ZOONOSES MONITORING

UNITED KINGDOM

The Report referred to in Article 5 of Directive 92/117/EEC

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

including information on foodborne outbreaks and antimicrobial resistance in zoonotic agents

IN 2004

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **United Kingdom**

Reporting Year: **2004**

Institutions and laboratories involved in monitoring:

Laboratory name	Description	Contribution
Department for Environment, Food and Rural Affairs (Defra)	Competent Authority for Directive 92/117	Co-ordination of report production
Department of Agriculture and Rural Development, (DARD) Northern Ireland	Competent authority in Northern Ireland for Dir 92/117	Co-ordination of information on zoonotic agents in animals, and feedingstuffs.
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's health and consumer interests in relation to food.	Data on zoonotic agents in food in UK
Health Protection Agency, Communicable Disease Surveillance Centre, Colindale, London	The Health Protection Agency (HPA) is an independent body that protects the health and well-being of everyone in England and Wales.	Data on zoonoses and zoonotic agents in humans, and on foodborne outbreaks of disease. Also antimicrobial resistance data on isolates from food.

Health Protection Scotland (HPS)	Health Protection Scotland (HPS) is a new organisation established by the Scottish Executive to strengthen and co-ordinate health protection in Scotland. Health Protection Scotland came into existence on 11 November 2004.	Data on zoonotic agents in humans in Scotland, and foodborne outbreaks in Scotland.
National Public Health Service for Wales, Communicable Disease Surveillance Centre (Zoonoses Surveillance Unit).	The epidemiological investigation arm of the National Public Health Service for Wales. It protects the population from infection by surveillance and independant advice, outbreak investigation and applied research.	Data on zoonotic agents in humans in England and Wales.
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 on foodborne outbreaks.
Veterianry Laboratories Agency	VLA is an Executive Agency of the Department for Environment, Food and Rural Affairs (Defra). Regional network of veterinary laboratories. 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 the Department of Health (DH) is to improve the health and wellbeing of people in England.	Overview

Scottish Agriculture College	Under contract provides surveillance information on a range of animal diseases to the Scottish Executive Environment and Rural Affairs Department.	Data on zoonotic agents in animals in Scoltand
Welsh Assembly Government, Department for Environment, Planning and Countryside	Devolved administration for Wales	Overview
Scottish Executive Environment and Rural Affairs Department	Devolved administration for Scotland	Overview

PREFACE

This report is submitted to the European Commission in accordance with Article 5 of Council Directive 92/117/EEC[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 2004. 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] Council Directive 92/117/ECC of 17 December 1992 concerning measures for protection against specified zoonoses and specified zoonotic agents in animals and products of animal origin in order to prevent outbreaks of foodborne infections and intoxications, OJ L 62, 15.3.1993, p. 38

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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

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

The figures given relate to census data, June 2004 unless otherwise stated.

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

The information collected on national statistics analysis does not always correspond to the information breakdown in the table and where this has occured it is noted. It is not possible in many cases to give the number of herds or flocks per holding.

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

Cattle
The number of cattle, 10,603,000 increased by 0.8% compared to 2003. The dairy cows decreased by 2.8% and the beef cows increased by 2.3%.
Sheep
Total sheep and lambs, 35,890,000, increased by 0.1% compared with 2004.
Pigs
Total breeding pigs increased slightly by 0.5% compared with 2003, and total pigs increased by 2.3% to 5,161,000
Poultry
Broilers, 119,912,000 increased by 2.7% and birds laying eggs for human consumption, 29,662,000 by 1.3% compared with 2003

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

Cattle
The June 2002 census indicated that for cattle and calves 53% of the number were located in England, 11% in Wales, 19% in Scotland and 16% in Northern Ireland. In UK almost 44% were in holdings of 200 head or more.
Sheep
In June cnsus 2003 43% of the number of sheep were in England, 28% in Wales, 22% in Scotland, 6% in Northern Ireland. Over 53% were on holding with 1000 or more head.
Pigs
In June 2002 census 83% of the total number of pigs was located in England, 0.01% in Wales, 9% in Scotland and 7% in Northern Ireland. Over 80% of the total number of pigs were on

holdings with 1000 head or more.

Table 14.1 Susceptible animal populations: number of herds and holdings rearing animals

* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks	Year*	Number of holdings	Year*
Cattle (bovine animals)	dairy cows and heifers (1)				
	meat production animals (2)				
	in total			110462	2002
Pigs	in total			10375	2002
Sheep	in total			88775	2002

(1): 2131000 breeding dairy cows
(2): 1739000 breeding beef cows

Footnote

Further information published on http://statistics.defra.gov.uk/esg/ and http://www.dardni.gov.uk/econs/stats.htm and http://www.scotland.gov.uk/Topics/Statistics/15631/2536 and http://www.wales.gov.uk/keypubstatisticsforwales/index.htm

Table 14.2 Susceptible animal populations: number of animals

* Only if different than current reporting year

Animal species	Category of animals	Livestock numbers (live animals)	Year*	Number of slaughtered animals	Year*
Cattle (bovine animals)	calves (under 1 year) (1)	2841000		23000	
	dairy cows and heifers (2)	2131000			
	meat production animals (3)	1739000		238000	
	in total (4)	10603000		536000	
Ducks	in total (5)	2392523	2003		
Gallus gallus	breeding animals for egg production line - in total (6)	1366000	2003		
	broilers	119912000			
	laying hens	29662000			
	breeding animals for meat production line - in total (7)	6399000	2003		
	in total			919940000	
Geese	in total (8)	157690	2003		
Goats	in total	92000			
Pigs	breeding animals	601000			
	in total	5161000		2128000	
Sheep	animals under 1 year (lambs)	17275000			
	in total	35890000		3490000	
Solipeds	horses - in total (9)	299886			
Turkeys	in total	7521967	2003		
Farmed deer	in total	33000			

(1): slaughter year Jume 04 to May 05
(2): Dairy cow Breeding herd
(3): Breeding beef cows 1739000, 238000 steers slaughtered in slaughter year June 04 to May 05
(4): slaughter year June 04 to May 05
(5): not including Wales
(6): Great Britain
(7): Great Britain
(8): Not including Wales
(9): Only horses kept on farm from census data

Footnote

Further information published on http://statistics.defra.gov.uk/esg/ and http://www.dardni.gov.uk/econs/stats.htm and http://www.scotland.gov.uk/Topics/Statistics/15631/2536 and http://www.wales.gov.uk/keypubstatisticsforwales/index.htm

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 continued reduction in the number of cases of salmonellosis reported in humans in the UK as a whole (14476 cases in 2004), and S. Enteritidis and S. Typhimurium remain the two most common serotypes. Laboratory reports reduced in all countries except Northern Ireland where the total was influenced by three outbreaks associated with 228 cases: S. Typhimurium DT104 (77 reports); S. Newport (130 reports); and S. Virchow (21 reports). In England and Wales S. Enteritidis PT 4 reports have declined since 1997, when there were over 15000 reports, to 2692 reports of PT4 in 2003 and 2201 reports in 2004. The situation in Scotland is similar but Northern Ireland has not seen an increase in non-PT4 serotypes.

In animals there was a reduction in the number of reported incidents of Salmonella in all species except for ducks and horses. In Gallus gallus breeding flocks where a control plan is in operation in line with Directive 92/117 there were no confirmed cases of S. Enteritidis or S. Typhimurium. In chickens the most common serotypes reported in 2004 were S. Livingstone and S. Senftenberg.

In cattle the most frequently isolated serotypes were S. Dublin and S. Typhimurium.

As in previous years, the most common serovar in sheep was S. enterica subspecies diarizonae serovar 61:k:1,5,(7) which made up over 70% of total reports.

Reports of Salmonella in pigs decreased compared with 2003. The most commonly isolated serovars were S. Typhimurium and S. Derby which comprised 65% and 15% of total reports respectively. However, the number of reports of S. Typhimurium from pigs fell compared with 2003. The most commonly reported phage types of S. Typhimurium during 2004 were U288 (54 incidents, 55.7% of STM in pigs) and DT193 (19 incidents, 19.6% of STM in pigs).

The most commonly isolated serovars from ducks were S. Indiana (26% of total reports) and S. Livingstone (19% of total reports).

The two most commonly isolated serovars in turkeys were S. Newport (15% of total reports) and S. Typhimurium (15% of total reports). All 37 reports of S. Newport were from production flocks and none showed the typical resistance pattern of the USA strains of multi-drug resistant Newport.

Surveys were carried out on food derived from chicken (40 positive with a range of serotypes out of 1033 samples), and milk (cheeses) where no salmonella were isolated. In addition a study of dried spices and herbs from import, production and retail premises was conducted and 32 out of 2963 (1%) of samples were positive for salmonella.

Antimicrobial resistance

Antimicrobial sensitivity of salmonella isolates from cattle, sheep, pigs, and chickens were

determined. No resistance to cefotaxime, ceftazidime or ciprofloxacin was detected in Salmonella isolates from any species; this is an important finding since third generation cephalosporins or fluoroquinolones are important antimicrobials in the treatment of salmonellosis in humans.

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 the Official Control of Foodstuffs Directive 89/397 (OCD). The results of this food testing, which is done locally, are returned to the European Commission annually as required by article 14 of the directive and therefore have not been included in this report.
Antimicrobial sensitivity
The surveillance programme for antimicrobial resistance in farm animals in England and Wales 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, which in fact covers the whole of Great Britain. The Veterinary Laboratories Agency (VLA) Salmonella surveillance programme is the second and covers England and Wales, capturing data from incidents reported under statute (the Zoonoses Order 1989). All Salmonella isolates from new incidents of infection with this organism in farm animals are examined. The third 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. These three data sets therefore complement each other, with the data from the diagnostic laboratories providing information on farms where clinical disease outbreaks are occurring (targeted surveillance) and the data gathered under the abattoir surveys providing information at the point at which animals (from a number of farms) enter the food chain. Statistically robust sampling schemes are important for the monitoring of abattoirs or sentinel farms. However, there is also 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 Laboratory of Enteric Pathogens (LEP), Central Public Health Laboratory 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 salmonella. 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 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 when numbers reported have declined. Generally during this period over 60% of reports were Salmonella Enteritidis.

Results of the investigation

England and Wales
The total number of cases of Salmonellosis decreased from 16484 in 2001, to 14916 in 2002, to 14883 in 2003 and further to 12887 in 2004, of which 63% were due to S. Enteritidis. S. Enteritidis PT 4 reports have declined since 1997, when there were over 15000 reports, to 2692 reports of PT4 in 2003 and 2201 reports in 2004. As in previous years, S. Typhimurium remains the second most commonly isolated serotype in humans (10.0%). Reports of S. Typhimurium increased from 2,424 in 1999 to 2,651, in 2000, and dropped in 2001 to 2095, a trend that continued in 2002 with 1912 reports but then increased in 2003 with 1993 reports, before resuming the downward trend to 1292 reports in 2004. Reports of S. Typhimurium DT104 increased from 990 in 1999 to 1,142 in 2000 fell to 810 in 2001 and to 725 in 2002 with a further fall in 2003 to 416 reports but rose slightly to 464 reports in 2004. The latter 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 2004 1143 cases were reported, compared with 1254 in 2003. The fall can be attributed to a reduction in isolates of S. Enteritidis phage Type 4 and in S. Typhimurium.
Northern Ireland
The number of reports of salmonella received in 2004 was 446, an increase of 108% compared to 2003. This increase was due to three outbreaks associated with 228 cases: S. Typhimurium DT104 (77 reports); S. Newport (130 reports); and S. Virchow (21 reports). Reports of S. enteritidis have remained fairly constant between 2002 and 2004 with 90 reports being received in 2004 (94 in 2003). Unlike other parts of the UK, Northern Ireland has not experienced an increase in reports of S. Enteritidis non PT4.
Laboratory reports of S. Typhimurium rose from 43 in 2003 to 142 in 2004 due largely to one outbreak (increase of 230%). Reports of S. typhimurium DT 104 rose from 10 in 2003 to 93, again largely because of this outbreak.
Of the 446 salmonella reports received in 2004, 104 (23%) were thought to have been acquired outside the UK.
The outbreak of S. Typhimurium DT104 was associated with consumption of mayonnaise made from raw shell eggs. S. Typhimurium DT104 was isolated from environmental samples taken from the egg supplier.
The outbreak of S. Newport was part of a larger multi centre UK outbreak which was epidemiologically associated with lettuce.
The outbreak of S. Virchow was associated with imported pre-cooked chicken.

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

Overall there has been a continued reduction in the number of cases of salmonellosis in humans in the UK, with a decline in numbers in all countries except Northern Ireland where there was an increase due to three outbreaks detailed above.

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 3.4.1.A Salmonellosis in man - species/serotype distribution

	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc	unknown status
Salmonella	14476	24.38	805	11.91	248	3.67	0
S. Agona	111	0.19					
S. Braenderup	127	0.21					
S. Enteritidis(1)	8935	15.00	486	7.19	211	3.12	
S. Hadar	124	0.21					
S. Infantis	105	0.18					
S. Newport	769	1.29					
S. Stanley	150	0.25					
S. Thompson	86	0.14					
S. Typhimurium(2)	1648	2.77	319	4.72	37	0.55	
S. Virchow	316	0.53					
other serovars(3)	2105	3.61					

(1) : Autochone cases and imported cases data refer only to Scotland and Northern Ireland where there was a total 1589 salmonellosis cases, 1143 in Scotland and 446 in Northern Ireland.
(2) : Autochone cases and imported cases data refer only to Scotland and Northern Ireland where there was a total 1589 salmonellosis cases, 1143 in Scotland and 446 in Northern Ireland.
(3) : The other serovars reported were less in total than the serovars mentioned above.

Footnote

UK data except for Autochone and imported cases refer only to Scotland and Northern Ireland where there was a total 1589 salmonellosis cases, 1143 in Scotland and 446 in Northern Ireland.

Table 3.4.1.B Salmonellosis in man - age distribution

Age Distribution	S. Enteritidis			S. Typhimurium			Salmonella spp.		
	All	M	F	All	M	F	All	M	F
<1 year	214	121	93	75	40	35	552	300	252
1 to 4 years	793	413	380	240	124	116	1408	753	655
5 to 14 years	1177	615	562	182	98	84	1578	844	734
15 to 24 years	1145	578	567	212	115	97	1874	948	926
25 to 44 years	2549	1360	1189	415	204	211	4126	2135	1991
45 to 64 years	1855	923	932	294	146	148	2975	1483	1492
65 years and older	765	341	424	140	70	70	1231	564	667
Age unknown	132	72	60	22	12	10	221	120	101
Total :	8630	4423	4207	1580	809	771	13965	7147	6818

Footnote

UK data. In England and Wales total salmonellosis was 12887, with 8238 S. Enteritidis and 1292 S. Typhimurium. Not included are 511 cases age and sex not known; the 511 includes 305 S. Enteritidis cases and 67 S. Typhimurium cases. Total salmonellosis cases for UK above of 13965 should be 14476

Table 3.4.2 Salmonellosis in man - seasonal distribution

Month	S. Enteritidis	S. Typhimurium	Salmonella spp.
	Cases	Cases	Cases
January	291	101	570
February	216	66	424
March	393	105	740
April	407	85	733
May	477	97	789
June	855	134	1235
July	1194	298	1779
August	1628	237	2229
September	1630	163	2750
October	1017	127	1566
November	548	120	968
December	279	115	693
not known	0	0	0
Total :	8935	1648	14476

Footnote

UK data

2.1.3. Salmonella in foodstuffs

A. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At retail

FSA Wales and Northern Ireland chicken survey (January-December 2004)
The aim of this survey was to produce an estimate of the Salmonella and Campylobacter contamination in whole chickens available to the consumer in Wales and Northern Ireland. Whole chickens were surveyed for the presence of Salmonella from all parts of Wales and Northern Ireland during a 12-month period (January-December 2004).

Frequency of the sampling

At retail

Other: 12-month period (January-December 2004).

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 12824: 1998 Microbiological examination of food and animal feeding stuffs Horizontal method for the detection of Salmonella spp.

Results of the investigation

37 samples out of a total of 753 chickens sampled tested positive for Salmonella in Wales, and 3 out of 280 in Northern Ireland. Samples were examined for the presence or absence of Salmonella spp. in accordance with the HPA Standard Microbiological Food Method for detection of Salmonella spp. which is based on the British Standard method BS EN 12824: 1998 Microbiological examination of food and animal feeding stuffs: Horizontal method for the detection of Salmonella spp.
Results are detailed in table 3.3.1. and antimicrobial susceptibility results are detailed in Table 3.2.5.5.

B. Salmonella spp. in food - Cheeses - at retail - survey (Cheese made from raw or thermised milk at production and retail)

Monitoring system

Sampling strategy

The European Commission Recommendation 2004/24/EC, made under Article 14(3) of

the Official Control of Foodstuffs Directive 89/397/EEC and published in the Official Journal of the European Communities on 10 January 2004 required Member States to assess the microbiological quality of cheeses made for raw or thermised milk at production and retail level. A two month (September to October 2004) study was undertaken and co-ordinated by the Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA), on behalf of the Food Standards Agency (FSA).
In total, 70 unripened (fresh) soft cheese, 814 ripened soft cheese and 958 semi-hard cheese samples were examined for the presence or absence of Salmonella spp. in accordance with the British Standard method BS EN ISO 6579:2002 Microbiological examination of food and animal feeding stuffs: Horizontal method for the detection of Salmonella spp. None of the samples examined had Salmonella spp. present.
Results are detailed in Table 3.3.2

Frequency of the sampling

A two month (September to October 2004) study was undertaken

Type of specimen taken

Other: cheese

Definition of positive finding

Isolation of Salmonella

Diagnostic/analytical methods used

British Standard method BS EN ISO 6579:2002 Microbiological examination of food and animal feeding stuffs: Horizontal method for the detection of Salmonella spp.

Results of the investigation

In total, 70 unripened (fresh) soft cheese, 814 ripened soft cheese and 958 semi-hard cheese samples were examined for the presence or absence of Salmonella spp. None of the samples examined had Salmonella spp. present.

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

In this study no salmonellas were found.

C. Salmonella spp. in food - Spices and herbs - survey (Dried spices and herbs at import, production, and retail level)

Monitoring system

Sampling strategy

The European Commission Recommendation 2004/24/EC, made under Article 14(3) of the Official Control of Foodstuffs Directive 89/397/EEC and published in the Official

Journal of the European Communities on 10 January 2004 required Member States to assess the microbiological quality of dried spices and herbs at import, production, and retail level.

Frequency of the sampling

A six month (July to December 2004) study was undertaken and co-ordinated by the Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA), on behalf of the Food Standards Agency (FSA).

