989 and 2006, total reports have ranged from 5 to 21 per year. Under ascertainment of imported infection may occur but has not been systematically studied. 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. This has mirrored the decline in disease in cattle brought about by compulsory eradication.
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 there were 101 reported cases of human brucellosis, 80 of which were thought to have been acquired occupationally. Five cases were female, and the remainder were male. Those affected included farmers (n=69), abattoir workers (n=6) and veterinarians (n=2). There were 2 cases of human

brucellosis in 2005.

Results of the investigation

Results of the investigations in 2007:
In England and Wales in 2007, 6 cases of brucellosis were recorded, 5 of which were Brucella mellitensis infections. This is an decrease on the total of 11 in the previous year (2006). All of the cases occurred in people believed to have acquired their infections overseas. None were believed to have been associated with occupation. No cases of Brucella abortus were recorded.
In 2007 in Scotland there were 2 recorded cases of brucellosis.
In Northern Ireland during 2007 there were 5 laboratory-confirmed cases of human Brucella abortus infection, an increase of 1 compared with the previous year's total of 4 for 2006. All 5 cases are thought to have aquired the infection occupationally.

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.

Table Brucella in humans - Species/ serotype distribution

Brucella	Cases 13	Cases Inc. 0.02	Autochthon cases 0	Autochthon Inc. 0	Imported cases 5	Imported Inc. 0.008
B. abortus	7	0.011				
B. melitensis	5	0.008			5	0.008
B. suis						
Brucella spp., unspecified	1	0.001				
Occupational cases	5					

Table Brucella in humans - Age distribution

Age Distribution	B. abortus			B. melitensis			Brucella spp.		
	All	M	F	All	M	F	All	M	F
<1 year	0	0	0	0	0	0	0	0	0
1 to 4 years	0	0	0	0	0	0	0	0	0
5 to 14 years	0	0	0	1	1	0	1	1	0
15 to 24 years	0	0	0	0	0	0	0	0	0
25 to 44 years	1	1	0	3	1	2	4	2	2
45 to 64 years	3	3	0	1	1	0	5	4	1
65 years and older	3	3	0	0	0	0	3	3	0
Age unknown	0	0	0	0	0	0	0	0	0
Total :	7	7	0	5	3	2	13	10	3

2.6.3. Brucella in foodstuffs

2.6.4. Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Great Britain - England, Scotland and Wales
Great Britain is officially free of infection from Brucella abortus, Brucella melitensis, Brucella ovis and Brucella suis.
Northern Ireland does not have Officially Free status for Brucella abortus

Free regions

England, Wales and Scotland (Great Britain). The situation in Northern Ireland is described separately.

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 2007 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. A key change was introduced to the surveillance programme in 2007:all routine blood testing of beef cattle, which has been carried out every other year since 1989, ceased. All other surveillance and risk management measures have been maintained
Farmers are legally required to notify the Animal Health Agency (State Veterinary Service) 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. If necessary, an abortion investigation is carried out and samples are taken from aborting animals and those calving prematurely (271 days or less from insemination) and tested both serologically and culturally. If a suspected Brucella organism has been cultured it must be identified at a Brucella reference centre; the reference centre for Great Britain is the Veterinary Laboratories Agency, Weybridge. Once infection is detected and confirmed, infected cattle and others at risk of infection must be slaughtered. Compensation is paid for cattle which have to be slaughtered to control brucellosis.

Frequency of the sampling

See sampling strategy

Type of specimen taken

Other: 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 (before laboratory confirmation). 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

All herds within Great Britain achieved Officially Brucellosis Free (OBF) status on 1 October 1985. All abortions and premature calvings are required to be reported. These 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 culturally.

Results of the investigation

England, Wales, Scotland
Results of the investigations in 2007:
During the year approved laboratories tested 175,933 bulk milk samples from 14,560 herds as part of the national surveillance programme. Routine monitoring of 5,967 cattle abortions and premature calvings was carried out. There were no cases of brucellosis in cattle detected during the year.

186 animals were tested serologically with 3 animals detected as positive. None of these led to identification of infection in cattle on subsequent investigation.

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

England, Wales, Scotland
All herds within Great Britain achieved Officially Brucellosis Free (OBF) status on 1 October 1985. GB achieved regional freedom in 1996; this has been retained since then.

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

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.
Further information is given in the section on brucellosis in humans in Great Britain.

B. 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 2007, 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.

Results of the investigation

During the year 2007, surveillance for brucellosis was provided by the National Sheep and Goat survey. 31,486 blood samples from 1,850 flocks were tested in Great Britain, all with negative results. In Northern Ireland, 3217 animals in 176 flocks were tested in Northern Ireland, all with negative results.
In addition, in Great Britain, samples from 2,376 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.

C. 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 flocks 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 2007, surveillance for brucellosis was provided by the National Sheep and Goat survey. 949 blood samples from 224 goat herds in Great Britain and 49 samples from 13 goat herds in Northern Ireland were tested, all with negative results.

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)

Brucella melitensis infection in man is acquired from outside the UK.

D. B. suis in animal - Pigs

Results of the investigation

Epidemiological history
Brucella suis has never been recorded in animals in Great Britain or Northern Ireland. Boars intended to be used as donors for Artificial Insemination are tested. During 2007, 3138 boars were blood tested, all with negative results.

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

Brucella suis has never been recorded 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 carries out a programme of blood and milk testing of all herds containing breeding stock. In the 3 divisions with the highest incidence of brucellosis the blood sampling is carried out annually. The remainder of the regions have biennial sampling. The blood samples are tested by means of a serum agglutination test (SAT) in accordance with Annex C of Directive 64/ 432/ EEC. 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 i.u. of agglutination per ml or any CFT reading is classified as an inconclusive reactor and is required to be isolated and retested. In addition, monthly bulk milk samples, which are collected by the dairies, are tested at the central government laboratory using an ELISA kit. Premovement testing of BR eligible cattle was introduced in 2004.
Notification of Abortions:

Herd keepers and veterinary surgeons are required under the Brucellosis Control Order (Northern Ireland) 1972 to notify a Divisional Veterinary Office if any bovine animal has aborted or, on calving, has retained the afterbirth for a period in excess of 24 hours. 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 both SAT and CFT 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/ organs

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, premovement testing and sampling at slaughter of all cattle older than 30 months. Monthly bulk milk sampling commenced in 2001 and all dairy herds were included in the screening programme within the following year. Serological screening at slaughter of cattle older than 30 months also commenced in 2001. The requirement for premovement 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. Where a herd keeper does not agree with the valuation as assessed by a DARD valuation officer, there is recourse to an independent valuer.
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.

Results of the investigation

In 2007 24,139 herds were checked; 157 herds were positive with 151 new herds positive during the period. 973,529 animals were tested individually and 402 animals were detected as positive.

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

There are over 1.6 million cattle in Northern Ireland.
Results of tests carried out in 2007 are given in the tables.
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 has stayed relatively level until autumn 2007 when there was another rise in incidence. The annual herd incidence as of December 2007 is now 0.65% while the annual animal incidence is 0.041%.
National statistics are based on a herd level Br test where number of cattle >= 0 (20,893 herds had a herd test where cattle were presented compared to 21,256 in same period of 2006). Prevalence and incidence figures were calculated using the herds which presented cattle at a herd test:
Of the 20,870 herds eligible for testing (973,500 cattle) within Northern Ireland that were actively monitored for Brucellosis by blood or bulk milk sampling, there were 151 new breakdown herds over the last 12 month period (402 Br reactor animals). This is 28% higher (118 new herd breakdowns) than in the previous 13-24 months. The current annual herd incidence was 0.72% with an animal incidence of 0.041%. For the last 13-24 months, annual herd incidence was lower at 0.56% and animal incidence was lower at 0.032%. Peak herd incidence (1.43%) occurred in early 2003.
Three administrative regions in the country contributed the majority of the reactors (74%) during 2007. The vast majority of confirmed breakdowns occurred in a specific disease hotspot area.
The 12-month rolling average number of brucellosis reactors is currently 38 per month (cf. 26

brucellosis reactors in December 2006).
The 12-month moving average is currently 15 new breakdown herds per month (cf. 10 breakdown herds in December 2006).
The introduction of the premovement testing requirement in December 2004 has detected 26 BR reactors from 471,100 animal tests with a further 3,445 inconclusive BR reactors up to the end of December 2007

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. During 2007 there were 5 reported cases of B. abortus in humans, all 5 cases considered to have had occupational exposure.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella spp.	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs	NRL	animal	3138	0	0	0	0	0
Dogs	NRL	animal	2132	0	0	0	0	0
Hares	NRL	animal	16	0	0	0	0	0
Marine mammals	NRL	animal	46	14	0	2	0	12
Alpacas								
(Alpacas and Camels)	NRL	animal	34	0	0	0	0	0

Footnote

NRL is the National Reference Laboratory

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	26915	26915	24139	157	151	60	38.217	89.686	0.65	0.626
Total	26915	26915	24139	157	151	60	38.217	89.686	0.65	0.626
Total - 1	27694	27694	24423	120	118	57	47.5	88.189	0.491	0.483

Footnote

Total number of herds is the number of herds in which cattle were presented at a BR test during the last 4 years. Number of herds checked is herds where the number of cattle is greater than or equal to 0

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	1643458	945318	973529	911394	402	402	6585	102.984	0.041
Total	1643458	945318	973529	911394	402	402	6585	102.984	0.041
Total - 1	1635727	938061	985127	928445	313	313	4986	105.017	0.032

Footnote

Total number of animals in the region obtained from the June Agricultural Census
Total number of animals to be tested under the programme is based on the average number of cattle presented at Br tests over the last 4 years. 96.4% animal coverage for individual tests. Indicators greater than 100% because of repeat herd testing and births & deaths throughout the year. Denominator also an estimate based on average herd size over last 4 years.