Definition of positive finding

Isolation of Salmonella

Diagnostic/analytical methods used

British Standard method BS EN ISO 6579:2002 Microbiological examination of food and animal feeding stuffs: Horizontal method for the detection of Salmonella spp.

Results of the investigation

In total 552 Capsicum spp., 355 Piper spp., 384 nutmeg/ginger/curcuma and 1672 other spice and herb samples were examined for the presence of Salmonella spp. in accordance with the British Standard method BS EN ISO 6579:2002 Microbiological examination of food and animal feeding stuffs: Horizontal method for the detection of Salmonella spp. Salmonella spp. was detected in 32 (1%) of the 2963 samples.
Results are detailed in Table 3.3.2

Table 3.3.1 Salmonella sp. in meat and meat products

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Derby	S. Hadar	S. Mbandaka	S. Poona	S. Agona	S. Liverpool	S. Livingstone	S. Thompson	S. Ohio	S. Indiana	S. Kentucky	Salmonella spp.
Broiler meat																				
fresh																				
- at retail	FSA/NPHS Wales and NI chicken survey		whole chicken		1033	40*	0	4	2	1	1	1	2	2	2	3	4	5	7	10

Footnote - *there were 44 isolates

Table 3.3.2 Salmonella sp. in other food

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium
Dairy products								
ready-to-eat	FSA	Sample type - Cheeses made from raw or thermised milk from production and retail premises		100g	1842	0		
Spices and herbs								
- import - survey (Dried, import, production and retail level)	FSA/ HPA/ LACORS	Sample type - Dried spices and herbs		30g	2963	32		

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 92/117 is implemented by the Zoonoses Order, 1989, and by the Poultry Breeding Flocks and Hatcheries Order, 1993.
Directive 92/117/EEC is implemented in Northern Ireland through the Poultry Breeding Flocks and Hatcheries Scheme Order (Northern Ireland) 1994 and the Zoonoses Order (Northern Ireland) 1991.

Laying hens flocks

In layer flocks all isolations of salmoenella 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.

Frequency of the sampling

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

Other: Sampled at the hatchery by the operator each elite grandparent supply flock once per week, and official samples each 4 weeks. For parents supply flocks the sampling is each 2 weeks and each 8 weeks respectively.

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

Other: Sampled by operator at 4 weeks and 2 weeks before prodcution. Samples to official laboratory.

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

Other: Grandparents sampled weekly at hatchery by operator, officially each 4 weeks. Parent flocks sampled every 2 weeks by operator, every 8 weeks officially at hatchery.

Laying hens: Day-old chicks

Other: Day olds are sampled from each source flock every 2 weeks by operator at hatchery, and officially every 8 weeks at hatchery as the monitoring procedure for layer breeder parent flocks

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: Official samples are as in Directive 92/117. Private samples may be fluff, dust etc.

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

Other: Official sample taken by operator is faeces. Private samples may be boot swabs, dust also.

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

Other: Official samples as per Directive 92/117 - cull chicks, meconium taken at hatchery

Laying hens: Day-old chicks

Other: Cull chicks, meconium, private samples may be fluff, environmental samples and others, used as monitoring of parent layer breeder.

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.

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 according to Directive 92/117 sent to authorised laboratory for examination. Official samples taken sent or delivered same day to National Reference Laboratory (Regional Laboratory) for culture. 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

Samples taken by operators according to Directive 92/117 sent to authorised laboratory for examination. Official samples taken sent or delivered same day to National Reference Laboratory (Regional Laboratory) for culture. 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 according to Directive 92/117 sent to authorised laboratory for examination. Official samples taken sent or delivered same day to National Reference Laboratory (Regional Laboratory) for culture. Isolates sent to NRL for serotyping and phage typing as priority if a Group B or Group D has been cultured.

Laying hens: Day-old chicks

No official sampling

Laying hens: Rearing period

No official sampling

Laying hens: Production period

No official sampling

Laying hens: Before slaughter at farm

No official sampling

Laying hens: At slaughter

No official sampling

Eggs at packing centre (flock based approach)

No official sampling

Case definition

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

If Salmonella Enteritidis or Salmonella Typhimurium is reported under the Zoonoses Order 1989 further investigations are instituted. In addition to investigation of the day old breeder chicks, the source flock/s of the hatching eggs will be investigated. If the report is one of a number of isolates made at the same time from a hatchery, serological monitoring may be carried out if the birds in the source flocks have not been vaccinated. No further action will be taken if the flock proves to be serologically negative. If the flock proves to be serologically positive, if the birds have been vaccinated or it is the only isolate, the flock will be investigated by taking a statistical sample of birds and examining organs for salmonellas (as per Directvie 92/117). On post-mortem examination all breeder flocks found to be culturally positive for Salmonella Enteritidis or Salmonella Typhimurium are slaughtered with compensation.

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

If Salmonella Enteritidis or Salmonella Typhimurium is reported under the Zoonoses Order 1989 further investigations are instituted. The flock will be investigated by taking a statistical sample of birds and examining organs for salmonellas (as per Directive 92/117). On post-mortem examination all breeder flocks found to be culturally positive for Salmonella Enteritidis or Salmonella Typhimurium are slaughtered with compensation.

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

If Salmonella Enteritidis or Salmonella Typhimurium is reported under the Zoonoses Order 1989 further investigations are instituted. The flock will be investigated by taking a statistical sample of birds and examining organs for salmonellas (as per Directvie 92/117). On post-mortem examination all breeder flocks found to be culturally positive for Salmonella Enteritidis or Salmonella Typhimurium are slaughtered with compensation.

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 as above.

Laying hens: Rearing 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: 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: Before slaughter at farm

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 on layer 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.

Laying hens flocks

Advice as per breeding flocks.

Control program/mechanisms

The control program/strategies in place

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

There is no official control plan for salmonella in layer flocks although there is an industry operated scheme which covers most of the 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.

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 Poultry Breeding Flocks and Hatcheries Order 1993 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
- monitoring of flocks and hatcheries using sampling regimes and bacteriological methods of sampling laid down in Directive 92/117/EC
- testing of samples to be carried out at authorised laboratories.

Results of the investigation

In 2004 there were 13 incidents of salmonella in layer breeder flocks. No S. Enteritidis, S. Typhimurium, S. Hadar, S. Infantis, or S. Virchow were isolated from this sector.
In layers there were 10 incidents of S. Enteritidis, and 6 incidents of S. Typhimurium recorded in Great Britain. In Northern Ireland during 2004 there was one outbreak of S. Enteriditis in a commercial laying flock. There were no clinical signs of disease in the birds. The flock originated from hatching eggs imported from GB. All testing carried out by DARD at the hatchery, as part of the disease investigation, was negative for S.Enteriditis.

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

The levels of Salmonella Enteridis and Salmonella Typhimurium in layer breeder flocks remains at very low levels with no confirmed reports in 2004.
In layers the total number of reports remains low and this coupled with the voluntary nature of the sampling makes it difficult to establish any trend.

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 92/117 is implemented by the Zoonoses Order, 1989, and by the Poultry Breeding Flocks and Hatcheries Order, 1993.

Directive 92/117/EEC is implemented in Northern Ireland through the Poultry Breeding Flocks and Hatcheries Scheme Order (Northern Ireland) 1994 and the Zoonoses Order (Northern Ireland) 1991.
In broiler flocks all isolations of salmoenella 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.

Frequency of the sampling

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

Other: Sampled at the hatchery by the operator each elite grandparent supply flock once per week, and official samples each 4 weeks. For parents supply flocks the sampling is each 2 weeks and each 8 weeks respectively.

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

Other: Sampled by operator at 4 weeks and 2 weeks before production. Samples to official laboratory.

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

Other: Grandparents sampled weekly at hatchery by operator, officially each 4 weeks. Parent flocks sampled every 2 weeks by operator, every 8 weeks officially at hatchery.

Broiler flocks: Day-old chicks

Other: Day olds are sampled from each source flock every 2 weeks by operator at hatchery, and officially every 8 weeks.

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: Official samples are as in Directive 92/117. Private samples may be fluff, dust etc.

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

Other: Official sample is faeces. Private samples may be boot swabs, dust also.

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

Other: Official samples as per Directive 92/117 - cull chicks, meconium

Broiler flocks: Day-old chicks

Other: cull chicks, meconium, private samples may be fluff, environmental samples and others

Broiler flocks: Rearing period

Other: Private samples, range of types but faeces, boot swabs common

Broiler flocks: Before slaughter at farm

Other: Private samples, boot swabs 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 according to Directive 92/117 sent to authorised laboratory for examination. Official samples taken sent or delivered same day to National Reference Laboratory (Regional Laboratory) for culture. 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

As above

Broiler flocks: Day-old chicks

As above - these are sampled at the hatchery as a check on the source breeding flock as per Directive 92/117.

Broiler flocks: Rearing period

No official sampling undertaken.

Broiler flocks: Before slaughter at farm

No official sampling undertaken

Broiler flocks: At slaughter (flock based approach)

No official sampling undertaken

Case definition

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

If Salmonella Enteritidis or Salmonella Typhimurium is reported under the Zoonoses Order 1989 further investigations are instituted. In addition to investigation of the day old breeder chicks, the source flock/s of the hatching eggs will be investigated. If the report is one of a number of isolates made at the same time from a hatchery, serological monitoring may be carried out if the birds in the source flocks have not been vaccinated. No further action will be taken if the flock proves to be serologically negative. If the flock proves to be serologically positive, if the birds have been vaccinated or it is the only isolate, the flock will be investigated by taking a statistical sample of birds and examining organs for salmonellas (as per Directvie 92/117). On post-mortem examination all breeder flocks found to be culturally positive for Salmonella Enteritidis or Salmonella Typhimurium are slaughtered with compensation.

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

If Salmonella Enteritidis or Salmonella Typhimurium is reported under the Zoonoses Order 1989 further investigations are instituted. The flock will be investigated by taking a statistical sample of birds and examining organs for salmonellas (as per Directvie 92/117). On post-mortem examination all breeder flocks found to be culturally positive for Salmonella Enteritidis or Salmonella Typhimurium are slaughtered with compensation.

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

If Salmonella Enteritidis or Salmonella Typhimurium is reported under the Zoonoses Order 1989 further investigations are instituted. The flock will be investigated by taking a statistical sample of birds and examining organs for salmonellas (as per Directvie 92/117). On post-mortem examination all breeder flocks found to be culturally positive for Salmonella Enteritidis or Salmonella Typhimurium are slaughtered with compensation.

Broiler flocks: Day-old chicks

Isolation of a sample from the broiler flock will be recorded as positive, but no confirmation testing will be carried out as no official action is taken on the broiler flock. Trace back to the breeding flock which produced the day old broiler chick will be conducted and the source breeding flock investigated as above.

Broiler flocks: Rearing period

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

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.

Broiler flocks: At slaughter (flock based approach)

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)

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 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.

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 Poultry Breeding Flocks and Hatcheries Order 1993 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
- monitoring of flocks and hatcheries using sampling regimes and bacteriological methods of sampling laid down in Directive 92/117/EC
- testing of samples to be carried out at authorised laboratories.

Results of the investigation

In Elite and Grandparent flocks for meat production no salmonella were isolated. In parent broiler breeder flocks no Salmonella Enteritidis or Salmonella Typhimurium were confirmed. There were 12 reports of S. Virchow, and no reports of S. Infantis or S. Hadar. However, reports from hatchery environment monitoring and include isolates which could not be linked to a specific breeding flock; some of these isolates may be from the same flock or residual infection in the hatchery environment. The most common isolates were S. Senftenberg and S. Livingstone, and S. Livingstone was the most common serotype in samples from the monitroing largely carried out by the industry in 3 to 4 week old broilers. In broilers one incident of S. Enteritidis was recorded (4 in 2003) and two incidents of S. Typhimurium (one in 2003).

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 with no confirmed cases in 2004 in UK.

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 isolate under the relevant legislation are classed as positive.

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

Reports of salmonella isolate under the relevant legislation are classed as positive.

Meat production flocks: Day-old chicks

Reports of salmonella isolate under the relevant legislation are classed as positive.

Meat production flocks: Rearing period

Reports of salmonella isolate under the relevant legislation are classed as positive.

Meat production flocks: Before slaughter at farm

Reports of salmonella isolate under the relevant legislation are classed as positive.

Meat production flocks: At slaughter (flock based approach)

Reports of salmonella isolate 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.

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

There were 242 reported incidents in 2004, a decrease from the 345 (revised) incidents in 2003. . The two most commonly isolated serovars were S. Newport (15% of total reports) and S. Typhimurium (15% of total reports). All 37 reports of S. Newport were from production flocks and none showed the typical resistance pattern of the USA strains of MDR Newport. There was little change in the number of reports of S. Typhimurium (37 incidents in 2004 compared with 37in 2003); the phage types reported were mainly DT104 (27 incidents), followed by DT99, and single incidents of DTs 41, 56 and 120. Decreases were also seen in the number of reports of S. Montevideo (9 compared with 64 in 2003) and S. Derby (20 compared with 39 in 2003), S. Indiana (23 compared with 35 in 2003) and S. Agona (15 compared with 22 in 2003). The number of reports of S. Kedougou increased to 19 reports in 2004 compared with 6 in 2003. There were two reports of Salmonella Rissen during 2004, one from production turkeys and one from breeding; this is the first time that this serovar has been isolated from turkeys. S. Rissen was frequently isolated from vegetable protein feed ingredients during 2004. There were single incidents of S. Kentucky, S. Orion and S. Poona reported from production turkeys during 2004. This is the first time that any of these serovars have been reported in turkeys since 2001.

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

The voluntary nature of sampling and the relatively low numbers involved make it difficult to detect trends. Apart from the reduction in the number of reports of S. Montevideo the other serovars are the same as those commonly reported in previous years.

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. There was only one incident reported in 2004 and this related to a clinical sample from which Salmonella Enteritidis PT 4 was isolated.

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.

Methods of sampling (description of sampling techniques)

Breeding flocks: Day-old chicks

No official sampling undertaken. Voluntary sampling.

Breeding flocks: Rearing period

No official sampling undertaken. Voluntary sampling.

Breeding flocks: Production period

No official sampling undertaken. Voluntary sampling.

Meat production flocks: Day-old chicks

No official sampling undertaken. Voluntary sampling.

Meat production flocks: Rearing period

No official sampling undertaken. Voluntary sampling.

Meat production flocks: Before slaughter at farm

No official sampling undertaken. Voluntary sampling.

Meat production flocks: At slaughter (flock based approach)

No official sampling undertaken. Voluntary sampling.

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.

Breeding flocks: Rearing period

Reports of salmonella isolate under the relevant legislation are classed as positive.

Breeding flocks: Production period

Reports of salmonella isolate under the relevant legislation are classed as positive.

Meat production flocks: Day-old chicks

Reports of salmonella isolate under the relevant legislation are classed as positive.

Meat production flocks: Rearing period

Reports of salmonella isolate under the relevant legislation are classed as positive.

Meat production flocks: Before slaughter at farm

Reports of salmonella isolate under the relevant legislation are classed as positive.

Meat production flocks: At slaughter (flock based approach)

Reports of salmonella isolate 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 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

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 was an increase in the number of reports from ducks in 2004 (496)compared with 2003 (412) as increased surveillance of ducks flocks continued. The most commonly isolated serovars from ducks were S. Indiana (131 reports 26% of total) and S. Livingstone (96 reports 19% of total). There were seven reports of S. Typhimurium in ducks in 2004 and six reports of S. Enteritidis. The phage types reported were for S. Typhimurium DT5 (5 incidents), DT30 (1 incident) and DT41 (1 incident), and for S. Enteritidis PT9b (3 incidents), PT1 (2 incidents) and PT35 (1 incident). There were no new or unusual serovars reported from ducks during 2004. During January to December 2004 there was only one report from geese. This was a single incident of S. Enteritidis PT4 reported during April.

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

The nature of the voluntary sampling makes it difficult to establish trends, but the serovars most common in 2003 remained most commonly reported in 2004

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 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]
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

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.

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.

Multiplying 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.

Fattening herds at farm

As above

Fattening herds at slaughterhouse (herd based approach)

As above.

Diagnostic/analytical methods used

Breeding herds

Bacteriological method: The voluntary nature of sampling and the relatively low numbers involved make it difficult to detect trends. Apart from the reduction in the number of reports of S. Montevideo the other serovars are the same as those commonly reported in previous years.

Multiplying herds

Bacteriological method: The voluntary nature of sampling and the relatively low numbers involved make it difficult to detect trends. Apart from the reduction in the number of reports of S. Montevideo the other serovars are the same as those commonly reported in previous years.

Fattening herds at farm

Bacteriological method: The voluntary nature of sampling and the relatively low numbers involved make it difficult to detect trends. Apart from the reduction in the number of reports of S. Montevideo the other serovars are the same as those commonly reported in previous years.

Fattening herds at slaughterhouse (herd based approach)

Bacteriological method: The voluntary nature of sampling and the relatively low numbers involved make it difficult to detect trends. Apart from the reduction in the number of reports of S. Montevideo the other serovars are the same as those commonly reported in previous years.

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 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

England, Wales, Scotland
Reports of Salmonella in pigs during (152) in 2004 decreased by 21% compared with 2003 (193). The most commonly isolated serovars were S. Typhimurium and S. Derby which comprised 65% and 15% of total reports respectively. However, the number of reports (99) of S. Typhimurium from pigs fell by 28% compared with 2003 (137). The most commonly reported phage types of S. Typhimurium during 2004 were U288 (54 incidents, 55.7% of STM in pigs) and DT193 (19 incidents, 19.6% of STM in pigs) and there were 10 incidents of DT104 reported. There were two incidents reported of Salmonella Give, which has not been recorded in pigs since 1999; both incidents were from the same farm. A single incident of Salmonella Durham was reported in November from a farm in England. This is the first time that this serovar has been recorded in pigs in GB.
Northern Ireland
In Northern Ireland there were 12 isolations from diagnostic samples of which 7 were S. Typhimurium. None of these isolations were connected with outbreaks of salmonella in man. The remainder were:-
3 - S. Derby;
1 - S. Give;
1 - S. Spp unidentified.

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

The number of reports is less than in previous years but it is too early to say that this is a trend. It could be related to the economic situation in the pig industry or other factors.

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

England, Wales, Scotland
Salmonella isolated in a laboratory from cattle must be reported to the competent authority and the isolate provided on request (Zoonoses Order 1981). 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 veterinarian for diagnostic purposes

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.

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

England, Wales, Scotland (GB)
The number of reports from cattle during 2004 fell by 27% (to 923) compared with 2003 (1,261 revised figure). The most frequently isolated serotypes were S. Dublin and S. Typhimurium which comprised 86% and 13% of total reports respectively. There were six reports of S. Newport in January to December 2004, three in January and single incidents in February, July and October; all six were fully sensitive to all antimicrobials tested. There were three incidents of S. Enteritidis during 2004, these were single incidents of phage types DT1, DT4 and DT13a. There were five reports of S. London from three different counties of England; this is the first time this serovar has been isolated from cattle since 1993. Salmonella Reading was isolated in cattle for the first time since 2000 and Salmonella Bradford, S. Larochelle and S. Liverpool were all isolated for the first time in cattle.

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

Over the last five years the number of reports of incidents of salmonella in cattle have varied between 812 and 1306, excluding 2001 when there were 662 which is likely to have been affected by a number of factors relating to the outbreak of foot and mouth disease. The majority of incidents have been Salmonella Dublin, with Salmonella Typhimurium the second most commonly reported. 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 further details under additional information).

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.

Additional information

Salmonella data and test results are now entered into Sample Manager/FarmFile replacing both the Salmonella incident recording system (ZO2 database) and the antimicrobial sensitivity database (Sentest). Under the previous data recording systems an isolation was flagged as a new incident by the Nominated Officer dealing with the report, however the new Salmonella database automatically designates new incidents using a series of pre-defined criteria. This report therefore includes incidents as defined by the Nominated Officer for submissions received in 2002, and incidents generated automatically for submissions received from January 2003 onwards. Complete information may link some provisional new incidents to previous reports, thereby altering incident numbers. The incident allocation programme is currently under review.

H. Salmonella spp. in animal - Cattle (bovine animals) (Northern Ireland)

Monitoring system

Sampling strategy

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

Vaccination policy

No restriction on vaccination with authorised products.

Measures in case of the positive findings or single cases

Where S. Typhimurium or S. Enteritidis is isolated, or any serotype is isolated in milk, a veterinary officer carries out a field investigation. Where other serotypes are isolated the case is discussed with the private veterinary surgeon of the owner. Written public health advice is given in all cases.

Results of the investigation

295 salmonella isolations from samples received, of which 274 were S. Dublin. 14 isolations were S. Typhimurium, none of which were associated with a human health incident. The remainder of salmonella isolations were as follows:-
1 S. Anatum;
1 S. Bredney;
1 S. Newport;
1 S. Muenster;
3 S. Spp. unidentified.

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

The most common serotypes reported in cattle are Salmonella Dublin, and Salmonella Typhimurium.

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

None of the reports was associated with a human health incident

Table 3.2.1 Salmonella sp. in Poultry breeding flocks (Gallus gallus) (Part A)

	Source of information	Remarks	Epidemiological unit	Flocks tested	Flocks positive	S. Enteritidis	S. Typhimurium	S. Senftenberg	S. Tennessee	S. 6,7:-:-	other serovars	S. Infantis	S. Hadar	S. Virchow	S. Brandenburg	S. Give	S. Indiana	S. Kedougou	S. Kentucky	S. Lexington
Gallus gallus																				
grandparent breeding flocks for egg production line	NRL		H	8	0	0	0													
		*																		
parent breeding flocks for egg production line (1)	NRL		H	87	13	0	0	2	1	0	0	0	0	0	4		1			1
		*																		
- during production period					10				1						2		1			
- during rearing period					3										2					1
grandparent breeding flocks for meat production line	NRL		H	97	0	0	0													
		*																		

parent breeding flocks for meat production line	NRL	*	H	533	198	0	0	40	2	32	2	0	0	12	0	4	0	10	1	1
- during rearing period								1						1		4		9	1	1
- during production period								39	2	32	2			11				1		

(1) : The 13 positive includes one S Pullorum in a small back yard breeding flock
(2) : Number of rearing flocks not known

Footnote

A number of hatchery operators carry out routine samping of the environment and equipment on a weekly or monthly basis. As a result salmonella are isolated which can not necessarily be associated with a particular breeding flock. Included in the data presented above ; the following number of each serotype could not be linked to a specific flock.
S. Liverpool 8, S. structure 6,7:-: 30, S. Livingstone 39, S. Senftenberg 23, S. Virchow 5, S. Tennessee 2, S. Mbandaka 9, Structure 3,19:-:- 2. The Salmonella isolated may indicate persistent infection in the hatchery environment or a few infected supply flocks. The data include official samples taken at hatchery and private monitoring at hatchery and on farm. If S. Enteritidis or S. Typhimurium are isolated confirmatory testing is carried out on farm of the flock of origin.
H = flock or group - if one sample is positive the whole flock or group is classed positive; * All salmonellas must be reported to the government

Table 3.2.1 Salmonella sp. in Poultry breeding flocks (Gallus gallus) (Part B)

	S. Liverpool	S. Livingstone	S. Mbandaka	S. Montevideo	S. Newport
Gallus gallus					
grandparent breeding flocks for egg production line					
parent breeding flocks for egg production line (1)		3			
- during production period		3			
- during rearing period					
grandparent breeding flocks for meat production line					
parent breeding flocks for meat production line	9	66	11	4	3
- during rearing period	1	6		3	3
- during production period	8	60	11	1	

(1) : The 13 positive includes one S Pullorum in a small back yard breeding flock
(2) : Number of rearing flocks not known

Footnote

A number of hatchery operators carry out routine samping of the environment and equipment on a weekly or monthly basis. As a result salmonella are isolated which can not necessarily be associated with a particular breeding flock. Included in the data presented above ; the following number of each serotype could not be linked to a specific flock.
S. Liverpool 8, S. structure 6,7:-: 30, S. Livingstone 39, S. Senftenberg 23, S. Virchow 5, S. Tennessee 2, S. Mbandaka 9, Structure 3,19:-:- 2. The Salmonella

isolated may indicate persistent infection in the hatchery environment or a few infected supply flocks. The data include official samples taken at hatchery and private monitoring at hatchery and on farm. If S. Enteritidis or S. Typhimurium are isolated confirmatory testing is carried out on farm of the flock of origin.
H = flock or group - if one sample is positive the whole flock or group is classed positive

Table 3.2.2 Salmonella sp. in other commercial poultry

	Source of information	Remarks	Epidemiological unit	Flocks tested	Flocks positive	S. Enteritidis	S. Typhimurium	S. Hadar	S. Infantis	S. Virchow	other serovars
Gallus gallus											
laying hens											
unspecified (1)	*	Voluntary sampling	H		26	12	7	0	0	0	7
broilers											
unspecified (2)	*	Voluntary sampling	H		335	1	3	0	13	13	305
Ducks											
unspecified (3)	*	Voluntary sampling	H		497	6	7	46	0	0	438
Geese											
unspecified (4)	*	Voluntary sampling	H		1	1	0	0	0	0	0
Turkeys											
unspecified (5)	*	Voluntary sampling	H		242	0	37	8	0	11	186

(1) : Number of flocks tested not known
(2) : Number of flocks tested not known
(3) : Number of flocks tested not known
(4) : Number of flocks tested not known
(5) : Number of flocks tested not known

Footnote

UK data
H = flock or group - if one sample is positive the whole flock or group is classed positive
* - NRL all salmonellas isolated must be reported to the government

Table 3.2.3 Salmonella sp. in non-commercial poultry and birds

	Source of information	Remarks	Epidemiological unit	Flocks tested	Flocks positive	S. Enteritidis	S. Typhimurium	S. Hadar	S. Infantis	S. Virchow	other serovars
Pigeons (1)	*	Voluntary sampling	H		24	0	23	1	0	0	0
Pheasants (2)	*	Voluntary sampling	H		7	0	1	0	0	0	6
Partridges (3)	*	Voluntary sampling	H		4	1	3	0	0	0	0

(1) : Number of flocks tested not known
(2) : Number of flocks tested not known
(3) : Number of flocks tested not known

Footnote

UK data. There were no reports received of the isolation of salmonella from guines fowl, quails, or ostriches
H = flock or group - if one sample is positive the whole flock or group is classed positive
* - NRL All salmonella isolates must be reported to the government

Table 3.2.4 Salmonella sp. in animals (non poultry)

	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Derby	S. Hadar	S. Infantis	S. Virchow	S. Dublin	other serovars
Cattle (bovine animals) (1)	NRL all salmonella isolates must be reported to the government	Voluntary samples mainly clinical isolates	H		923	3	119	2	0	0	0	672	127
(Northern Ireland) (6)	NRL all salmonella isolates must be reported to the government	Voluntary samples mainly clinical isolates	H		295	0	14	0	0	0	0	274	7
Sheep (2)	NRL all salmonella isolates must be reported to the government	Voluntary samples mainly clinical isolates	H		249	0	9	9	0	0	0	15	216
(Northern Ireland) (7)	NRL all salmonella isolates must be reported to the government	Voluntary samples mainly clinical isolates	H		6	0	1	0	0	0	0	5	0

Goats (3)		H	0									
(Northern Ireland) (10)	NRL all salmonella isolates must be reported to the government	H	1								1	
	Voluntary samples mainly clinical isolates											
Pigs												
unspecified (4)	NRL all salmonella isolates must be reported to the government	H	152	0	99	23	0	2	0	2	26	
	Voluntary samples mainly clinical isolates											
(Northern Ireland) (8)	NRL all salmonella isolates must be reported to the government	H	12	0	7	3	0	0	0	0	2	
	Voluntary samples mainly clinical isolates											
Solipeds (5)	NRL all salmonella isolates must be reported to the government	H	48	3	24	1	0	0	0	0	20	
	Voluntary samples mainly clinical isolates											
(Northern Ireland) (9)	NRL all salmonella isolates must be reported to the government	H	4	0	3	0	0	0	0	1	0	
	Voluntary samples mainly clinical isolates											

(1) : Number of units tested not known

(2) : Number of units tested not known. Majority of other serotypes were Enterica Diarizonae with 48 of 61:-:1,5,7 and 136 of 61:K:1,5,7
(3) : Number of units tested not known
(4) : Number of units tested not known
(5) : Number of units tested not known
(6) : Number of units tested not known
(7) : Number of units tested not known
(8) : Number of units tested not known
(9) : Number of units tested not known
(10) : Number of units tested not known

Footnote

GB data (England, Wales, Scotland) except where Northern Ireland specified
H = herd or group - if one sample is positive the whole flock or group is classed positive

2.1.5. Salmonella in feedstuffs

A. Salmonella spp. in feed - all feedingstuffs

History of the disease and/or infection in the country

Great Britian
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 GB is tested according to a risk assessment.
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

In Great Britain salmonella was most commonly reported from cereals/vegetable feed materials during the manufacturing process, and most reports were from samples of rape, and soya where the most common serotype reported was S. Rissen and S. Mbandaka respectively. A wide range of other serotypes were reported. Salmonella Typhimurium was reported in GB in cocoa (1), wheat (30), soya (1), fishmeal (1), pig feed (2), cattle (1), poultry (1).
In Northern Ireland no isolations of S. Typhimurium or S. Enteritidis were reported.
The 19 unspecified isolations are as follows:-
1 S. Reading; 3 S. Minnesota; 1 S. Pisa; 6 S. Binza; 1 S. Livingstone;
1 S. Tennessee; 1 S. Mbandaka; 1 S. Risen; 1 S. Lexington;. 3 S. Orion.
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.

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 3.1.1 Salmonella sp. in feed material of animal origin

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Anatum	S. Corvallis	S. Indiana	S. Mbandaka	S. Senftenberg	S. Tennessee	S. 6,7:-:-	other serovars
Feed material of marine animal origin																
Fish meal (1)	NRL		Batch			17	0	1	1	4	3	1	3	1	1	2

(1) : Sample weight is unknown - guidelines suggest aggregated 500g sample. Only the positive results have to be reported to the NRL so total tested is not known.

Footnote

UK (England Wales Scotland Northern Ireland)
Great Britain (England, Wales, Scotland)
3578 samples of GB processed animal protein tested - 32 (0.9 %) positive; 1153 samples of imported animal protein tested - 36 (3.1%) positive
Isolation of Salmonella in feed must be reported to the Competent Authority

Table 3.1.2 Salmonella sp. in feed of vegetable origin (Part A)

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Agona	S. Agama	S. Cannstatt	S. Carno	S. Cotham	S. Anatum	S. Corvallis	S. Cubana	S. Derby	S. Give	S. Hadar	S. Ilugun
Feed material of cereal grain origin																				
Barley derived	NRL					1	0	0												
Wheat derived	NRL					9	0	3												
Maize	NRL					4	0	0	1											
other cereal grain derived (1)	NRL					19	0	0												
Feed material of oil seed or fruit origin																				
Rape seed derived	NRL					195	0	0	3	4							2			
Palm kernel derived	NRL					20	0	1			2	2	1			1				
Soya (bean) derived	NRL					104	0	1	6					1	1	3	2		1	2
Sunflower seed derived	NRL					11	0	0	1								1	1		
Linseed derived	NRL					13	0	0												

(1) : Data from Nothern Ireland

Footnote

UK (England Wales Scotland Northern Ireland)
It is not known if sample is final feed or process control sample. The number of samples taken is not known. Protocol is available on sampling but not known if followed.

Isolation of Salmonella in feed must be reported to the Competent Authority

Table 3.1.2 Salmonella sp. in feed of vegetable origin (Part B)

	S. Infantis	S. Kedougou	S. Kentucky	S. Kingston	S. Leiden	S. Lexington	S. Livingstone	S. Mbandaka	S. Meleagridis	S. Minnesota	S. Molade	S. Montevideo	S. Newport	S. Ouakam	S. Rissen	S. Ruiru	S. Senftenberg	S. Stourbridge	S. Sundsvall	S. Taksony
Feed material of cereal grain origin																				
Barley derived															1					
Wheat derived		1											1		1		1	1		1
Maize		1															1			
other cereal grain derived (1)																				
Feed material of oil seed or fruit origin																				
Rape seed derived		2						13							167		3			
Palm kernel derived						1	1	1			1					1	7			
Soya (bean) derived	1	2	1	1	1	1	3	27	3	1		1		1	8		15		1	
Sunflower seed derived							1	6												
Linseed derived								13												

(1) : Data from Nothern Ireland

Footnote

UK (England Wales Scotland Northern Ireland)
It is not known if sample is final feed or process control sample. The number of samples taken is not known. Protocol is available on sampling but not known if followed.
Isolation of Salmonella in feed must be reported to the Competent Authority

Table 3.1.2 Salmonella sp. in feed of vegetable origin (Part C)

	S. Tees	S. Tennessee	S. Yoruba	Salmonella spp.
Feed material of cereal grain origin				
Barley derived				
Wheat derived				
Maize				1
other cereal grain derived (1)				19
Feed material of oil seed or fruit origin				
Rape seed derived		1		
Palm kernel derived	1	1		
Soya (bean) derived		3	4	13
Sunflower seed derived				1
Linseed derived				

(1) : Data from Nothern Ireland

Footnote

UK (England Wales Scotland Northern Ireland)
It is not known if sample is final feed or process control sample. The number of samples taken is not known. Protocol is available on sampling but not known if followed.
Isolation of Salmonella in feed must be reported to the Competent Authority

Table 3.1.3 Salmonella sp. in compound feedingstuff (Part A)

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Agona	S. Carno	S. Corvallis	S. Derby	S. Ealing	S. Infantis	S. Kedougou	S. Kentucky	S. Lexington	S. Livingstone	S. Mbandaka	S. Meleagridis
Compound feedingstuffs for cattle																				
Process control	NRL		Batch	Not known		5	0	1	1	1					2					
Compound feedingstuffs for pigs																				
Process control	NRL		Batch	Not known		12	0	2	3						1	1			2	1
Compound feedingstuffs for poultry (non specified)																				
Process control	NRL		Batch	Not known		38	0	1	1		1	1	1	2	5	3	2	1	4	

Footnote

UK (England Wales Scotland Northern Ireland)
It is not known if sample is final feed or process control sample. The number of samples taken is not known. Protocol is available on sampling but not known if followed.
Isolation of Salmonella in feed must be reported to the Competent Authority

Table 3.1.3 Salmonella sp. in compound feedingstuff (Part B)

	S. Montevideo	S. Ohio	S. Quakam	S. Rissen	S. Senftenberg	S. Thompson	S. Yoruba	S. 4,12:d:-
Compound feedingstuffs for cattle								
Process control								
Compound feedingstuffs for pigs								
Process control	1			1				
Compound feedingstuffs for poultry (non specified)								
Process control	1	1	2	3	2	1	5	1

Footnote

UK (England Wales Scotland Northern Ireland)
It is not known if sample is final feed or process control sample. The number of samples taken is not known. Protocol is available on sampling but not known if followed.
Isolation of Salmonella in feed must be reported to the Competent Authority

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 3.3.3 Salmonella serovars in animals

Serovars		Cattle (bovine animals)		Pigs		Gallus gallus		Other poultry		Ducks - at farm - HACPP or own checks by industry		Turkeys - at farm - HACPP or own checks by industry		Sheep - at farm - clinical investigations		Solipeds - at farm - clinical investigations	
		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates																	
Number of isolates in the laboratory	N=		923		152	675				496		242			249		48
Number of isolates serotyped	N=		923		152	675				496		242			249		48
Number of isolates per type																	
S. Agama			16			1						2			5		8
S. Agona			6			2				2		15					
S. Ajiobo			2									3			1		
S. Anatum			31							3					1		1
S. Berta															1		
S. Bovismorbificans			1														
S. Bradford			1														

S. Braenderup					1											
S. Brandenburg				1	19											
S. Bredeney											3					
S. Choleraesuis				1												
S. Corvallis											6					
S. Derby		2		23					2		20			9		1
S. Dublin		672		2							2			15		
S. Durham				1												
S. Enteritidis		3			12				7							3
S. Fischerkietz											2					
S. Give		2		2	28				16							
S. Goldcoast		4		5					2							
S. Hadar									44		8					
S. Havana					5				5							
S. Idikan					2				1							
S. Indiana					8				131		23			1		1
S. Infantis				2	18											
S. Kedougou		5		5	33				31		19					2
S. Kentucky					5						1					
S. Kimuenza		1														
S. Kisarawe																1
S. Kottbus		1			5				5		27					
S. Larochelle		1														
S. Lexington					10											
S. Liverpool		1			40											
S. Livingstone		0			146				96							
S. London		5		4												
S. Mbandaka		2			22						1					
S. Meleagridis					1											
S. Montevideo		5			15						9			18		
S. Muenchen																1
S. Newport		6			11				1		37			3		4

S. Ohio					30											
S. Orion					1				38		1					
S. Oslo														1		1
S. Poona		1									1					
S. Reading		1		6	1											
S. Rissen											2					
S. Saintpaul					2				3							
S. Schwarzengrund		6														
S. Senftenberg					78				1							
S. Stanley		2														
S. Stourbridge		1												1		
S. Tennessee					2											
S. Thompson		2			26											1
S. Typhimurium		119		99	11				7		37			9		24
S. Vejle		8														
S. Virchow					26						11					
other serovars		3			5				82		1					
S. enterica subsp. diarizonae		1												184		
Not typeable		12		1	109				19		11					
Total of typed *Salmonella* isolates																

Footnote

(*) M : Monitor, C : Clinical
GB data (England, Wales, Scotland).