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

Region	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							
	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals
NORTHERN IRELAND	26915	945318	0	0	33	4308	103	4147	1524	61824			25255	875039
Total	26915	945318	0	0	33	4308	103	4147	1524	61824	0	0	25255	875039
Total - 1	27694	938061	0	0	118	313	27574		118				27574	

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 samples			Information about abortions			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	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
																		Serologically	BST		
UNITED KINGDOM (1)	87000	10000000	87000	100	0	0	14380	404171	0	14560	175933	0	5967	0	0	186	3	3	0	3	0
Total	87000	10000000	87000	100	0	0	14380	404171	0	14560	175933	0	5967	0	0	186	3	3	0	3	0

(1) : Great Britain which includes England, Scotland and Wales

Footnote

Great Britain (England, Scotland and Wales only). Northern Ireland in community co-financed programme

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

Region	Total number of existing ovine / caprine		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of suspended herds
UNITED KINGDOM (1)	117000	35000000	117000	100	0	0	2074	32435	0	0	0	0	0	0
NORTHERN IRELAND	9164	2026511	9164	100	0	0	189	3266	0	0	0	0	0	0
Total	126164	37026511	126164	100	0	0	2263	35701	0	0	0	0	0	0

(1) : Great Britain - England, Wales and Scotland

Footnote

Table gives results of the National Sheep and Goat Survey, which is carried out annually and involves the sampling of over 2000 flocks in the UK to confirm disease freedom

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

There were a total of 73 cases of yersiniosis in humans in 2007, 72 of these designated as autochtone cases and 1 case of unknown origin.
There has been a slight decreasing trend in the number of reports in the last few years. A total of 62 cases were recorded in 2006, compared with 64 in 2005 and 68 in 2004. However, in contrast, in 2007 there was a slight increase in the number of cases reported for the year.
No food or animal surveys were conducted in 2007. A survey of cattle, sheep and pigs in Great Britain eligible for slaughter was carried out in 2003 (see 2003 report).
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 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 Northern Ireland reports have fluctuated between 3 and 17 per annum from 1992-2006.

Results of the investigation

In 2007 in the UK, 73 cases of Yersiniosis were recorded.
There were 50 cases recorded in England and Wales, of which 49 were typed as Y. enterocolitica. In Scotland in 2007, 22 cases of yersiniosis were recorded; 19 of these infections were due to Y. enterocolitica. In Northern Ireland 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.

Table Yersinia in humans - Species/ serotype distribution

Yersinia	Cases 73	Cases Inc. 0.18	Autochthon cases 72	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
Y. enterocolitica	69	0.11	68		0	
Yersinia spp., unspecified	4	0.07	4			
Y. enterocolitica - O:3	0		0		0	
Y. enterocolitica - O:9	0		0		0	

Footnote

Incidence calculated per 100,000 based on total UK population of 60,587,300 in 2007

Table Yersinia in humans - Age distribution

Age Distribution	Y. enterocolitica			Yersinia spp.		
	All	M	F	All	M	F
<1 year	1	0	0	2	0	0
1 to 4 years	4	1	3	5	2	3
5 to 14 years	7	6	1	7	6	1
15 to 24 years	2	1	1	2	1	1
25 to 44 years	18	9	8	18	9	8
45 to 64 years	6	2	4	6	2	4
65 years and older	5	3	2	7	4	3
Age unknown	26	0	0	26	0	0
Total :	69	22	19	73	24	20

Table Yersinia in humans - Seasonal distribution

Month	Y. enterocolitica	Yersinia spp.
	Cases	Cases
January	3	4
February	6	6
March	9	10
April	3	4
May	9	9
June	6	6
July	5	6
August	21	21
September	4	4
October	2	2
November	1	1
December	0	0
not known	0	0
Total :	69	73

2.7.3. Yersinia in foodstuffs

2.7.4. Yersinia in animals

A. Yersinia enterocolitica in pigs

Monitoring system

Sampling strategy

Animals at farm

The last survey of pigs was conducted in 2003 and reported in 2003. It consisted of a statistically based survey and examination of faeces of pigs arriving for slaughter in abattoirs in Great Britain.

Results of the investigation

There were no cases of pigs detected infected with Yersinia spp. from clinical diagnostic samples submitted to the Veterinary Laboratories Agency in Great Britain in 2007.
The animal table shows number of incidents of yersiniosis detected from examination of clinical diagnostic samples in other animals. 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 spp.	Y. pseudotuberculosis	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:9	Y. enterocolitica - O:3	Y. enterocolitica - unspecified
Sheep	VLA	animal		9			9			
Goats	VLA	animal		2			2			
Poultry, unspecified	VLA	animal		2			2			
Birds (1)	VLA	animal		5	1		4			
Alpacas	VLA	animal		1			1			
Deer	VLA	animal		1	1					
Other animals (2)	VLA	animal		4			4			

(1) : Other birds (3), parakeet (1) and pigeon (1)
(2) : Including 2 hares, 1 rabbit and 1 unspecified mammal

Footnote

Data for Great Britain - England, Wales and Scotland only.
Above are the number of incidents of yersiniosis, from clinical diagnostic samples. Units tested are not known because the laboratory does not report negative results.

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, 2003, 2004, 2005, 2006 or 2007.
Animals:
There was no evidence to indicate that trichinellosis exists in the UK domesticated pig population or in horses in 2007. The last positive diagnosis in pigs in Great Britain was in 1978. The last confirmed case of Trichinellosis was in 1979 in pig meat from a farm in Northern Ireland. This case was linked to suspected illegally imported meat. An on-going survey of foxes has identified 1 case of Trichinella in reported Northern Ireland

National evaluation of the recent situation, the trends and sources 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).
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 and Wales, Northern Ireland or Scotland in 2007. 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 large proportion of carcasses that have and continue to be tested annually. This view was supported by a 2002-2004 survey of 1048 foxes in Great Britain in which no Trichinella were found in muscle digests. A similar survey of 150 foxes was carried out in Northern Ireland during 2003/ 04 in which all muscle digests were also negative for Trichinella. Pigs are routinely monitored for the presence of Trichinella.
In 2007, 205,393 breeding sows and boars 3,748 horses and 2023 wild and feral wild boar muscle samples were examined for Trichinella in Great Britain. In Northern Ireland, 3328 breeding sows and boars and 767 [all] outdoor reared pigs were sampled. All samples examined were negative.
An ongoing survey of Trichinella in foxes was carried out by the Food Standards Agency (FSA) in Great Britain with 700 samples examined during September 2005 to March 2006 and 450 samples examined from November 2006 to October 2007. All were negative for Trichinella. FSA have also

carried out a further survey of 150 foxes in Northern Ireland from January 2007 to October 2007 and one fox originating from Eniskillen, county Fermanagh tested positive. The isolate was sent to the International Reference Laboratory in Rome and identified as T. spiralis.

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

Finding of cases in humans would be as a result of imported cases.

Additional information

From January 2006, enhanced testing for Trichinella spiralis, by the EU approved pepsin digest method, was extended to the domestic slaughter of all boars, sows and farmed and ferral wild boar that are processed in an Approved Game Handling Establishment. Testing of samples are undertaken by laboratories in the slaughterhouse or at the regional Veterinary Laboratories Agency (VLA) laboratories, under contract to the Meat Hygiene Service. All laboratories take part in the QA programme organised by the NRL.

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 in 2002, 2003, 2004, 2005, 2006 or 2007.

Results of the investigation

No human cases of Trichinellosis were recorded in 2007.

Table Trichinella in humans - Species/ serotype distribution

Trichinella	Cases 0	Cases Inc. 0	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
Trichinella spp.	0	0				

Footnote

There were no cases of Trichinellosis diagnosed in humans in the UK in 2007.

Table Trichinella in humans - Age distribution

Age Distribution	Trichinella spp.		
	All	M	F
<1 year	0	0	0
1 to 4 years	0	0	0
5 to 14 years	0	0	0
15 to 24 years	0	0	0
25 to 44 years	0	0	0
45 to 64 years	0	0	0
65 years and older	0	0	0
Age unknown	0	0	0
Total :	0	0	0

Footnote

There were no cases of Trichinellosis diagnosed in humans in the UK in 2007.

2.8.3. Trichinella in animals

A. 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.

Diagnostic/ analytical methods used

General

From January 2006, enhanced testing for Trichinella spiralis, by the EU approved pepsin digest method, was extended to the domestic slaughter of all boars, sows and farmed and ferral 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

NI: 906,530 tested, 0 positive

Breeding sows and boars

GB: 205,393 tested, 0 positive
NI 3,328 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 or horses in the UK, as shown by the negative results from the large proportion of carcasses that are tested annually for export. From 2000 to 2005 this is estimated to be 12% in Great Britain and 66% in Northern Ireland of all fattening pigs which corresponds to 4.6 million tests in Great Britain and 4.3 million tests in Northern Ireland.

Pigs and horses are routinely monitored for the presence of Trichinella at the slaughterhouse. In 2007, 205,393 breeding sows and boars and 2,023 farmed wild boar and wild boar muscle samples were examined for Trichinella in Great Britain, together with a large proportion of pigs destined for export (the actual number of which is not recorded centrally). In Northern Ireland 3,328 breeding sow and boars and 767 outdoor reared pigs and were tested during 2007. All samples examined were negative.

B. 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.

Results of the investigation including the origin of the positive animals

A total of 3748 samples were tested in 2007, 3748 in Great Britain and none in Northern Ireland. There were no positive findings during the year.

Notification system in place

Notified to the Meat Hygiene Service, Veterinary Services and the Food Standards Agency.