Table 3.3.4 Salmonella serovars in food

Serovars		Bovine meat		Pig meat		Broiler meat		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=					44					
Number of isolates serotyped	N=					44					
Number of isolates per type											
S. Agona						2					
S. Derby						2					
S. Hadar						1					
S. Indiana						5					
S. Kentucky						7					
S. Liverpool						2					
S. Livingstone						2					
S. Mbandaka						1					
S. Ohio						4					
S. Poona						1					
S. Thompson						3					
S. Typhimurium						4					
other serovars (1)						10					
Total of typed *Salmonella*isolates											

(1) : Including 2 S. New Brunswick

Footnote

(*) M : Monitor, C : Clinical

Table 3.3.5 S.Enteridis phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus		Other poultry	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=		3		0	12		7	
Number of isolates serotyped	N=		3		0	12		7	
Number of isolates per type									
PT 1			1					2	
PT 4			1			7		1	
PT 6						2			
PT 13a			1						
PT 35						1		1	
PT 7						1			
Other						1		3	
Total of typed *Salmonella*isolates									

Footnote

(*) M : Monitor, C : Clinical
GB data (England, Wales, Scotland)

Table 3.3.6 S.Enteridis phagetypes in food

Phagetype		Bovine meat		Pig meat		Broiler meat		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 serotyped	N=										

Footnote

(*) M : Monitor, C : Clinical
No information to report in 2004

Table 3.3.9 S. Enteritidis phagetypes in humans

Phagetype	humans	
Sources of isolates	M(*)	C(*)
Number of isolates in the laboratory N=		8934
Number of isolates serotyped N=		8918
Number of isolates per type		
PT 1		1997
PT 4		2373
PT 5		5
PT 6		483
PT 8		373
PT 14b		1362
PT 21		555
Not typable		21
PT 1b		2
PT 3		51
PT 44		29
PT 13a		28
PT 2		22
PT 24 var		13
PT 35		22
PT 4b		8
PT 56		40
PT 6a		335
PT 6b		2
PT 12		161
PT 31		1
PT 22		40
PT 23		2
PT 7		10
Other (1)		308
PT RDNC		44
PT 25		1
PT 28		2
PT 5a		31
PT 5b		2
PT 5c		119
PT 29		10
PT 33		3
PT 34		7
PT 37		1
PT 42		1
PT 9b		5
PT 9a		3
PT 7a		2

PT 6d		92
PT 6c		7
PT 3a		1
PT 24a		1
PT 20a		1
PT 1e		12
PT 59		109
PT 58		1
PT 57		10
PT 55		5
PT 53		21
PT 50		4
PT 48		2
PT 47		13
PT 46		2
PT 38		1
PT 24		96
PT 21a		1
PT 20		2
PT 16		1
PT 15		3
PT 13		9
PT 11		49
PT 1c		1
Total of typed *Salmonella*isolates		

(1) : 308 isolates not phage typed

Footnote

(*) M : Monitor, C : Clinical
Combined UK data

Table 3.3.7 Salmonella Typhimurium phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus		Other poultry	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=		119		99	11		44	
Number of isolates serotyped	N=		119		99	11		44	
Number of isolates per type									
DT 8								5	
DT 12			5		1				
DT 104			67		10	5		29	
DT 104b			5		3				
DT 120			6			1		1	
DT 193			5		19	1			
DT 208					1				
U 302			8		3				
DT 40			2		1	1			
DT 41			1			1		2	
DT 193a			6		1				
DT 49			3			1			
DT 195			2						
DT 30								1	
DT 99								5	
U 310			7						

U 288				56				
other		2		4	1		1	
Total of typed *Salmonella*isolates								

Footnote

(*) M : Monitor, C : Clinical
GB data (England, Wales, Scotland)

Table 3.3.8 Salmonella Typhimurium phagetypes in food

Phagetype		Bovine meat		Pig meat		Broiler meat		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 serotyped	N=										

Footnote

(*) M : Monitor, C : Clinical
No information to report in 2004

Table 3.3.10 S. Typhimurium phagetypes in humans

Phagetype	humans	
Sources of isolates	M(*)	C(*)
Number of isolates in the laboratory N=		1610
Number of isolates serotyped N=		1652
Number of isolates per type		
DT 2		6
DT 8		23
DT 9		1
DT 12		24
DT 46		2
DT 66		3
DT 104		638
DT 104b		60
DT 120		26
DT 170		10
DT 193		69
DT 208		14
U 302		56
Not typable		15
DT 40		12
DT 41		16
DT RDNC		43
DT 132		2
DT 22		2
DT 193a		43
DT 49		20
U 311		29
U 310		15
DT 160		12
DT 124		2
DT 194		2
DT 195		1
DT 15a		3
DT 186		1
DT 17		3
DT 30		2
DT 85		1
DT 99		6
DT 97		5
DT 93		1
DT 3		1
DT 135		5
U 277		2
U 288		22

other (1)		221
DT 1		34
DT 4		1
DT 13		3
DT 66a		1
DT 141		4
U 278		1
DT 56 var		4
DT 178		1
DT 11		1
U 313		2
U 308		2
U 291		11
U 289		2
U 276		2
DT 87		3
DT 112		1
DT 125		4
DT 94		9
DT 82		1
DT 80		2
DT 73		2
DT 67		1
DT 64		5
DT 63		1
DT 56		44
DT 54		1
DT 52		1
DT 38		2
DT 26		1
DT 19		3
DT 18		2
DT 15		10
DT 2a		2
DT 206		1
DT 197		1
DT 164		1
DT 161		10
DT 131		2
DT 129		2
DT 170b		4
DT 153		1
DT 137		1
DT 136		4
Total of typed *Salmonella*isolates		

(1) : 221 isolates were not phage typed

Footnote

(*) M : Monitor, C : Clinical
Combined UK data

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 (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]
The isolates tested for antimicrobial resistance were from these isolates.

Type of specimen taken

In cattle over 94%% 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 and Northern Ireland laboratories are tested at the respective national reference laboratory.

Laboratory methodology used for identification of the microbial isolates

Modified ISO 6579:2002 in 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, Nalidixic acid, Trimethoprim / Sulfonamide, Sulfonamide, Streptomycin, Gentamicin, Neomycin (Kanamycin in

Northern Ireland).

Breakpoints used in testing

Disc Diffusion 13mm breakpoint

Results of the investigation

In England and Wales, 657 salmonella isolates were tested from cattle. 85% were fully sensitive. In Northern Ireland 335 isolates were tested and 80% were fully sensitive.
For S. Enteritidis 7 samples were available in England and Wales and all were fully sensitive. In Northern Ireland no isolates were available. For S. Typhimurium in cattle in England and Wales 90 isolates were available for testing and 11% were fully sensitive. 44% showed resistance to more than 4 antimicrobials. 44 were pentaresistant ACSSuT only and 44 were ACSSuT plus one other antimicrobial. No resistance to cefotaxime, ceftazidime or ciprofloxacin was detected in Salmonella isolates from cattle.
Of the Salmonella Dublin cultures tested during 2004, the vast majority (more than 97.5%) were susceptible to all 16 antimicrobial drugs tested. Most S. Dublin isolates originate 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.
There has been an increase in resistance to trimethoprim/ sulphonamides in recent years in isolates of S. Typhimurium from England and Wales, though the data suggests this may now have peaked. Comparing the 2004 resistance figures with those produced in 2003, trimethoprim/ sulphonamide resistance was similar in S. Typhimurium isolates from cattle and pigs in both years.

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

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

Procedures for the selection of isolates for antimicrobial testing

One isolate from each incident reported.

Methods used for collecting data

Isolates from England, Wales and Northern Ireland laboratories are tested at the respective national reference laboratory.

Laboratory methodology used for identification of the microbial isolates

Modified ISO 6579:2002 in 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, Nalidixic acid, Trimethoprim / Sulfonamide, Sulfonamide, Streptomycin, Gentamicin, Neomycin (Kanamycin in Northern Ireland).

Breakpoints used in testing

Disc Diffusion 13mm breakpoint

Results of the investigation

In England and Wales, 209 salmonella isolates were tested from pigs. 12% were fully sensitive. In Northern Ireland 29 isolates were tested and 24% were fully sensitive.
In GB and Northern Ireland no isolates of S. Enteritidis were available for testing. For S. Typhimurium in pigs in GB 147 isolates were available for testing and 3% were fully sensitive. 71% showed resistance to more than 4 antimicrobials. Four isolates were pentaresistant ACSSuT only, and 2 were pentaresistant plus one other antimicrobial.

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

It is evident that in general terms, that 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. There is a greater prevalence of resistance in porcine Salmonella isolates compared to

isolates from sheep and cattle to several antimicrobials, including ampicillin, chloramphenicol, streptomycin, trimethoprim/ sulphonamides, sulphonamides, and tetracyclines. No resistance to cefotaxime, ceftazidime or ciprofloxacin was detected in Salmonella isolates from pigs.

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

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

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

In England, Wales and Scotland (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]
The isolates tested for antimicrobial resistance were from these isolates.

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.

Procedures for the selection of isolates for antimicrobial testing

One isolate from each incident reported.

Methods used for collecting data

Isolates from England, Wales and Northern Ireland laboratories are tested at the respective national reference laboratory.

Laboratory methodology used for identification of the microbial isolates

Modified ISO 6579:2002 in national reference laboratory. Other methods may be used in prevate 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, Nalidixic acid, Trimethoprim / Sulfonamide, Sulfonamide, Streptomycin, Gentamicin, Neomycin (Kanamycin in Northern Ireland).

Breakpoints used in testing

Disc Diffusion 13mm breakpoint

Results of the investigation

In England and Wales, 958 salmonella isolates were tested from poultry (Gallus gallus). 64% were fully sensitive. In Northern Ireland 23 isolates were tested and 74% were fully sensitive.
For S. Enteritidis 13 samples were available in GB and 85% were fully sensitive. In Northern Ireland 2 fully sensitive isolates were available. For S. Typhimurium in poultry in GB 11 isolates were available for testing and 27% were fully sensitive. 45% showed resistance to more than 4 antimicrobials. 6 DT104 were pentaresistant ACSSuT.

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

There has been an increase in resistance to trimethoprim/ sulphonamides in recent years in isolates of S. Typhimurium from England and Wales, though the data suggests this may now have peaked. Comparing the 2004 resistance figures with those produced in 2003, trimethoprim/ sulphonamide resistance declined in 2004 in chickens. No resistance to cefotaxime, ceftazidime or ciprofloxacin was detected in Salmonella isolates; this is an important finding since third generation cephalosporins or fluoroquinolones are important antimicrobials in the treatment of salmonellosis in humans.

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 poultry

Sampling strategy used in monitoring

Frequency of the sampling

Samples from a survey detailed in section on 'Salmonella spp. in Broiler meat and products thereof'.

Type of specimen taken

See above

Methods of sampling (description of sampling techniques)

See above

Laboratory methodology used for identification of the microbial isolates

See section on Salmonella spp. in Broiler meat and products thereof

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Health Protection Agency, Colindale

Results of the investigation

40 salmonella isolates were tested from poultry (Gallus gallus). 50% of isolates were fully sensitive. 7% were resistant to more than 4 antimicrobials.

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

No national trend is apparent.

Table 3.2.5.2 Antimicrobial susceptibility testing of S.Enteritidis in animals

	S. Enteritidis									
	Cattle (bovine animals)		**Pigs**		**Gallus gallus**		**Gallus gallus (Northern Ireland)**		**Turkeys**	
Isolates out of a monitoring program	yes		yes		yes		yes		yes	
Number of isolates available in the laboratory	7		0		13		2		1	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	7	0%	0	0%	13	8%	2	0%	1	0%
Amphenicols										
Chloramphenicol	7	0%	0	0%	13	8%	2	0%	1	0%
Cephalosporin										
3rd generation cephalosporins							2	0%		
Cefotaxim	7	0%	0	0%	13	0%			1	0%
Ceftazidim	7	0%	0	0%	13	0%			1	0%
Fluoroquinolones										
Ciprofloxacin	7	0%	0	0%	13	0%	2	0%	1	0%
Quinolones										
Nalidixic acid	7	14%	0	0%	13	0%	2	0%	1	0%
Sulfonamides										
Sulfonamide	7	0%	0	0%	13	8%	2	0%	1	0%
Aminoglycosides										
Streptomycin	7	0%	0	0%	13	8%	2	0%	1	0%
Gentamicin	7	0%	0	0%	13	0%	2	0%	1	0%
Neomycin	7	0%	0	0%	13	0%			1	0%
Kanamycin							2	0%		
Trimethoprim + sulfonamides	7	0%	0	0%	13	0%			1	0%
Penicillins										
Ampicillin	7	0%	0	0%	13	0%	2	0%	1	0%
Number of multiresistant isolates										
fully sensitives	6	86%	0	0%	11	85%	2	100%	1	100%
resistant to 1 antimicrobial	1	14%			1	8%	0	0%	0	0%
resistant to 2 antimicrobials	0	0%	0	0%	0	0%	0	0%	0	0%
resistant to 3 antimicrobials	0	0%	0	0%	1	8%	0	0%	0	0%
resistant to 4 antimicrobials	0	0%	0	0%	0	0%	0	0%	0	0%
resistant to >4 antimicrobials	0	0%	0	0%	0	0%	0	0%	0	0%

Footnote

England and Wales data except where stated as Northern Ireland. Totals may not correspond because of rounding

Table 3.2.7.6 Antimicrobial susceptibility testing of S. Enteritidis in humans - qualitative data

	S. Enteritidis	
	humans	
Isolates out of a monitoring program		
Number of isolates available in the laboratory		
Antimicrobials:	**N**	**%R**

Footnote

No information to report in 2004

Table 3.2.5.3 Antimicrobial susceptibility testing of S.Typhimurium in animals

	S. Typhimurium																	
	Cattle (bovine animals)		**Cattle (bovine animals) (Northern Ireland)**		**Pigs**		**Pigs (Northern Ireland)**		**Sheep - clinical investigations**		**Gallus gallus**		**Gallus gallus (Northern Ireland)**		**Turkeys**		**all animals (Northern Ireland Various (3 pigeon, 4 solipeds,1 fox, 1 sheep))**	
Isolates out of a monitoring program (1)	yes		yes		yes		yes		yes		yes		yes		yes		yes	
Number of isolates available in the laboratory	90		18		147		21		7		11		3		55		9	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	90	84%	16	62.5%	147	93%	21	71.4%	7	86%	11	55%	3	33.3%	55	62%	9	44.4%
Amphenicols																		
Chloramphenicol	90	62%	16	68.8%	147	71%	21	66.7%	7	71%	11	45%	3	33.3%	55	62%	9	11.1%
Cephalosporin																		
3rd generation cephalosporins			16	0%			21	0%					3	0%			9	0%
Cefotaxim	90	0%			147	0%			7	0%	11	0%			55	0%		
Ceftazidim	90	0%			147	0%			7	0%	11	0%			55	0%		
Fluoroquinolones																		
Ciprofloxacin	90	0%	16	0%	147	0%	21	0%	7	0%	11	0%	3	0%	55	0%	9	0%
Quinolones																		
Nalidixic acid	90	1%	16	12.5%	147	4%	21	0%	7	0%	11	0%	3	0%	55	60%	9	0%
Trimethoprim			16	43.8%			21	19.1%					3	33.3%			9	0%
Sulfonamides																		
Sulfonamide	90	76%	16	81.3%	147	90%	21	71.4%	7	86%	11	64%	3	100%	55	80%	9	11.1%
Aminoglycosides																		
Streptomycin	90	68%	16	87.5%	147	80%	21	57.1%	7	71%	11	64%	3	66.7%	55	64%	9	44.4%
Gentamicin	90	0%	16	0%	147	3%	21	0%	7	0%	11	0%	3	0%	55	0%	9	0%
Neomycin	90	0%			147	10%			7	0%	11	0%			55	0%		

Kanamycin			16	0%			21	4.8%					3	0%			9	0%
Trimethoprim + sulfonamides	90	30%			147	72%			7	0%	11	0%			55	2%		
Penicillins																		
Ampicillin	90	69%	16	68.8%	147	82%	21	71.4%	7	71%	11	45%	3	66.7%	55	80%	9	11.1%
Number of multiresistant isolates																		
fully sensitives	10	11%	2	12.5%	4	3%	5	23.8%	1	14%	3	27%	0	0%	7	13%	2	22%
resistant to 1 antimicrobial	11	12%	0	0%	4	3%	1	4.7%	0	0%	1	9%	0	0%	4	7%	6	66%
resistant to 2 antimicrobials	4	4%	0	0%	1	1%	0	0%	0	0%	2	18%	1	33.3%	8	15%	0	0%
resistant to 3 antimicrobials	3	3%	3	18.75%	9	6%	0	0%	1	14%	0	0%	0	0%	1	2%	0	0%
resistant to 4 antimicrobials	7	8%	1	6.25%	21	14%	4	19%	0	0%	0	0%	1	33.3%	1	2%	0	0%
resistant to >4 antimicrobials	55	61%	10	62.5%	104	71%	11	52.3%	5	71%	5	45%	1	33.3%	34	62%	1	11%
Number of multiresistant DT104																		
with penta resistance	44	45%	1	6.25%	10	40%	3	14.3%	2	50%	6	67%	0	0%	39	11%	0	0%
resistant to other antimicrobials	44	32%	1	6.25%	10	20%	0	0%	2	50%	6	0%	0	0%	39	74%	0	0%

(1) : All isolations of salmonella must be reported to governmnet. Mainly isolates from clinical cases for diagnostic purposes in cattle, sheep, pigs. Isolates from poultry - large majority from private monitoring programmes.