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

No Trichinella was reported in any samples examined in 2007

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	Trichinella spp., unspecified
Pigs						
fattening pigs						
not raised under controlled housing conditions in integrated production system	DARD/ FSA	animal	767	0	0	0
breeding animals						
unspecified						
sows and boars	MHS/ FSA	animal	208721	0	0	0
Solipeds, domestic						
horses	MHS/ FSA	animal	3748	0	0	0
Wild boars						
wild (1)	MHS/ FSA	animal	2023	0	0	0
Foxes (2)	FSA	animal	600	1	1	0

(1) : Great Britain data only
(2) : UK data.
Great Britain - 450 examined between November 2006 - October 2007. Northern Ireland - 150 tested, 1 positive

Footnote

Meat Hygiene Service (MHS) reports from self-testing establishments in Great Britain. NRL (VLA) reports from other approved establishments and provides testing to the MHS. The data from both sources are combined in the table.
DARD reports from Northern Ireland.
The data from some establishments is based on MHS financial periods, which do not exactly correlate with calendar months. Data that is not included in a particulr quarter is included in the following quarter

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. Recently, there have been on average 10 - 15 cases reported annually. In Scotland reports of cases are infrequent, averaging less than 1 per year.
Animals:
Echinococcosis (hydatid disease) in animals is not reportable in Great Britain 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 Veterinary Surgeon.
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.

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

Humans:
There were 8 cases of Echinococcus granulosus in the UK in 2007 - all in England and Wales. This is a decrease on the 12 recorded cases in 2006 and the 9 cases recorded in 2005.
Animals:
In Great Britain, hydatid disease is present in the sheep population. Findings at post mortem are not recorded centrally.
No cases of hydatidosis (echinococcosis) were detected in Northern Ireland in 2007. The last cases recorded were from imported Alpacas over 10 years ago.
E. multilocularis is not known to be present in the UK.

Recent actions taken to control the zoonoses

The Welsh Assembly Government has agreed to fund a 10 year disease eradication programme to control hydatid disease in Wales, to be implemented in the near future. This programme will be 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

Case definition

Positive laboratory report.

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. Reports of cases are infrequent, averaging less than 1 per year.

Results of the investigation

In the UK, 8 cases of Echinococcus granulosus were recorded in 2007, compared to 12 cases in 2006 and 9 in 2005. The recorded cases in 2007 were all in England and Wales, with no reports from Scotland or Northern Ireland for the year or for previous years 2006 and 2005. No occupational or travel histories were recorded.

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

The number of cases reported have remained low in 2007.
E. multilocularis is believed to be absent from animals in UK.

Table Echinococcus in humans - Species/ serotype distribution

Echinococcus	Cases 8	Cases Inc. 0.013	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
E. granulosus	8	0.013				
E. multilocularis						
Echinococcus spp.						

Footnote

Incidence calculated per 100,000 based on total UK population of 60,587,300 in 2007

Table Echinococcus in humans - Age distribution

Age Distribution	E. granulosus			E. multilocularis			Echinococcus spp.		
	All	M	F	All	M	F	All	M	F
<1 year	0	0	0				0	0	0
1 to 4 years	0	0	0				0	0	0
5 to 14 years	0	0	0				0	0	0
15 to 24 years	2	2	0				2	2	0
25 to 44 years	2	2	0				2	2	0
45 to 64 years	1	1	0				1	1	0
65 years and older	1	0	0				1	0	0
Age unknown	2	0	0				2	0	0
Total :	8	5	0	0	0	0	8	5	0

2.9.3. Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals)	MHS	animal	1757942	1421			1421
- at slaughterhouse - Monitoring (1)	MHS	animal	104398	1822			1822
adult cattle over 2 years							
- at slaughterhouse - Monitoring (Over thirty month (OTM)cattle for human consumption)	MHS	animal	392748	747			747
Sheep	MHS	animal	14998121	76827			76827
Pigs	MHS	animal	8152129	29			29
Deer							
- at slaughterhouse - Monitoring	MHS	animal	83538	1			1

(1) : Older cattle disposal scheme (OCDS)

Footnote

Older Cattle Disposal Scheme (OCDS) cattle - not for human consumption.
The sampling unit is the individual animal.
E. multilocularis has not ever been recorded 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 appears to be endemic in the Northern Ireland sheep population, and the situation is similar in the rest of the UK.

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

The number of laboratory reports recorded in humans in the UK in 2007 was 152, and there is no obvious trend. There were 127 reports in 2006.
Toxoplasmosis remained the second most common cause of abortions in sheep in Great Britain during the year and accounted for 29.3% of all incidents of foetopathy in sheep and goats diagnosed in 2007. Toxoplasmosis was confirmed in 376 incidents recorded in 2007 in diagnostic samples from sheep in Great Britain and in 5 samples from goats.
Serological examinations for Toxoplasma gondii using the latex agglutination test (LAT) are undertaken by VLA on sera submitted to regional laboratories: the findings presented below provide an overview of the serological status of samples submitted for diagnosis, monitoring and screening purposes 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.
In sheep in 2007, 228 (44%) of 649 sera tested (from 149 separate submissions) were positive for T. gondii compared with 197 (46%) of 428 sera (113 submissions) in 2006. In goats, 18 (47%) of 38 sera (10 submissions) were positive in 2007 compared with 3 (16%) of 19 sera (5 submissions) in 2006. No pig sera were examined in 2006 but in 2007, 3 (6%) of 54 sera (7 submissions) were positive. There was also serological evidence of infection in an alpaca in 2007.
Note: in addition to confirmed VIDA diagnoses of toxoplasmosis in sheep and goats, toxoplasma tachyzoites were detected by immunohistochemistry in a wallaby in 2007. Similar diagnoses during the period 1999-2006 were made in cats (4), wallabies (1), dogs (1) and other mammals (3).

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.

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. During 2007, there were no notifications made.
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. It is known that they underestimate 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. In Northern Ireland there were no cases reported in 2006, compared to 2 cases in 2005.

Results of the investigation

In total in UK there were 152 laboratory reports in 2007.
In England and Wales 106 cases of toxoplasmosis were reported under the surveillance system, compared with 94 in 2006 and 102 in 2005. 3 congenital cases were reported.
In Scotland in 2007 there were 44 laboratory reports compared with 33 in 2006 and 11 in 2005. The number of congenital cases is unknown.
In Northern Ireland there were 2 cases reported during the year, compared to none in 2006 and 2 in 2005. None of the reported cases were congenitel cases.

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).

Table Toxoplasma in humans - Species/ serotype distribution

Toxoplasma	Cases 152	Cases Inc. 0.25
Toxoplasma spp.	152	0.25
Congenital cases	3	0.005

Footnote

Incidence per 100,000 based on UK population of 60,587,300 in 2007.

Table Toxoplasma in humans - Age distribution

Age Distribution	Toxoplasma spp.		
	All	M	F
<1 year	3	3	0
1 to 4 years	0	0	0
5 to 14 years	7	4	3
15 to 24 years	22	6	14
25 to 44 years	77	28	49
45 to 64 years	28	10	18
65 years and older	11	7	4
Age unknown	4	0	2
Total :	152	58	90

2.10.3. Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
Sheep	VLA	animal		376	376
Goats	VLA	animal		5	5
Zoo animals, all					
(Wallaby)	VLA	animal		1	1

Footnote

Data for Great Britain - England, Wales and Scotland only.
Clinical diagnostic samples submitted by private veterinary surgeons to the Veterinary Laboratories Agency (VLA) in 2007. Units tested are not known because the laboratory does not report negative results.
Table shows the number of incidents of Toxoplasma fetopathy diagnosed in sheep and goats in Great Britain. There was also one case in a wallaby.

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. In the UK the last indigenous human death from classical rabies occurred in 1902. In 2005 one case was reported. The Patient had suffered a dog bite whilst on holiday in Goa. There was one report of rabies caused by infection with European bat lyssavirus type 2 in 2002.
The last case of indigenous terrestial rabies in an animal was in 1922. One bat tested positive for live European Bat Lyssavirus (EBLV-2), detected during the passive surveillance programme in England in 2007.

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

Humans:
No cases of human rabies were recorded in 2007.
Animals:
There were no cases of classical rabies in animals in 2007. In total 18 dogs, 3 foxes, 14 cats and 27 exotic fruit bats were tested for rabies; most cases were deaths while in quarantine.
There was 1 report of infection with European Bat Lyssavirus 2 (EBLV 2) in a bat in England during the year (detected as part of the passive surveillance programme)
The VLA has a longstanding programme of scanning (passive) surveillance for EBLVs in bats. 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 poassive surveillance programme and 2 were suspect cases, making a total of 1206 bats tested during the year.
A three year active surveillance programme for testing bats for EBLV in England and Scotland took place between 2003-2006. Target species 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. In December 2005 a draft rabies contingency plan was published for consultation.

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 appearance and/ or behaviour 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 teh patient.

History of the disease and/ or infection in the country

Human rabies is extremely rare in the UK. In the UK the last human death from classical rabies occurred in 1902 and the last case of indigenous terrestial rabies was in 1922.

Results of the investigation

One case 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.

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

The last indigenously acquired case of classical human rabies in the United Kingdom was in 1902. Cases occurring since then have all been acquired abroad, usually through dog bites. Since 1946, some 20 cases have been reported in England and Wales, all imported; prior to 2005, the last imported case was in 2001. In 2002 a man in Scotland who was a licensed bat handler died from infection with European Bat Lyssavirus-2, a rabies-like virus. No cases were reported in 2007.

2.11.3. Lyssavirus (rabies) in animals

A. Rabies in dogs

Monitoring system

Sampling strategy

Rabies is compulsorily notifiable if the animal's clinical appearance is such that rabies is considered as a possible cause of the animal's condition.