Footnote

England and Wales where not specified

Table Antimicrobial susceptibility testing of S. Typhimurium in Pigs - at slaughter - survey (Great Britain 2003) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Typhimurium
	Pigs - at slaughter - survey (Great Britain 2003)
Isolates out of a monitoring program	no
Number of isolates available in the laboratory	67

Antimicrobials:	**N**	**%R**	**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**
Tetracycline	67	86%	57	19	6	4	0	0	0	0	0	0	0	0	0	0	0	1	3	3	0	1	3	0	1	0	0	0	0	0	0	0
Amphenicols																																
Chloramphenicol	67	42	30	7	1	3	1	0	0	0	0	0	0	6	4	12	7	4	9	3	7	0	0	1	0	0	0	0	0	0	0	1
Cephalosporin																																
Ceftazidim	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9	18	25	13	18	12	3	0	0	0
Quinolones																																
Nalidixic acid	67	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3	28	19	22	18	3	0	1	0	0	0	0	0	0	0
Sulfonamides																																
Sulfonamide	67	72	55	12	3	1	1	0	0	0	0	0	0	0	3	0	9	3	4	4	1	0	1	0	0	0	0	0	0	0	0	0
Aminoglycosides																																
Streptomycin	67	57	27	7	7	10	6	0	0	0	0	3	16	12	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gentamicin	67	6	4	0	0	1	1	0	0	0	0	0	0	3	22	27	18	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Neomycin	67	7	6	0	0	0	0	0	0	1	9	27	36	16	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trimethoprim + sulfonamides	67	45%	30	7	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	6	10	6	9	3	6	3	0	0	0	1
Penicillins																																
Ampicillin	67	61	45	10	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	1	6	13	7	3	1	0	0	0	0

Footnote

Survey of GB pigs arriving for slaughter in 2003 as detailed in previous report.

Table 3.2.7.7 Antimicrobial susceptibility testing of S. Typhimurium in humans - qualitative data

	S. Typhimurium	
	humans	
Isolates out of a monitoring program		
Number of isolates available in the laboratory		
Antimicrobials:	**N**	**%R**

Footnote

No information to report in 2004

Table 3.2.5.1 Antimicrobial susceptibility testing of Salmonella spp. in animals

	Salmonella spp.															
	Cattle (bovine animals)		**Cattle (bovine animals) (Northern Ireland)**		**Pigs**		**Pigs (Northern Ireland)**		**Gallus gallus**		**Gallus gallus (Northern Ireland)**		**Turkeys**		**all animals (Northern Ireland various animals (7 Foxes, 7 Ovine,9 Meal, 3 Pigeons, 5 Horses, 1 Caprine, 1 Duck, 1 Gecko and 1 Snake).)**	
Isolates out of a monitoring program (1)	yes		yes		yes		yes		yes		yes		yes		yes	
Number of isolates available in the laboratory	657		360		209		29		958		23		374		35	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	657	12%	335	3%	209	82%	29	69%	958	9%	23	4.4%	374	39%	34	11.8%
Amphenicols																
Chloramphenicol	657	9%	335	3.6%	209	52%	29	48.3%	958	2%	23	8.7%	374	11%	34	2.9%
Cephalosporin																
3rd generation cephalosporins			335	0%			29	0%			23	0%			34	0%
Cefotaxim	657	0%			209	0%			958	0%			374	0%		
Ceftazidim	657	0%			209	0%			958	0%			374	0%		
Fluoroquinolones																
Ciprofloxacin	657	0%	335	0%	209	0%	29	0%	958	0%	23	0%	374	0%	34	0%
Quinolones																
Nalidixic acid	657	1%	335	1.5%	209	4%	29	6.9%	958	2%	23	0%	374	15%	34	0%
Sulfonamides																
Sulfonamide	657	11%	335	4.2%	209	73%	29	65.5%	958	31%	23	13%	374	47%	34	2.9%
Aminoglycosides																
Streptomycin	657	11%	335	18.5%	209	60%	29	48.3%	958	8%	23	21.7%	374	23%	34	23.5%
Gentamicin	657	1%	335	0%	209	3%	29	0%	958	0%	23	0%	374	0%	34	0%

Neomycin	657	0%			209	7%			958	2%			374	3%		
Kanamycin			335	0%			29	0%			23	0%			34	0%
Trimethoprim + sulfonamides	657	5%			209	56%			958	27%			374	18%		
Penicillins																
Ampicillin	657	10%	335	3.6%	209	58%	29	55.2%	958	3%	23	8.7%	374	18%	34	2.9%
Number of multiresistant isolates																
fully sensitives	558	85%	269	80%	25	12%	7	24%	613	64%	17	74%	149	40%	23	68%
resistant to 1 antimicrobial	20	3%	51	15%	27	13%	2	6.8%	50	5%	3	13%	41	11%	10	29%
resistant to 2 antimicrobials	7	1%	0	0%	6	3%	2	6.8%	182	19%	1	4%	71	19%	0	0%
resistant to 3 antimicrobials	6	1%	4	1%	21	10%	1	3.4%	17	8%	0	0%	64	17%	0	0%
resistant to 4 antimicrobials	7	1%	1	0.3%	23	11%	7	24%	29	3%	1	4%	11	3%	0	0%
resistant to >4 antimicrobials	59	9%	10	3%	107	51%	12	41%	9	0.9%	1	4%	41	11%	1	3%

(1) : All isolates of salmonella from livestock must be reported to the government. Most isolates from cattle, pigs, and sheep are samples taken by private vets for diagnostic purposes. Isolates from poultry are mainly result of private monitoring programmes.

Footnote

Data from England and Wales and Northern Ireland where specified.
Because of rounding of figures or percentages total may not correspond.

Table 3.2.5.5 Antimicrobial susceptibility testing of Salmonella spp. in food

	Salmonella spp.							
	Broiler meat		**Other poultry meat**		**Pig meat**		**Bovine meat**	
Isolates out of a monitoring program	yes							
Number of isolates available in the laboratory	40							
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	3	6.8%						
Amphenicols								
Chloramphenicol	2	4.5%						
Quinolones								
Nalidixic acid	0	0.0%						
Trimethoprim	0	0.0%						
Sulfonamides								
Sulfonamide	3	13.6%						
Aminoglycosides								
Streptomycin	6	13.6%						
Gentamicin	0	0.0%						
Neomycin	0	0.0%						
Kanamycin	0	0.0%						
Spectinomycin	5	11.4%						
Trimethoprim + sulfonamides	12	27.3%						
Penicillins								
Ampicillin	4	9.1%						
Number of multiresistant isolates								
fully sensitives	22	50.0%						
resistant to 1 antimicrobial	4	9.1%						
resistant to 2 antimicrobials	9	20.5%						
resistant to 3 antimicrobials	2	4.5%						
resistant to 4 antimicrobials	2	4.5%						
resistant to >4 antimicrobials	3	6.8%						

Table 3.2.7.5 Antimicrobial susceptibility testing of Salmonella spp. in humans - qualitative data

	Salmonella spp.	
	humans	
Isolates out of a monitoring program		
Number of isolates available in the laboratory		
Antimicrobials:	**N**	**%R**

Footnote

No information to report in 2004

Table 3.2.6 Breakpoints for antibiotic resistance of Salmonella in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS
CASFM

Subject to quality control

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 <=
Tetracycline	VLA						10	13		13
Amphenicols										
Chloramphenicol	VLA						10	13		13
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	VLA						1	13		13
Enrofloxacin										
Quinolones										
Nalidixic acid	VLA						30	13		13
Trimethoprim(1)	VLA									
Sulfonamides										
Sulfonamide	VLA						300	13		13
Aminoglycosides										
Streptomycin							25	13		13
Gentamicin							10	13		13
Neomycin							10	13		13
Kanamycin										
Trimethoprim + sulfonamides							25	13		13
Cephalosporin										
Cefotaxim							30	13		13
Ceftazidim							30	13		13
3rd generation cephalosporins										
Penicillins										
Ampicillin							10	13		13

(1) : Trimethoprim sulfonamide combination

Table 3.2.6 Breakpoints for antibiotic resistance of Salmonella in Food

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS
CASFM

Subject to quality control

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 <=
Tetracycline	VLA						10	13		13
Amphenicols										
Chloramphenicol	VLA						10	13		13
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	VLA						1	13		13
Enrofloxacin										
Quinolones										
Nalidixic acid	VLA						30	13		13
Trimethoprim	VLA									
Sulfonamides										
Sulfonamide	VLA						300	13		13
Aminoglycosides										
Streptomycin							25	13		13
Gentamicin							10	13		13
Neomycin							10	13		13
Kanamycin										
Trimethoprim + sulfonamides							25	13		13
Cephalosporin										
Cefotaxim							30	13		13
Ceftazidim							30	13		13
3rd generation cephalosporins										
Penicillins										
Ampicillin							10	13		13

Table 3.2.6 Breakpoints for antibiotic resistance of Salmonella in Feedingstuff

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS
CASFM

Subject to quality control

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 <=
Tetracycline	VLA						10	13		13
Amphenicols										
Chloramphenicol	VLA						10	13		13
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	VLA						1	13		13
Enrofloxacin										
Quinolones										
Nalidixic acid	VLA						30	13		13
Trimethoprim	VLA									
Sulfonamides										
Sulfonamide	VLA						300	13		13
Aminoglycosides										
Streptomycin							25	13		13
Gentamicin							10	13		13
Neomycin							10	13		13
Kanamycin										
Trimethoprim + sulfonamides							25	13		13
Cephalosporin										
Cefotaxim							30	13		13
Ceftazidim							30	13		13
3rd generation cephalosporins										
Penicillins										
Ampicillin							10	13		13

Footnote

No information to report in 2004

Table 3.2.6 Breakpoints for antibiotic resistance of Salmonella in Humans

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS
- CASFM

Subject to quality control

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 <=
Tetracycline										
Amphenicols										
Chloramphenicol										
Florfenicol										
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin										
Quinolones										
Nalidixic acid										
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin										
Gentamicin										
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporin										
Cefotaxim										
Ceftazidim										
3rd generation cephalosporins										
Penicillins										
Ampicillin										

Footnote

No information to report in 2004

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 stable lately and appear to be declining although there was a slight increase in 2004 compared with 2003. 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.

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

In the UK as a whole there were 49233 cases reported in humans. This is a small increase in the number of cases reported in 2003 (49064 revised). Increases were seen in all countries except Scotland where there was a decrease.

Food

A number of studies were carried out on food, chicken and cheeses. Whole chickens were surveyed for the presence of Campylobacter from all parts of Wales and Northern Ireland during a 12-month period (January-December 2004). 517 samples out of a total of 753 chickens sampled tested positive for Campylobacter in Wales, and 202 out of 280 in Northern Ireland.

Results are detailed in Table 6.2 and antimicrobial susceptibility results are detailed in Table 6.1.5

A study of cheeses made from raw or thermised milk from production and retail premises. One of the 1842 (0.05%) cheese samples (semi-hard) was Campylobacter positive (C. jejuni).

A study to assess the microbiological quality of fresh refrigerated poultrymeat at production and retail level as regards to thermophilic Campylobacter spp. was carried out over 6 month period (May to October 2004). In total, 1723 fresh poultrymeat samples samples were examined for the presence or absence of Campylobacter spp. Campylobacter spp. was detected in 60% (1028/1723) of poultrymeat samples (chicken, 62% (959/1538); turkey, 36% (55/152); game fowl 42% (14/33).

All samples were tested for the presence or absence of Campylobacter and most isolates speciated and screened for antimicrobial resistance. The one isolate from cheese was 100% sensitive. For the other isolates resistance to more than four antimicrobial agents was seen in 8-16% of those tested (detailed in Table 6.1.5). The majority of the isolates were C. jejuni, followed by C. coli and a few C. lari.

Animals

No specific studies were conducted in animals in 2004. Isolates obtained from a statistically based survey of cattle and pigs arriving at GB abattoirs in 2003 were tested for antimicrobial resistance and are reported in the tables 6.1.2. C. coli was the predominant species found in pigs in that survey.

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.

The Food Standards Agency has begun a 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.

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, Communicable Disease Surveillance Centre, (Colindale), Health Protection Scotland, Health Protection Agency, Communicable Disease Surveillance Centre (Northern Ireland).

Case definition

Laboratory confirmed isolate, usually form 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 stable lately and appear to be declining although there was a slight increase in 2004 compared with 2003. 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.

Results of the investigation

In the UK as a whole there were 49233 cases reported in humans. This is a small increase in the number of cases reported in 2003 (49064 revised). Increases were seen in all countries with the smallest increase in Scotland.

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. This has been followed by a continued slight decline (55,888 cases were reported in 2000, 55798 cases were reported in 2001, and 46581 in 2002). A further reduction was noted in 2002 and 2003 when 43,876 cases were reported for each year. The route of transmission to humans in many sporadically occurring cases remains obscure.

In 2004, 44,038 cases were recorded. This remained the most commonly isolated gastrointestinal pathogen in 2004. Just over 61% of cases were reported between May and October 2004. A serotyping method developed at the Laboratory of Enteric Pathogens of the Health Protection Agency Centre for Infections is still being selectively used in England and Wales.

Scotland

In 2004 there were 4365 cases of Campylobacter in Scotland, denoting a nominal decrease from 2003 when there were 4445 isolates. This is a 13% decrease from the total of 5115 isolates reported in 2002, which marks a decrease of 6% on the level reported on the previous year, similarly, this follows a decrease of 16% in 2001 compared to 2000.

Campylobacter has remained the most frequently reported gastrointestinal pathogen reported from humans in Scotland. The national rate of infection observed in 2004 was 86.3 per 100,000. No clear pattern in the rates of infection across the 15 National Health Service Boards was observed.

Northern Ireland

There were 830 laboratory reports in 2004. Since 1991 this 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 2004 by 12% with 830 reports. It is not known how many cases were imported.

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

The number of reports of Campylobacter in humans in the UK gradually increase 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. 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 (see survey of cattle, sheep and pigs eligible for slaughter reported in 2003).

Table 6.3.A Campylobacteriosis in man - species/serotype distribution

	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc	unknown status
Campylobacter	49233	82.67	0	0	0	0	0
C. coli							
C. jejuni							
C. upsaliensis							
Campylobacter spp.(1)	49233	82.67					

(1) : 79 out of 4365 cases in Scotland were imported, and 29 out of 830 cases in Northern Ireland were imported. The number of imported cases in England and Wales not known (44038 in total).

Footnote

UK data - not all isolates are speciated. In England and Wales out of 1039 isolates 965 (92.9 %) were C. jejuni, and 73 (7.0 %) C coli, and 1 C. upsaliensis. In Northern Ireland out of 31, 26 (83.9%) C. jejuni, and 5 (16.1%) C. coli.

Table 6.3.B Campylobacteriosis in man - age distribution

Age Distribution	C. coli			C. jejuni			Campylobacter spp.		
	All	M	F	All	M	F	All	M	F
<1 year							882	516	362
1 to 4 years							720	1648	1068
5 to 14 years							2538	1583	950
15 to 24 years							6148	3215	2927
25 to 44 years							15556	8216	7335
45 to 64 years							13985	7556	6426
65 years and older							6666	3345	3321
Age unknown							310	182	126
Total :	0	0	0	0	0	0	46805	26261	22515

Footnote

UK Data. Total cases 49233, but age and sex not known in all cases.

Table 6.3.C Campylobacteriosis in man - seasonal distribution

Month	C. coli	C. jejuni	C. upsaliensis	Campylobacter spp.
	Cases	Cases	Cases	Cases
January				3105
February				3118
March				3352
April				3185
May				5024
June				6316
July				4773
August				4884
September				5064
October				4043
November				3594
December				2775
not known				0
Total :	0	0	0	49233

Footnote

UK data - only a sample of isolates are speciated

2.2.3. Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Sampling strategy

At retail

FSA Wales and Northern Ireland chicken survey (January-December 2004)
The aim of this survey was to produce an estimate of the Campylobacter contamination in whole chickens available to the consumer in Wales and Northern Ireland. Whole chickens were surveyed for the presence of Campylobacter from all parts of Wales and Northern Ireland during a 12-month period (January-December 2004). Samples were examined for the presence or absence of Campylobacter in accordance with the HPA Standard Microbiological Food Method F21 for detection of Campylobacter spp., which is based on the British Standard method BS 5763: Part 17: 1996, ISO 10272: 1995. Methods for microbiological examination of food and animal feeding stuffs: detection of thermotolerant Campylobacter.
LACORS/HPA Study of raw poultrymeat from production and retail premises
The European Commission Recommendation 2004/24/EC, made under Article 14(3) of the Official Control of Foodstuffs Directive 89/397/EEC and published in the Official Journal of the European Communities on 10 January 2004 required Member States to assess the microbiological quality of fresh refrigerated poultrymeat at production and retail level as regards to thermophilic Campylobacter spp. A six month (May to October 2004) study was undertaken and co-ordinated by the Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA), on behalf of the Food Standards Agency (FSA).

Frequency of the sampling

At retail

Other: January-December 2004 for first study, and May - October 2004 for the second study

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 samples were examined for the presence or absence of Campylobacter in accordance with the

HPA Standard Microbiological Food Method F21 for detection of Campylobacter spp., which is based on the British Standard method BS 5763: Part 17: 1996, ISO 10272: 1995. Methods for microbiological examination of food and animal feeding stuffs: detection of thermotolerant Campylobacter.
In the second 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

Results of the investigation

FSA Wales and Northern Ireland chicken survey (January-December 2004)
517 samples out of a total of 753 chickens sampled tested positive for Campylobacter in Wales, and 202 out of 280 in Northern Ireland
Results are detailed in Table 6.2 and antimicrobial susceptibility results are detailed in Table 6.1.5.
LACORS/HPA Study of raw poultrymeat from production and retail premises
In total, 1723 fresh poultrymeat samples samples were examined for the presence or absence of Campylobacter spp. Campylobacter spp. was detected in 60% (1028/1723) of poultrymeat samples (chicken, 62% (959/1538); turkey, 36% (55/152); game fowl 42% (14/33).
All samples were tested for the presence or absence of Campylobacter and most isolates speciated and screened for antimicrobial resistance.
Results are detailed in Table 6.2 and antimicrobial susceptibility results are detailed in Table 6.1.5.

B. Campylobacter spp. in food - Cheeses - survey (Study of cheeses made from raw or thermised milk from production and retail premises)

Monitoring system

Sampling strategy

The European Commission Recommendation 2004/24/EC, made under Article 14(3) of the Official Control of Foodstuffs Directive 89/397/EEC and published in the Official Journal of the European Communities on 10 January 2004 required Member States to assess the microbiological quality of cheeses made for raw or thermised milk at production and retail level. A two month (September to October 2004) study was undertaken and co-ordinated by the Local Authority Co-ordinators of Regulatory Services

(LACORS) and the Health Protection Agency (HPA), on behalf of the Food Standards Agency (FSA).

Frequency of the sampling

September to October 2004 two month study

Methods of sampling (description of sampling techniques)

In total, 70 unripened (fresh) soft cheese, 814 ripened soft cheese and 958 semi-hard cheese samples were examined for the presence or absence of Campylobacter spp.