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

Other: A number of tests may be used 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

There were no cases of classical rabies in animals in 2007. In total 18 dogs, 3 foxes, 14 cats and 27 exotic fruit bats were tested for rabies; most cases were deaths while in quarantine.

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

No cases of classical rabies in terrestrial animals were confirmed in the United Kingdom during 2007 and the country is recognised as having rabies free status by the O.I.E. There was one case of European Bat Lyssavirus-2 detected in a bat during the year.
Although free of classical rabies for many decades there is still concern about the disease being reintroduced into the UK by imported animals.

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 2007, 10,137 cats, 89,127 dogs and 43 ferrets successfully entered the UK under the Scheme. In total, 461,909 pet animals have entered the UK under the Pet Travel Scheme 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 to date.

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	European Bat Lyssavirus 2 (EBL 2)	Unspecified Lyssavirus	European Bat Lyssavirus - unspecified	Classical rabies virus (genotype 1)
Dogs								
stray dogs	NRL	animal	3	0	0	0	0	0
(Deaths in quarantine)	NRL	animal	15	0	0	0	0	0
Cats								
(Deaths in quarantine)	NRL	animal	14	0	0	0	0	0
Bats								
wild (1)	NRL	animal	1206	1	1	0	0	0
zoo animal (2)	NRL	animal	27	0	0	0	0	0
Foxes								
wild	NRL	animal	3	0	0	0	0	0

(1) : 1204 bats tested as part of passive surveillance programme. 2 bats tested for suspected disease
(2) : Exotic fruit bats

Footnote

NRL is National Reference Laboratory

2.12. Q-FEVER

2.12.1. General evaluation of the national situation

2.12.2. Coxiella (Q-fever) in animals

A. C. burnetii in animal

Monitoring system

Frequency of the sampling

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

Results of the investigation

There were 3 incidents of Q fever infection reported in sheep and 1 incidence in cattle detected during the year from clinical diagnostic samples submitted to the Veterinary Laboratories Agency

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

There was increased interest in Q fever in 2007 in the wake of the large outbreak affecting workers in a meat processing plant in Stirlingshire in 2006. VLA assisted the HPA with the retrospective investigation of a human outbreak (about 30 cases) of Q fever (Coxiella burnetii) in the Cheltenham area in 2007. The source of the infection was not apparent but one possibility was windborne transmission from local livestock premises and this was investigated by a telephone survey of local farms identified by HPA from prevailing wind direction (data obtained from the Met Office). The survey assessed whether any husbandry risk practices (particularly relating to parturition and handling of potentially contaminated bedding material) may have been adopted during the period (late April/ early May 2007) when cases appeared to have acquired infection. The findings are still being evaluated. A veterinary surveillance project is currently underway in an infected goat herd and a PCR for Q fever and other initiatives are under development.

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)	VLA	animal		1	1
Goats	VLA	animal		3	3

Footnote

Data from Great Britain - England, Wales and Scotland only
Clinical diagnostic sample submissions. Units tested are not known because the laboratory does not report negative results.

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ENTEROCOCCUS, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

3.1.2. Antimicrobial resistance in Enterococcus, non-pathogenic isolates

3.2. ESCHERICHIA COLI, NON-PATHOGENIC

3.2.1. 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.
No similar survey has since been carried out, but a number of isolates resulting from submission of diagnostic samples have been tested for antimicrobial resistance in 2007 and the results are presented in the tables.

3.2.2. Antimicrobial resistance in Escherichia coli, non-pathogenic isolates

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.
This 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 last year continued in 2007

Results of the investigation

Although resistance to the indicator cephalosporins was detected in very low numbers of E.coli isolates from pigs and chickens in 2007, further confirmatory tests showed that these isolates did not possess ESBLs. Results were the same in 2006.
The situation is different in cattle, where some of the isolates resistant to the indicator third generation cephalosporins have been shown to possess ESBLs of the CTX-M family, mainly CTX-M-14 and CTX-M-15. However, overall figures show that a very low number of bovine isolates possess these enzymes and these are mainly isolates from calves. Visits to some affected premises have in some cases demonstrated clear links to potential human sources of infection for cattle.
Resistance to enrofloxacin was detected at a low or very low prevalence in E. coli isolates from cattle, pigs, chickens and turkeys in 2007. This mirrors the situation in 2006, when similar findings occurred, but differs from the situation in 2005, when resistance was only detected in isolates from pigs.

Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates

E. coli

	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys	
Isolates out of a monitoring programme	yes		yes		yes		yes	
Number of isolates available in the laboratory	1921		231		71		18	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides								
Gentamicin	1652	28	3	0				
Neomycin					71	2	18	2
Streptomycin	1650	1023	53	29				
Amphenicols								
Chloramphenicol	1651	701	3	1				
Cephalosporins								
Cefotaxim	1652	111						
Cefpodoxime			156	2	68	1	18	0
Ceftazidim	1652	60						
Fluoroquinolones								
Enrofloxacin	1918	125	231	15	71	4	18	2
Penicillins								
Ampicillin	1921	1367	231	107	71	31	18	10
Resistant to >4 antimicrobials	1921	1120	231	73	71	9	18	2
Tetracyclines								
Tetracyclin	1921	1435	231	181	71	36	18	12
Trimethoprim + sulfonamides	1918	709	231	123	71	17	18	6

Footnote

Cattle, pig, turkey and chicken isolates monitoring programme - isolates mostly from clinical diagnostic samples. Data for Great Britain (England, Wales and Scotland)

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

Disc diffusion

Standards used for testing

VLA

VLA_historical_standards_based_on_British_Society_for_Antimicrobial_Chemotherapy_Standard_

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	VLA						30	13		13
Florfenicol	VLA						30	13		13
Tetracyclines										
Tetracyclin	VLA						10	13		13
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin	VLA						5	13		13
Quinolones										
Nalidixic acid										
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin	VLA						10	13		13
Gentamicin	VLA						10	13		13
Neomycin	VLA						10	13		13
Kanamycin										
Trimethoprim + sulfonamides	VLA						25	13		13
Cephalosporins										
Cefotaxim	BSAC						30	29		29
Ceftazidim	BSAC						30	21		21
3rd generation cephalosporins										
Penicillins										
Ampicillin	VLA						10	13		13

Footnote

VLA historical standards based on British Society for Antimicrobial Chemotherapy Standard

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1. HISTAMINE

4.1.1. General evaluation of the national situation

4.1.2. Histamine in foodstuffs

4.2. ENTEROBACTER SAKAZAKII

4.2.1. General evaluation of the national situation

4.2.2. Enterobacter sakazakii in foodstuffs

4.3. STAPHYLOCOCCAL ENTEROTOXINS

4.3.1. General evaluation of the national situation

4.3.2. Staphylococcal enterotoxins in foodstuffs

5. FOODBORNE OUTBREAKS

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

Health Protection Agency CDSC Colindale, Health Protection Scotland, and Health Protection Agency CDSC 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

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 zoonosis.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

There were no verified foodborne outbreaks reported in the UK during the year. There were a total of 25 outbreaks that were designated as possible foodborne outbreaks during 2007.

The most common causative agent identified in the outbreaks was Salmonella species (8). There were in total 387 people affected by foodborne outbreak infections during the year (all showing symtoms but not necessarily positive microbiological isolations made). There were 30 hospitalisations and 5 deaths in total

England and Wales:

There were 16 possible foodborne outbreaks in England and Wales during 2007. The most common causative agents identified during the outbreaks was Salmonella species and foodborne viruses. S. Enteritidis PT5c, possibly transmitted by cooked ham and beef, egg fried rice and duck resulted in a restaurant outbreak affecting 6 people. S. Muenchen (suspect food vehicle houmous) and S. Senftenberg (suspect food vehicle basil) was reported in 6 people and 30 people respectively. 3 Norovirus outbreaks (hotel/ club associated) affected a total of 30 people, with the suspect food vehicle in 2 of the outbreaks being oysters. In the 3rd case a suspect food vehicle could not be determined. Beef in a hotel was the suspect food vehicle in a case of a Cl. perfingens possible food borne outbreak that affected 25 people. E. coli O157 (suspect food vehicle cooked meats) caused an outbreak affecting 46 people, the largest number of cases in a single foodborne outbreak in England and Wales during the year. Evidence for the source of the outbreak was descriptive only. In total during the year, 17 people were hospitalised due to food-borne outbreaks and there were 5 deaths.

Scotland:

There were 9 possible foodborne outbreaks in Scotland during 2007. The most common causative agents identified during the outbreaks was Salmonella. S. Schwartzengrund caused 14 cases, but the source foodstuff remained unknown. S. Senftenburg was also detected in basil in Scotland and was linked to 9 possible cases. S. Enteritidis and S. Typhimurium were implicated in 5 and 32 human cases respectively, with source foodstuff unknown. E. coli O157 (suspect food vehicle cooked meats) caused an outbreak in 33 people. Campylobacter caused an outbreak affecting 52 people, the largest number of cases in a single foodborne outbreak during the year. The suspect food vehicle in this case was chicken liver pate in a restaurant. In total during the year, 13 people were hospitalised due to food-borne outbreaks and there was one death.

Northern Ireland:

There were no foodborne outbreaks in Northern Ireland during 2007.

Foodborne Outbreaks: summarized data

	Total number of outbreaks	Number of possible outbreaks	Number of verified outbreaks
Bacillus	0	0	0
Campylobacter	3	3	0
Clostridium	2	2	0
Escherichia coli, pathogenic	2	2	0
Foodborne viruses	3	3	0
Listeria	0	0	0
Other agents	3	3	0
Parasites	0	0	0
Salmonella	8	8	0
Staphylococcus	0	0	0
Unknown	4	4	0
Yersinia	0	0	0