Definition of positive finding

Isolation of Campylobacter spp.

Diagnostic/analytical methods used

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.

Results of the investigation

One semihard cheese of the 1842 (0.05%) cheese samples was Campylobacter positive (C. jejuni).
Results are detailed in Table 6.2 and antimicrobial susceptibility results are detailed in Table 6.1.5.

Table 6.2 Thermophilic Campylobacter spp. in food

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	C. coli	C. lari	C. upsaliensis	C. jejuni	Campylobacter spp.
Poultry meat										
fresh										
- at slaughter	*	**	chicken	100	5	2	0	0	2	1
- at retail (1)	***	****	chicken	100	1533	344	2	0	572	37
Turkey meat										
fresh										
- at retail - survey	*	*****	turkey	100	152	18	3	0	23	11
Wild game meat - birds										
fresh										
- at retail - survey	*	******	game bird	100	33	5	0	0	5	4

(1) : In FSA/NPHS Wales and NI study 1033 samples tested, 719 positive for thermophilic Campylobacter spp. 25% isolates were typed - 66 C coli, 1 C. lari, and 114 C. jejuni

Footnote

Weight of sample in gram

* - HPA/LACORS; ** - Sample type - Fresh refrigerated poultry meat (chicken)

*** - FSA/NPHS Wales and NI, HPA LACORS; **** - Sample type - Fresh refrigerated poultry meat

***** - Sample type -Fresh refrigerated poultry meat (turkey);

****** - Sample type -Fresh refrigerated poultry meat (game bird meat)

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 2004.

Table 6.1.1 Thermophilic Campylobacter spp. in animals

		Source of information	Remarks	Epidemiological unit	Units tested	Units positive	C. jejuni	C. coli	C. lari	C. upsaliensis

Footnote

No information to report in 2004. Survey in GB cattle, sheep and pigs arriving for slaughter in 2003 detailed in 2003 report.

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

Isolates were from a survey of GB cattle arriving for slaughter at the abattoir. See 2003 report for further details.

Type of specimen taken

Faeces

Methods of sampling (description of sampling techniques)

Culture at National Reference Laboratory

Procedures for the selection of isolates for antimicrobial testing

One isoalte from each positive culture was selected.

Methods used for collecting data

Isolates were from survey to establish the prevalence of Campylobacter in cattle arriving for slaughter.

Laboratory methodology used for identification of the microbial isolates

Standard VLA reference protocol

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Tetracyclin, Ampicillin, Ciprofloxacin, Naladixic acid, Erythromycin.

Breakpoints used in testing

Tetracycline 8 micro gram per ml, Ampicillin 32, ciprofloxacin 1, naladixic acid 16, erytromycin 4.

Control program/mechanisms

The control program/strategies in place

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

Results of the investigation

Out of 284 C.jejuni isolates tested 74% were fully sensitive, and 1% were resistant to more than 4 antimicrobials. The Campylobacter susceptibility data relates to isolates recovered in 2003 from

statistically-based surveillance of cattle, sheep and pigs at slaughter in abattoirs in Great Britain. The method used was identical to that used by medical colleagues in England and Wales to facilitate direct comparison of medical and veterinary results. Ampicillin resistance was most prevalent and it is recognised that Campylobacter commonly possess a chromosomal beta-lactamase. Resistance to nalidixic acid and ciprofloxacin was detected in C. coli and C. jejuni from cattle in 2003, with 3% of C. coli and C. jejuni isolates resistant to ciprofloxacin.

B. Antimicrobial resistance in Campylobacter jejuni and coli in pigs

Sampling strategy used in monitoring

Frequency of the sampling

Isolates were from a survey conducted in 2003 on the prevalence of certain zoonotic agents in pigs arriving for slaughter at GB abattoirs.

Type of specimen taken

Faeces

Methods of sampling (description of sampling techniques)

Details of the sampling are given in 2003 report.

Procedures for the selection of isolates for antimicrobial testing

One isolate from each positive culture.

Methods used for collecting data

As described for cattle.

Laboratory methodology used for identification of the microbial isolates

As for cattle

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The tests were carried out at the veterinay laboratories agency centre laboratory.

Breakpoints used in testing

The same breakpoints as detailed in the cattle study. The method and breakpoints are the same as those used in the Health Protection Agency dealing with human and food isolates to enable comparison with other surveys.

Results of the investigation

In pigs 40% of the C. Jejuni isolates were fully sensitive and none were resistant to 4 or more antimicrobials. For C. coli, the majority isolate in pigs in this survey, 13% were fully sensitive and 4% were resistant to more than 4 antimicrobials.

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

In pigs, no resistance was detected in Campylobacter jejuni to ciprofloxacin, furazolidone, kanamycin or nalidixic acid. C. coli and C. jejuni isolates from pigs were commonly resistant to tetracyclines (69% and 53% respectively). Erythromycin resistance in C. coli from pigs was 21% in 2003, a decline from the figure of 85% recorded in a similar survey performed in 1999/ 2000. This decline could possibly be linked to the cessation of use of tylosin as a growth promoter in 1999. No resistance to nalidixic acid or ciprofloxacin was detected in the low number of isolates of C. jejuni recovered from pigs. Ciprofloxacin resistance in C. coli from pigs was 16% in 2003, whilst 27% of C. coli isolates from pigs were resistant to nalidixic acid.

Table 6.1.2 Antimicrobial susceptibility testing of Campylobacter in animals

	Campylobacter spp.									
	Cattle (bovine animals)		**Cattle (bovine animals) - at slaughter - survey (C. coli)**		**Pigs**		**Pigs - at slaughter - survey (C. coli)**		**Poultry**	
Isolates out of a monitoring program	yes		yes		yes		yes			
Number of isolates available in the laboratory	284		33		15		328			
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	284	6%	33	0%	15	53%	328	70%		
Fluoroquinolones										
Ciprofloxacin	284	3%	33	3%	15	0%	328	16%		
Quinolones										
Nalidixic acid	284	8%	33	15%	15	0%	328	27%		
Macrolides										
Erythromycin	284	3%	33	18%	15	13%	328	21%		
Penicillins										
Ampicillin	284	14%	33	48%	15	33%	328	24%		
Number of multiresistant isolates										
fully sensitives	284	74%	33	30%	15	40%	328	13%		
resistant to 1 antimicrobial	284	18%	33	52%	15	20%	328	22%		
resistant to 2 antimicrobials	284	5%	33	15%	15	33%	328	31%		
resistant to 3 antimicrobials	284	1%	33	0%	15	7%	328	18%		
resistant to 4 antimicrobials	284	1%	33	3%	15	0%	328	12%		
resistant to >4 antimicrobials	284	1%	33	0%	15	0%	328	4%		

Footnote

Isolates from survey of cattle, sheep and pigs arriving for slaughter ar GB abattoirs in 2003 - see report 2003. Campylobaacter spp isolates in the table were all C. jejuni

Table 6.1.4 Antimicrobial susceptibility testing of Campylobacter in food

	Campylobacter spp.									
	Broiler meat		**Other poultry meat**		**Pig meat**		**Bovine meat**		**Cheeses - soft and semi soft - official food or feed controls - random sampling**	
Isolates out of a monitoring program (1)	no		no						no	
Number of isolates available in the laboratory	788		49						1	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	399	51%	28	57%					0	0%
Fluoroquinolones										
Ciprofloxacin	210	27%	15	31%					0	0%
Quinolones										
Nalidixic acid	231	29%	17	35%					0	0%
Aminoglycosides										
Gentamicin	0	0%	0	0%					0	0%
Macrolides										
Erythromycin	61	8%	6	12%					0	0%
Penicillins										
Ampicillin	581	74%	33	67%					0	0%
Number of multiresistant isolates										
fully sensitives	109	14%	6	12%					1	100%
resistant to 1 antimicrobial	224	28%	10	20%						
resistant to 2 antimicrobials	117	15%	2	4%						
resistant to 3 antimicrobials	151	19%	13	26%						
resistant to 4 antimicrobials	59	7%	4	8%						
resistant to >4 antimicrobials	128	16%	8	16%						

(1) : Survey

Table 6.1.3 Antimicrobial susceptibility testing of Campylobacter in humans

	Campylobacter spp.	
	humans	
Isolates out of a monitoring program		
Number of isolates available in the laboratory		
Antimicrobials:	**N**	**%R**

Footnote

No information to report in 2004

Table 6.1.6 Breakpoints used for antimicrobial susceptibility testing of Campylobacter in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS
CASFM

Subject to quality control

Campylobacter	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 <=
Tetracycline	HPA, UK	8		8	8	8				
Fluoroquinolones										
Ciprofloxacin	HPA, UK	1		1	1	1				
Quinolones										
Nalidixic acid	HPA, UK	16		16	16	16				
Aminoglycosides										
Gentamicin										
Macrolides										
Erythromycin	HPA, UK	4		4	4	4				
Penicillins										
Ampicillin	HPA, UK	32		32	32	32				

Table 6.1.6 Breakpoints used for antimicrobial susceptibility testing of Campylobacter in Food

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS
CASFM

Subject to quality control

Campylobacter	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 <=
Tetracycline	HPA, UK	8		8	8	8				
Fluoroquinolones										
Ciprofloxacin	HPA, UK	1		1	1	1				
Quinolones										
Nalidixic acid	HPA, UK	16		16	16	16				
Aminoglycosides										
Gentamicin										
Macrolides										
Erythromycin	HPA, UK	4		4	4	4				
Penicillins										
Ampicillin	HPA, UK	32		32	32	32				

Table 6.1.6 Breakpoints used for antimicrobial susceptibility testing of Campylobacter in Humans

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS
CASFM

Subject to quality control

Campylobacter	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 <=
Tetracycline	HPA, UK	8		8	8	8				
Fluoroquinolones										
Ciprofloxacin	HPA, UK	1		1	1	1				
Quinolones										
Nalidixic acid	HPA, UK	16		16	16	16				
Aminoglycosides										
Gentamicin										
Macrolides										
Erythromycin	HPA, UK	4		4	4	4				
Penicillins										
Ampicillin	HPA, UK	32		32	32	32				

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 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 cases in 2004 was 236, a slight reduction in the number in 2003 (243). A survey of butter from production, retail and catering premises was carried out as described below. A study of cheeses made from raw or thermised milk from production and retail premises was also completed.Eighteen of the 1842 (0.97%) of the cheeses samples were L. monocytogenes positive, of which 16 (0.87%) were at levels below 100 cfu/g and 2 (0.11%) contained L. monocytogenes above 100 cfu/g. Further details are given in separate report.

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

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 the Official Control of Foodstuffs Directive 89/397 (OCD). The results of this food testing, which is done locally, are returned to the European Commission annually as required by article 14 of the directive 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)

Food
Results of the investigations published in 2004:
LACORS/HPA Study of Butter from Production, Retail and Catering Premises
A two month Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA) study (May - June 2004) was carried out to assess the microbiological quality of butter from production, retail and catering premises.
In total 3229 samples were examined, comprising 2672 packed and 345 unwrapped butter samples, and for the remaining 212 samples this information was not recorded. All samples were tested for presence or absence of Listeria monocytogenes and all isolates at 100 cfu/g or more were subtyped.
Listeria monocytogenes.
Thirteen of the 3229 (0.40%) of the butter samples were L. monocytogenes positive, of which

all 13 were at levels below 100 cfu/g. None of the samples contained L. monocytogenes above 100 cfu/g.

The enrichment and enumeration methods used were the HPA Standard Microbiological Food Method for detection and enumeration of Listeria monocytogenes and other Listeria species which is based on the British Standard method BS EN ISO 11290 parts 1 and 2: Microbiological examination of food and animal feeding stuffs: Horizontal method for the detection and enumeration of Listeria monocytogenes, Parts 1 (1997) and 2 (1998).

Results are detailed in Table 7.1.

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 236 laboratory reports.
England and Wales
There were 9 pregnancy-associated cases reported in 2004. (Note that we do not call these congenital or perinatal cases since a proportion of neonates are not born with symptoms of listeriosis; there are both early and late stage neonatal infections up to the end of the neonatal period, i.e., day 28 after birth). There were 9 cases in 2002 and 32 such cases in 2003.
There were a total of 217 cases in 2004, down from 226 cases the previous year.
Scotland
In 2004 there were 15 cases of Listeriosis with 10 of them being in the over 65 age bracket (Table 7.2 Listeriosis).
Northern Ireland
There were four cases reported among elderly patients in 2004, all of which were L. monocytogenes.

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

The total number of reports is down slightly to 236 from 243 in 2003.
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. Since that date annual numbers have been approximately 12. In England and Wales peak infection was seen in the late 1980's.

Table 7.2.A Listeriosis in man - species/serotype distribution

	Cases	Cases Inc
Listeria	236	0.4
Listeria spp.	236	0.40
congenital cases	10	0.02
deaths(1)	21	0.04

(1) : 2 cases also had cancer

Footnote

UK data

Table 7.2.B Listeriosis in man - age distribution

Age Distribution	L. monocytogenes			Listeria spp.		
	All	M	F	All	M	F
<1 year				6	3	3
1 to 4 years				2	0	2
5 to 14 years				3	2	1
15 to 24 years				3	2	1
25 to 44 years				30	7	23
45 to 64 years				47	29	18
65 years and older				135	70	65
Age unknown				10	8	2
Total :	0	0	0	236	121	115

Footnote

UK data. Species where determined were all L. monocytogenes

2.3.3. Listeria in foodstuffs

A. Listeria spp. in food - Cheeses - survey

Monitoring system

Sampling strategy

The European Commission Recommendation 2004/24/EC, made under Article 14(3) of the Official Control of Foodstuffs Directive 89/397/EEC and published in the Official Journal of the European Communities on 10 January 2004 required Member States to assess the microbiological quality of cheeses made from raw or thermised milk at production and retail level. A two month (September to October 2004) study was undertaken and co-ordinated by the Local Authority Co-ordinators of Regulatory Services (LACORS) and the Health Protection Agency (HPA), on behalf of the Food Standards Agency (FSA).
In total, 70 unripened (fresh) soft cheese, 816 ripened soft cheese and 958 semi-hard cheese samples were examined for the presence or absence of Listeria monocytogenes and all isolates at 100 cfu/g or more were subtyped.

Frequency of the sampling

At retail

Other: retail and production

Results of the investigation

Listeria monocytogenes.
Eighteen of the 1842 (0.97%) of the cheeses samples were L. monocytogenes positive, of which 16 (0.87%) were at levels below 100 cfu/g and 2 (0.11%) contained L. monocytogenes above 100 cfu/g.
The enrichment and enumeration methods used was the HPA Standard Microbiological Food Method for detection and enumeration of Listeria monocytogenes and other Listeria species which is based on the British Standard method BS EN ISO 11290 parts 1 and 2: Microbiological examination of food and animal feeding stuffs: Horizontal method for the detection and enumeration of Listeria monocytogenes, Parts 1 (1997) and 2 (1998).

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

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

Table 7.1 Listeria monocytogenes in food

	Source of information	Remarks	Epidemiological unit	Sample weight	Definition used	Units tested	<100 cfu/g	>100 cfu/g	L. monocytogenes
Cheeses									
- at processing plant	*	Sample type- cheese made from raw or thermised milk		100	Unacceptable Level > 100cfu/g	25	0	1	1
- at retail	*	Sample type- cheese made from raw or thermised milk		100	Unacceptable Level > 100cfu/g	1817	16	1	17
Dairy products									
other products									
ready-to-eat									
- at retail	*	Sample type - Butter		50	Unacceptable Level > 100cfu/g	3229	13	0	13

Footnote

Sample weight gram (g)

* - HPA/LACORS

2.4. VEROCYTOTOXIC ESCHERICHIA COLI

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 there was an increase on the 864 laboratory confirmed cases in 2003 to 898 laboratory confirmed cases reported in 2004; of these 890 were VTEC O157. There were 38 cases of HUS (1 clinical case and 37 confirmed laboratory reports). Of these 35 were caused by VTEC O157 and two by non-O157. The main increase in reports was in Scotland where 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. In England and Wales there was a small increase in the number of cases and in Northern Ireland there was a fall in the number of cases reported compared with the previous year.
Animals
No surveys were carried out in 2004. A survey of eligible cattle, sheep and pigs was carried out in 2003 - report for 2003.

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 GB have shown the importance of contact with animals and the animals' environment.

2.4.2. Verocytotoxic Escherichia coli 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.
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 there were 898 laboratory confirmed cases reported, and of these 890 were VTEC O157. There were 38 cases of HUS (1 clinical case and 37 confirmed laboratory reports). Of these 35 were caused by VTEC O157 and two by non-O157.
In detail for England and Wales the total recorded cases was 688 (all except 2 were O157), a small increase on the 663 cases reported in 2003, more than the 595 cases recorded in 2002, but less than the 751 cases recorded in 2001, which was a reduction in the 896 cases recorded in 2000. In 2004 there were 14 laboratory confirmed cases of HUS compared to the 12 cases reported for 2003.
In Scotland VTEC was confirmed in 216 cases, of which 209 were culture positive for O157, six culture positive for non-O157 VTECs and one seropositive for O157. Twenty-four of these cases developed HUS.
In Northern Ireland there were 19 reports of E. coli O 157 in 2004, 18 of which were VT positive. This compares with 53 reports of E. coli O 157 in 2003, 51 of which were VT positive

and 46 reports in 2001 of which 43 were VT positive. There were no E. coli O157 outbreaks reported to CDSC NI during 2004.

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

In Scotland 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. In England and Wales there was a small increase in the number of cases and in Northern Ireland there was a fall in the number of cases reported compared with the previous year.
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 there were 3.8 cases per 100,000 population compared with 1.1 and 1.3 cases per 100,000 population in Northern Ireland, and England and Wales, respectively.

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 GB have shown the importance of contact with animals and the animals' environment.

Table 11.3.A Verocytotoxic Escherichia coli infections in man - species/serotype distribution

Pathogenic Escherichia coli	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
HUS(1)	38	0.06	37	0.06	1	0.0
- clinical cases	1	0.00	1	0.00	0	0.0
- lab. confirmed cases	37	0.06	36	0.06	1	0.00
- caused by O157 (VT+)	35	0.06	34	0.06	1	0.00
- caused by other VTEC	2	0.00	2	0.00	0	0.00
E.coli infect. (except HUS)						
- laboratory confirmed	898	1.51	791	1.33	89	0.15
- caused by 0157 (VT+)	890	1.49	803	1.35	87	0.15
- caused by other VTEC	8	0.01	5	0.01	3	0.01

(1) : No HUS cases recorded in Northern Ireland

Footnote

UK data

Table 11.3.B Verocytotoxic Escherichia coli infections in man - age distribution

Age Distribution	Verotoxigenic E. coli (VTEC)			VTEC O 157:H7			VTEC non-O 157		
	All	M	F	All	M	F	All	M	F
<1 year	0	0	0	24	16	7	0	0	0
1 to 4 years	23	10	13	165	95	69	1	0	1
5 to 14 years	10	6	4	165	99	66	0	0	0
15 to 24 years	0	0	0	94	38	56	1	2	0
25 to 44 years	1	0	1	163	66	97	2	0	2
45 to 64 years	2	0	2	133	45	88	3	1	1
65 years and older	1	0	1	90	27	63	1	0	1
Age unknown	1	0	1	56	17	38	0	0	0
Total :	38	16	22	890	403	484	8	3	5

Footnote

UK data. Verotoxigenic E. coli (VTEC) cases equals HUS cases

2.4.3. Pathogenic Escherichia coli in foodstuffs

Table 11.2 Verocytotoxic Escherchia coli in food

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	VTEC O 157	VTEC O 157:H7

Footnote

No information to report in 2004

2.4.4. Pathogenic Escherichia coli in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

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

Table 11.1 Verocytotoxic Escherchia coli in animals

		Source of information	Remarks	Epidemiological unit	Units tested	Units positive	VTEC O 157	VTEC O 157:H7

Footnote

The last survey was carried out in cattle sheep and pigs in 2003, see report for 2003. No information to report in 2004

2.5. TUBERCULOSIS

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)
Great Britain, as a country, cannot be considered officially free from TB (OTF) in cattle under Directive 64/432/EEC due to the incidence of TB in the national herd. Nevertheless, the majority of individual cattle herds in GB enjoy OTF status. When reactor animals are found during routine testing, the OTF status of the herd in question is suspended. The geographical distribution of TB incidents continues to show a high degree of clustering. Areas of the South West of England, the West Midlands and South and West Wales account for the vast majority of confirmed TB incidents and test reactors. TB incidents are confirmed sporadically outside these areas. Scientific evidence suggests that in the high TB incidence areas, some wild mammal species (mainly the Eurasian badger, Meles meles) constitute 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. Additional details on the Northern Ireland situtation are in a separate report.

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

Great Britain (England, Wales and Scotland).
Situation as at 08 March 2005
Approximately 1% fewer herd tests were carried out in 2004 (44,720) than in 2003 (45,122), involving just over 4.6 million animal tests (almost 4.5 million in 2003). Cattle herd numbers continued to decrease across GB in relation to previous years.
A total of 5,263 cattle herds were under TB restrictions (i.e. had their OTF status suspended) because of a TB incident at some time during 2004, compared with 5,496 herds in 2003. On 31 December 2004, a total of 2,052 cattle herds were under TB restrictions and had their OTF status suspended or withdrawn because of a TB incident. This figure represented approximately 2.2% of the national cattle herd.
The absolute number of new TB incidents (herd breakdowns) disclosed in 2004 was up by 3.6% on 2003 (3,339 against 3,220). The proportion of new incidents confirmed by post mortem examination and/or culture in 2004 was 51% (1,702 of 3,339), very similar to the 52% overall confirmation proportion observed in 2003.
For every 100 tests carried out in unrestricted cattle herds in 2003, an average of 3.5 new confirmed incidents were found. The equivalent rate for 2004 was 3.4.
A provisional total of 23,003 cattle were slaughtered as tuberculin test reactors (19,938), direct

contacts (2,576) or inconclusive test reactors (489) in 2004, a figure comparable to the total for 2003 (23,748).
The 19,938 test reactors detected in 2004 represented 0.43% of the total cattle tested. The average total number of reactors per TB incident (including new herd breakdowns and those that started in 2003 and continued in 2004) was 3.8, compared with 3.7 in 2003.
A total of 2.6 million head of cattle were slaughtered in British abattoirs in 2004. This figure included cattle destined for human consumption and adult bovines removed from the food chain by the Over Thirty Month Scheme. The number of suspect cases detected by the Meat Hygiene Service during routine meat inspection rose from 305 in 2003 (of which 53% were bacteriologically confirmed) to 391 in 2004 (of which 50% were bacteriologically confirmed).
More information on TB control measures and statistics for GB are available on the Department for Environment, Food and Rural Affairs (Defra) website at http://www.defra.gov.uk/animalh/tb/index.htm.
Norhtern Ireland
There are approximately 27,800 active cattle herds in Northern Ireland. The June Agricultural Census 2004 figures state that there were 1.68 million cattle. During the year, 1,865,671 animals were tested and 15,082 reactors were found. A further 673 animals were removed as negative in-contacts because although they showed negative results to the tuberculin test, they were deemed to be at high risk of becoming infected with tuberculosis (or showed reaction to the gamma-interferon blood assay). The herd incidence has shown a small decrease since 2002 (2002 = 9.93%; 2003 = 9.56%; 2004 = 9.17%). See additional report for further details.

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 SVS, 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, the SVS 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 2004 there were 6 (provisional) cases of M bovis in humans and none were known to be directly associated with contact with infected cattle.

Recent actions taken to control the zoonoses

Great Britain
Once identified, reactor cattle (and, if necessary, any in-contact animals) are compulsorily removed, with compensation paid to the owner at 100% of the market value of the animal. Slaughtered reactor cattle are subject to post mortem examination for evidence of typical lesions of TB. Tissue samples are collected for bacteriological culture and strain typing. In affected herds with multiple reactors only a representative number of carcases may be sampled for bacteriological examination.
Cattle movements are restricted on the affected premises. These restrictions preclude movements of cattle on and off the premises, except for movements of animals to slaughter under licence issue by the State Veterinary Service (SVS). Restrictions on animal movements remain in place until the herd has had one (or two, depending on whether infection was confirmed or not) tuberculin test at 60-day intervals with negative results. Any animals moved out of an infected herd prior to the disclosure of reactors are forward traced and, if any of those animals are still alive on another holding, they are tested. Cattle herds contiguous to an infected herd are also tuberculin tested. Six months after the restoration of OTF status, affected herds undergo tuberculin check testing. A second check test takes place 12 months later and, if its results are negative, the herd returns to its normal testing frequency.
Please see Northern Ireland report for details relating to the situation there.

2.5.2. Tuberculosis 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
Surveillance of tuberculosis in humans in Northern Ireland is based on:
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) 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 2004, reports have fluctuated between 6 and 37 per annum.
The majority has 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 2004 the number of reports of M. bovis has varied from 0 to 7 per year.

Results of the investigation

In England and Wales in 2004 there were 6 (provisional) laboratory reports of tuberculosis due to M. bovis, a decrease in the total of 13 for the previous year. One case reported in 2004 (male aged 25-44 yrs) had previous agricultural and livestock contact but no known contact with infected cattle). None of the remaining cases had any known contact with infected cattle.
In Scotland in 2004, two (2) cases of tuberculosis due to M. bovis was reported.

In Northern Ireland in 2004 there were no human cases of M. bovis notified as was the case in 2003.

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. In England and Wales in 2004 there was no definite link established between infected human and infected cattle, and in Northern Ireland there have been no cases in 2003 and 2004.

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 1.2.A Tuberculosis in man - species/serotype distribution

Mycobacterium	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
	188	2.68	0	0	0	0
M. bovis(1)	8	0.01				
M. tuberculosis(2)	180	2.67				
reactivation of previous cases(3)	5	0.01				

(1) : 6 cases reported in England and Wales (provisional figure); 2 in Scotland and 0 in Northern Ireland
(2) : Only Scotland and Northern Ireland data available
(3) : At least 5 were reactivation

Footnote

UK data for M. bovis is provisional.
M. tuberculosis data not available for England and Wales.

Table 1.2.B Tuberculosis in man - 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	1	1	0
45 to 64 years	5	0	0
65 years and older	2	0	2
Age unknown			
Total :	8	1	2

Footnote

UK data; no cases in Northern Ireland

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 from TB (OTF).

Additional information

Great Britain, 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 GB enjoy OTF status.
Further information on Northern Ireland is given in separate section.

Monitoring system

Sampling strategy

Great Britain (England, Wales, and Scotland)
The TB testing programme applied in Great Britain (i.e. England, Scotland and Wales) follows the principles of Council Directive 64/432/EEC, last amended on 8 July 2002 by Commission Regulation 1226/2002.
Northern Ireland
Similar to Great Britain - for further details on Northern Ireland see separate section.

Frequency of the sampling

Great Britain (England, Wales, and Scotland)
Compulsory tuberculin testing of cattle herds takes 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 2004, 25.6% of all cattle herds in GB (just over 93,000) were on an annual tuberculin testing frequency. The remainder were tested every two (12.8%), three (0.7%), or four (60.9%) years. TB testing intervals are reviewed nationally once a year, for compliance with Annex A of 64/432/EEC. More regular adjustments may take place at local level in response to the evolving disease situation. Furthermore, individual herds situated in 2-, 3- and 4-yearly testing areas are subjected to annual testing if they represent a high public or animal health risk (e.g. producers of raw drinking milk from cows, herds owned by dealers, bull hirers).
The programme of regular tuberculin herd testing is supplemented by veterinary inspection of cattle during routine meat production at slaughterhouses. Animals with suspect tuberculous lesions (granulomas) are traced back to the herd of origin, which is then subjected to tuberculin check testing.
Test reactors and contact animals presented for slaughter undergo post mortem inspection in accordance with the requirements of the EC fresh meat directive (64/433/EEC). Post mortem inspection of reactors and contacts takes place regardless of whether the animals are fit for human consumption or excluded from the food chain under the Over Thirty Months Scheme. The affected organ or part of the carcase (or the whole carcase if more

than one organ is affected) are disposed of and do not enter the food chain.
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)

Great Britain (England, Wales, Scotland).
Ante mortem diagnosis and surveillance of TB in cattle is by the single intradermal comparative cervical test (SICCT) using avian and bovine Weybridge purified protein derivative (PPD) tuberculin, according to the procedure described in Commission Regulation 1226/2002 (Annex B to 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 is the only diagnostic test approved for certification of British herds as officially TB free (OTF). The in vitro gamma interferon blood test (BovigamTM) is used ad hoc in herds with confirmed, severe TB breakdowns and routinely as part of a field trial under way in Wales and nine English counties.
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 variable number tandem repeats (VNTR) analysis.
Northern Ireland
The comparative intradermal tuberculin test as described in Annex B of Directive 64/432 is used to test all animals for tuberculosis.

Case definition

Great Britain (England, Wales, Scotland).
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 tissue specimens. In suspect TB cases detected during routine meat inspection, disease is only confirmed if M. bovis can be isolated from the suspect lesions. A confirmed TB incident (breakdown) is one in which at least one confirmed animal was found.
Northern Ireland
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. 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.

Vaccination policy

Vaccination of cattle against TB is not carried out in Great Britain and is expressly forbidden by

the domestic animal health legislation. Vaccination of cattle against TB is not carried out in Northern Ireland.

Other preventive measures than vaccination in place

As described under control program mechanisms.

Control program/mechanisms

The control program/strategies in place

Great Britain (England, Wales, Scotland)
The TB testing programme applied in Great Britain (i.e. England, Scotland and Wales) follows the principles of Council Directive 64/432/EEC, last amended on 8 July 2002 by Commission Regulation 1226/2002.
Once identified, reactor cattle (and, if necessary, any in-contact animals) are compulsorily removed, with compensation paid to the owner at 100% of the market value of the animal. Slaughtered reactor cattle are subject to post mortem examination for evidence of typical lesions of TB. Tissue samples are collected for bacteriological culture and strain typing. In affected herds with multiple reactors only a representative number of carcases may be sampled for bacteriological examination.
Cattle movements are restricted on the affected premises. These restrictions preclude movements of cattle on and off the premises, except for movements of animals to slaughter under licence issue by the State Veterinary Service (SVS). Restrictions on animal movements remain in place until the herd has had one (or two, depending on whether infection was confirmed or not) tuberculin test at 60-day intervals with negative results. Any animals moved out of an infected herd prior to the disclosure of reactors are forward traced and, if any of those animals are still alive on another holding, they are tested. Cattle herds contiguous to an infected herd are also tuberculin tested. Six months after the restoration of OTF status, affected herds undergo tuberculin check testing. A second check test takes place 12 months later and, if its results are negative, the herd returns to its normal testing frequency.
Northern Ireland
The comparative intradermal tuberculin test as described in Annex B of Directive 64/432 is used to test all animals for tuberculosis.
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.
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.

Measures in case of the positive findings or single cases

Measures are taken as described under control programs above.

Results of the investigation

Great Britain (England, Wales, Scotland)
Approximately 1% fewer herd tests were carried out in 2004 (44,720) than in 2003 (45,122), involving just over 4.6 million animal tests (almost 4.5 million in 2003). Cattle herd numbers continued to decrease across GB in relation to previous years.
A total of 5,263 cattle herds were under TB restrictions (i.e. had their OTF status suspended) because of a TB incident at some time during 2004, compared with 5,496 herds in 2003. On 31 December 2004, a total of 2,052 cattle herds were under TB restrictions and had their OTF status suspended or withdrawn because of a TB incident. This figure represented approximately 2.2% of the national cattle herd.
The absolute number of new TB incidents (herd breakdowns) disclosed in 2004 was up by 3.6% on 2003 (3,339 against 3,220). The proportion of new incidents confirmed by post mortem examination and/or culture in 2004 was 51% (1,702 of 3,339), very similar to the 52% overall confirmation proportion observed in 2003.
For every 100 tests carried out in unrestricted cattle herds in 2003, an average of 3.5 new confirmed incidents were found. The equivalent rate for 2004 was 3.4.
A provisional total of 23,003 cattle were slaughtered as tuberculin test reactors (19,938), direct contacts (2,576) or inconclusive test reactors (489) in 2004, a figure comparable to the total for 2003 (23,748).
The 19,938 test reactors detected in 2004 represented 0.43% of the total cattle tested. The average total number of reactors per TB incident (including new herd breakdowns and those that started in 2003 and continued in 2004) was 3.8, compared with 3.7 in 2003.
A total of 2.6 million head of cattle were slaughtered in British abattoirs in 2004. This figure included cattle destined for human consumption and adult bovines removed from the food chain by the Over Thirty Month Scheme. The number of suspect cases detected by the Meat Hygiene Service during routine meat inspection rose from 305 in 2003 (of which 53% were bacteriologically confirmed) to 391 in 2004 (of which 50% were bacteriologically confirmed).
More information on TB control measures and statistics for GB are available on the Department for Environment, Food and Rural Affairs (Defra) website at http://www.defra.gov.uk/animalh/tb/index.htm.
Northern Ireland
There are approximately 27,800 active cattle herds in Northern Ireland. The June Agricultural Census 2004 figures state that there were 1.68 million cattle. During the year, 1,865,671 animals were tested and 15,082 reactors were found. A further 673 animals were removed as "negative in-contacts" because although they showed negative results to the tuberculin test, they were deemed to be at high risk of becoming infected with tuberculosis (or showed reaction to the gamma-interferon blood assay). The herd incidence has shown a small decrease since 2002 (2002 = 9.93%; 2003 = 9.56%; 2004 = 9.17%).

Relevance of the findings in animals to findings in foodstuffs and 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 SVS, 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, the SVS will notify the Environmental Health Department of the Local Authority, as the body responsible for ensuring that all the milk sold from such herds undergoes heat treatment. The medical authorities are also informed once infection with M. bovis is confirmed in tuberculin reactors or in cattle carcases undergoing routine meat inspection.

Every year since 1990, between 20 and 50 (typically 40) people have been diagnosed with zoonotic TB in the UK. This represents between 1.0 and 1.5% of all culture-confirmed cases of TB in humans, a proportion similar to that reported in other industrialised countries. This figure has remained stable, with no discernible positive or negative trend despite the increasing incidence of TB in cattle. The vast majority of these cases represent infections contracted abroad (i.e. classed as imported cases) or reactivation of long-standing latent 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.

There were 6 (provisional) cases of M. bovis in humans, none of which could be associated with direct contact with infected cattle.

B. Mycobacterium bovis in farmed deer

Monitoring system

Sampling strategy

Deer (Farmed and Park)
(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 SVS. Under the same order, the SVS 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. Skin testing is limited to farmed deer and, occasionally, park deer 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 surveys of wild deer. 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 single intradermal comparative cervical 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 maximum of £1,200 (i.e. the maximum compensation payable is £600). Great Britain is currently reviewing compensation arrangements for all notifiable diseases of livestock, including farmed deer.

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. TB 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 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. 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

Under the Tuberculosis (Deer) Order 1989 (as amended), TB in deer became notifiable in Great Britain on 1 June 1989.

Results of the investigation

During 2004, M. bovis infection was confirmed in 44 of 88 tissue submissions suitable for culture, from a total of 98 suspect cases of TB in deer reported to Defra. All positive submissions were from wild deer. Of those, 29 submissions involved wild red (Cervus elaphus),

14 fallow (Dama dama) and 1 roe (Capreolus capreolus) deer. All of these originated in south west England and the Welsh Borders, except one positive red deer hind shot in December 2003 on a large estate south of Inverness, in the Scottish Highlands.
Northern Ireland
In 2004 24 samples were examined from deer and 10 were found to be positive.

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

During 2004, M. bovis infection was confirmed in 44 of 88 tissue submissions suitable for culture, from a total of 98 suspect cases of TB in deer reported to Defra. All positive submissions were from wild deer. Of those, 29 submissions involved wild red (Cervus elaphus), 14 fallow (Dama dama) and 1 roe (Capreolus capreolus) deer. All of these originated in south west England and the Welsh Borders, except one positive red deer hind shot in December 2003 on a large estate south of Inverness, in the Scottish Highlands.
Lesions typical of TB have been observed sporadically in deer in Great Britain for many years. M. bovis infection has been confirmed in five of the six species of wild deer present in this 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 the national wild deer herd is very low. Inspection of farmed venison provides an additional source of surveillance data to support the view that TB is not widespread in the farmed population. Although meat from wild deer destined for the domestic market will not be 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. Nonetheless, there may be under-reporting of TB in deer, particularly in those areas of the country where the disease is uncommon in cattle.
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.
In 2004 24 samples were examined from deer and 10 were found to be positive.

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

No cases of human M. bovis infection due to close contact with tuberculous deer or their carcases have ever been reported in UK.

C. M. bovis in animal - Cattle (bovine animals) - Control programme (Northern Ireland)

Monitoring system

Sampling strategy

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.

Frequency of the sampling

As detailed in sampling strategy

Methods of sampling (description of sampling techniques)

The comparative intradermal tuberculin test as described in Annex B of Directive 64/432 is used to test all animals for tuberculosis.

Case definition

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.

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 animals against TB is not carried out.

Other preventive measures than vaccination in place

Movement restrictions are placed on the herd and remain in place until the status of the herd has been resolved. Removal of restrictions are dependent upon the herd giving negative results to one herd test if the disease is not confirmed, or 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

Recent actions taken to control the zoonoses

The farming industry in Northern Ireland is traditionally characterised by high movement of cattle between and within herds that are kept on small, fragmented farms along with a

high dependency on rented pasture (conacre). High between-herd movement is a marked feature of the cattle industry and is regulated by movement permits. In 2000, 563 000 cattle, equivalent to 33% of the national herd, were recorded on the database as having moved between herds or to markets. Analysis indicates that there is a clear increase in risk associated with increased herd size, but the effect of purchases is equivocal in small to medium herds, which encompass the majority of herds in Northern Ireland. The extent of cattle movement between premises used by a herd (referred to as within-herd movement), is unknown and a field study is currently ongoing to describe it (involving a year-long monitoring of all within-herd movements in a random sample of herds). The role of within-herd movement in TB epidemiology is also unclear but it is likely that such movement and the poor economic status of farming in recent years must play some role in disease maintenance and spread.

The badger is widely regarded as a significant source of TB for cattle and an important factor in the continuing problem of M. bovis in cattle in some countries. Some have advocated that eradication of TB is extremely difficult if not impossible in the presence of such a wildlife reservoir (OReilly and Daborn 1995, Gallagher and others 2000).

The badger population in Northern Ireland was estimated in 1994 at 38,000 with a mean sett density of 3.51 km-2. A high preponderance of setts occurs in hedgerows and it is postulated that this increases the proximity of badgers to cattle, and therefore, the potential for inter-species transmission . Badgers are a protected species in the province and culling for TB control purposes is not permitted. Ad hoc surveys, using badgers killed by cars, have been undertaken in the past but a province-wide survey has been ongoing for the last 3 years. An interim report has been published which noted the following:

The prevalence of M. bovis in badgers was 17%;

TB infection is geographically widespread in badgers with no evidence of clustering and no apparent association, at regional level, with the distribution of infection in cattle;

Herds immediately adjacent to infected badger carcases did not have a higher risk of infection compared to those adjacent to TB-negative animals. However, a higher proportion of herds within 3km of a positive carcase had TB compared to those within 3 km of a negative carcase and the difference was statistically significant.

The provisional conclusions arising from the survey was that there did appear to be a link between the distribution of infection in both species, although this did not indicate causality i.e. direction of spread. In May 2004, the Department established an expert group involving local stakeholders (including farming and wildlife conservation representatives) to develop a badger management strategy with the aim of reducing the incidence of TB in Northern Ireland. A case-control study in 1994 attributed 40% of breakdowns to badgers.

Measures in case of the positive findings or single cases

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.

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.

Results of the investigation

Results of the investigations in 2004:
There are approximately 27,800 active cattle herds in Northern Ireland. The June Agricultural Census 2004 figures state that there were 1.68 million cattle. During the year, 1,865,671 animals were tested and 15,082 reactors were found. A further 673 animals were removed as negative in-contacts because although they showed negative results to the tuberculin test, they were deemed to be at high risk of becoming infected with tuberculosis (or showed reaction to the gamma-interferon blood assay). The herd incidence has shown a small decrease since 2002 (2002 = 9.93%; 2003 = 9.56%; 2004 = 9.17%).

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

Epidemiological history:
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.
The prevalence of test-positive herds and animals increased from 1995/1996 to a peak of 13.2% in 2002 before reducing. Note that the denominator for animal prevalence is the number of tests rather than animals. The downward trend in 2003 has continued in 2004 with a current herd prevalence of 9.2% and animal prevalence of 0.49% for the first quarter of this year.
With respect to herd and animal incidence of TB, these have decreased from a peak herd incidence of 10.2% (animal incidence of 0.99%) in February 2003 to 9.16% in December 2004 (animal incidence of 0.81%). As well as the continued reduction in herd incidence, 2004 has also seen a reduction in animal incidence indicating a fall in the in within-herd incidence of infection.
Although breakdowns are distributed throughout the province, traditionally the preponderance of infection has been in the southern parts of the province. Reasons for this are presently unclear: spatial analysis has demonstrated that the concentration of infection in the southern part is not entirely explained by the underlying distribution of herds and cattle. This is being investigated further using a range of spatial analytical tools.
80% of reactors are removed under standard interpretation of the SICCT, 14% under severe while the remaining 6% are taken using epidemiological data and stricter criteria (so-called super-severe). All reactors are removed by government-contracted hauliers to specified abattoirs where they are examined for evidence of TB infection.
TB tests on APHIS are labelled according to the reason for the test. Routine tests are those

conducted in Officially Free herds where there is no discernible risk of infection. Restricted tests apply to herds with infection, while Risk tests are those where cattle have some link to infection. From these data, it can be seen that the reactor prevalence was lowest in routine tests than in herds tested due to disease being present. Highest reactor rates were seen in herds where TB reactors had came from to the disclosure herd and in restricted herds.
Contiguous tests are undertaken in herds that are in close proximity to infected herds, usually neighbouring them, and the higher prevalence for reactors confirms the importance of this type of testing. This is consistent with the results from epidemiological investigations undertaken by Veterinary Officers who attribute 31% of breakdowns to Local Spread. This is not, however, prescriptive as to the source of the outbreak in that no investigation is undertaken of infection levels or the role of badgers in the outbreak. The badger (Meles meles) is a protected species in Northern Ireland and no culling or disturbance of them is permitted. Thus the term local spread merely refers to infection being disclosed in a herd that is in proximity to another herd, with little certainty in most cases as to the means of spread. NI cattle (11%) refers to infection being introduced through the purchase of cattle born in Northern Ireland.

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

There were no human cases of M. bovis in Northern Ireland in 2004 (or in 2003). See Section on M. bovis in humans for further details.

Additional information

Historical data on the epidemiological evolution of the disease:
There are 1.68 million cattle in Northern Ireland with the population remaining at a fairly constant level in recent years following a reduction from 1998 to 2001. Dairy cows/heifers account for 21% of the national herd while beef cows/heifers account for 20%.
There are 47,000 herds are registered in the province but less than 30,000 are active at any one time. Based on cattle tested in herds, the mean herd size has increased from 56 cattle in 1990 to 74 in 2004, an increase of 32%. However, the data are strongly skewed to the right and the median, which describes the central point better than the mean, was 36 for all herd tests in 2004. Almost two-thirds of herds (60%) in Northern Ireland have fewer than 50 cattle.
Herd and cattle density is highest in the south and west, with the highest concentration, 6.6.herds per square kilometre, in Counties Armagh and Down. Conversely, herds in the north and east tend to be larger than those in the south or west (median 20.4 and 15.2 eligible cattle, respectively).
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 (APHIS), incorporating an animal movement and test management system is used for all aspects of TB 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.
TB testing is undertaken by Veterinary Surgeons, using the Single Intradermal Comparative Cervical Test (SICCT). Most testing is carried out by Private Veterinary Practitioners but the Department also uses contract-based specialist vets and Veterinary Officers (VOs) in specific

instances. During the period 1994 to 2004, an annual average of 2.36 million animal tests were undertaken in the province. There has been a steady increase in the number of tests is the dip in 2001 caused by the foot and mouth disease outbreak, with an increase in 2004 to more than 3.1 million animal tests.

Various factors are thought to have contributed to the rise in disease incidence from 1990 to 2004. These include the following:

·the role of wildlife, in particular, the Eurasian badger, Meles meles;

·Programme-related factors

During the last 10 years, Northern Ireland has experienced a Newcastle Disease epidemic (1997), Foot and Mouth disease epidemic (2001) and BSE (entire period). All 3 diseases, but particularly BSE due to the long duration, have resulted in prioritisation and resources being diverted for varying periods. Although the effect of these diseases on TB prevalence is difficult to determine or define, they are likely to have had a negative impact. Analytical work is continuing to assess their likely impact.

Table 1.1.3 Tuberculosis in animals

	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	M. bovis	M. tuberculosis	S. Enteritidis
Pigs (1)	NRL	Biased sample - animals suspected to be infected	animal	8	1	1	0	
Zoo animals	NRL	Biased sample - animals suspected to be infected	animal	10	0	0	0	
Sheep (2)	NRL	Biased sample - animals suspected to be infected	Animal	11	3	3	0	
Pet animals								
cats	NRL	Biased sample - animals suspected to be infected	Animal	38	6	6	0	
dogs	NRL	Biased sample - animals suspected to be infected	Animal	3	1	1	0	
Wildlife								
badgers								
(Badgers killed in road accidents in Northern Ireland)	NRL	Road traffic accident	Animal	54	14	14	0	
deer								
(Great Britain (England Wales Scotland))	NRL	Biased sample - animals suspected to be infected	Animal	77	44	44	0	

(1) : From lesion seen at meat inspection
(2) : From lesion seen at meat inspection

Footnote

UK data

1.1.1 Bovine tuberculosis - Northern Ireland

MANDATORY	CATTLE		
Number of herds under official control:	27766	Number of animals under official control:	1977583
	OTF bovine herds	**OTF bovine herds with status suspended**	**Bovine herds infected with tuberculosis**
Status of herds at year end (a):	25413		
New cases notified during the year (b):		1086	1267
	Units tested	**Units suspected**	**Units positive**
Routine tuberculin test (c) - data concerning herds:	25347	3926	3070
Routine tuberculin test (c) - data concerning animals:	1865671	14210	15082
	Animals slaughtered	**Animals suspected**	**Animals positive**
Routine post-mortem examination (d):	533322	1054	756
		Herds suspected	**Herds confirmed**
Follow up of suspected cases in post-mortem examination (e):		157	146
Follow-up investigation of suspected cases: trace, contacts (f):		6488	566
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (g):	1034	1	6
Other routine investigations: tests at AI stations (h):	122	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (i):	0	0	0
Animals slaughtered (j):	15755	15082	673

VOLUNTARY	CATTLE		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):	0	0	0
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):	9277	1506	518
	Samples tested	***M. bovis*isolated**	
Bacteriological examination (m):	5252	1065	

Footnote

Northern Ireland

1.1.1 Bovine tuberculosis

MANDATORY	CATTLE		
Number of herds under official control:	93165	Number of animals under official control:	8924000
	OTF bovine herds	**OTF bovine herds with status suspended**	**Bovine herds infected with tuberculosis**
Status of herds at year end (a):	91113	2052	1491
New cases notified during the year (b):		3339	1702
	Units tested	**Units suspected**	**Units positive**
Routine tuberculin test (c) - data concerning herds:	44720	3339	1702
Routine tuberculin test (c) - data concerning animals:	4637055	56474	6587
	Animals slaughtered	**Animals suspected**	**Animals positive**
Routine post-mortem examination (d):	2603000	391	194
		Herds suspected	**Herds confirmed**
Follow up of suspected cases in post-mortem examination (e):(1)			
Follow-up investigation of suspected cases: trace, contacts (f):		178	71
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (g):	320	0	0
Other routine investigations: tests at AI stations (h):	282	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (i):(2)			
Animals slaughtered (j):	23003	6632	2576

VOLUNTARY	CATTLE		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):	2351	34	3
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):	2244	672	201
	Samples tested	***M. bovis*isolated**	
Bacteriological examination (m):	17338	3774	

(1) : Data not available
(2) : Data not available

Footnote

England, Wales, Scotland data only

1.1.2 Tuberculosis in farmed deer

MANDATORY	FARMED DEER		
Number of herds under official control:(1)	3	Number of animals under official control:	
	"OTF" herds	**"OTF" herds with status suspended**	**Herds infected with tuberculosis**
Status of herds at year end (a):			1
New cases notified during the year (b):			
	Units tested	**Units suspected**	**Units positive**
Routine tuberculin test (c) - data concerning herds:			
Routine tuberculin test (c) - data concerning animals:			
	Animals slaughtered	**Animals suspected**	**Animals positive**
Routine post-mortem examination (d):			
		Herds suspected	**Herds confirmed**
Follow up of suspected cases in post-mortem examination (e):			
Follow-up investigation of suspected cases: trace, contacts (f):			
	Herds tested	**Herds suspected**	**Herds positive**
Other routine investigations: exports (g):			
Other routine investigations: tests at AI stations (h):			
	All animals	**Positives**	**Contacts**
Animals destroyed (i):			
Animals slaughtered (j):			

VOLUNTARY	FARMED DEER		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):			
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):			
	Samples tested	***M. bovis*isolated**	
Bacteriological examination (m):	9	0	

(1) : This is the number of deer health scheme members (voluntary control programme) at the end of the year.

Footnote

GB data (England, Wales, Scotland).

1.1.2 Tuberculosis in farmed deer - Northern Ireland

MANDATORY	**FARMED DEER**		
Number of herds under official control:	0	Number of animals under official control:	0
	"OTF" herds	**"OTF" herds with status suspended**	**Herds infected with tuberculosis**
Status of herds at year end (a):			
New cases notified during the year (b):			
	Units tested	**Units suspected**	**Units positive**
Routine tuberculin test (c) - data concerning herds:			
Routine tuberculin test (c) - data concerning animals:			
	Animals slaughtered	**Animals suspected**	**Animals positive**
Routine post-mortem examination (d):(1)		24	10
		Herds suspected	**Herds confirmed**
Follow up of suspected cases in post-mortem examination (e):			
Follow-up investigation of suspected cases: trace, contacts (f):			
	Herds tested	**Herds suspected**	**Herds positive**
Other routine investigations: exports (g):			
Other routine investigations: tests at AI stations (h):			
	All animals	**Positives**	**Contacts**
Animals destroyed (i):			
Animals slaughtered (j):			
VOLUNTARY	**FARMED DEER**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):			
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):			
	Samples tested	***M. bovis*isolated**	
Bacteriological examination (m):	24	10	

(1) : Number slaughtered not known

Footnote

Northern Ireland

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

Great Britain - England, Wales, Scotland
In March 2004, Brucella abortus was confirmed in cattle from in a single herd in England. As this was an isolated cases with no further spread, Great Britain has retained its Officially Brucellosis Free Status.

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 recorded associated with infection acquired outside Great Britain.
Northern Ireland
In Northern Ireland cases of brucellosis are associated with infection in cattle. From 1986 to 1997 there were no reported cases of brucellosis in humans. During 1998 one case was reported in a member of a family whose cattle herd was also confirmed with Brucella abortus. Between 1999 and 2003 there were 89 reported cases of human brucellosis, 66 of which were thought to have been acquired occupationally. Five cases were female, and the remainder were male. Those affected included farmers (n=58), abattoir workers (n=6) and veterinarians (n=2).
In 2004 there were 12 cases reported, all of whom were male, and 5 were thought to have been occupationally acquired. Occupational details on the other 7 are still being sought.

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 England, Wales, and Scotland, unless believed acquired as a result of occupation. Diagnoses are made by serology or blood culture. Disease caused by Brucella 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) and Health Protection Scotland. 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 2003 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.

Results of the investigation

Results of the investigations in 2004:
In England and Wales in 2004, 19 cases of brucellosis were recorded. This is an increase on the total of 5 in the previous year. All of the cases occurred in people believed to have acquired their infections overseas. Two cases known to have contracted infection in the Middle East had

come to the UK for treatment. None were believed to have been associated with occupation. No cases of Brucella abortus were recorded.
In Scotland no cases of brucellosis were recorded in 2004.

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

In England, Wales and Scotland cases of brucellosis in humans occur as a result of infection acquired outside the countries.

B. B. abortus in humans - humans (Northern Ireland)

Reporting system in place for the human cases

The surveillance system is based on laboratory reporting of serologically or culture confirmed cases. Notification of brucellosis is not mandatory unless the infection was acquired occupationally.

Case definition

Laboratory report of seological confirmed case or culture.

History of the disease and/or infection in the country

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 2003 there were 89 reported cases of human brucellosis, 66 of which were thought to have been acquired occupationally. Five cases were female, and the remainder were male. Those affected included farmers (n=58), abattoir workers (n=6) and veterinarians (n=2).

Results of the investigation

Results of the investigations in 2004:
In 2004 there were 12 cases reported, all of whom were male, and 5 were thought to have been occupationally acquired. Occupational details on the other 7 are still being sought.

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

The prevalence of Brucella abortus in cattle has been falling since the peak in 2002 and the number of human cases appears to reflect this with 28 in 2002, and 14 in 2003.

Table 2.3.A Brucellosis in man - species/serotype distribution

	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
Brucella	12	0.7	0	0	19	0
B. abortus	8	0.47				
B. melitensis					9	
B. suis	0	0.00				
Brucella spp.	4	0.23			10	
occupational cases	5	0.29				

Footnote

All cases of brucellosis (12) which were not considered to be imported cases occurred in Northern Ireland, and of these 12, 5 were considered to be occupationally acquired. B. abortus is present in cattle in Northern Ireland but not in the rest of the UK (GB - England, Wales, Scotland).
The 'cases inc' figure refers to the Norhtern Ireland population only.

Table 2.3.B Brucellosis in man - age distribution

Age Distribution	B. abortus			B. melitensis			Brucella spp.		
	All	M	F	All	M	F	All	M	F
<1 year									
1 to 4 years(1)							1	1	0
5 to 14 years									
15 to 24 years(2)							1	1	0
25 to 44 years(3)	4	4	0				11	8	3
45 to 64 years(4)	4	4	0				9	9	0
65 years and older									
Age unknown							9		
Total :	8	8	0	0	0	0	31	19	3

(1) : Imported case
(2) : Northern Ireland case
(3) : 6 from Northern Ireland
(4) : 5 from Northern Ireland - others imported

Footnote

UK data - 12 cases in Northern Ireland; others believed to be imported cases

2.6.3. Brucella in foodstuffs

Table 2.2 Brucella sp. in food

	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	B. melitensis	B. abortus	B. suis

Footnote

No information to report in 2004

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

(England, Scotland, Wales)
GB is officially free of infection from Brucella abortus, Brucella melitensis, Brucella ovis and Brucella suis.

Free regions

England, Wales, Scotland. The situation in Northern Ireland is described separately.

Monitoring system

Sampling strategy

Great Britain (England, Wales, Scoland)
As in previous years in 2004 the principle surveillance system was monthly testing of bulk milk samples from dairy herds by the ELISA test, together with biennial blood testing, by indirect ELISA, of adult cattle in beef herds and non-milking cattle in dairy herds. 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.

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. The most recent female calf of a reactor is slaughtered as a dangerous contact unless testing makes it unlikely that the dam was positive at the last calving. 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 varies depending on whether the animal is a reactor or a contact. In the case of reactors and infected cattle compensation is paid to a limit of 75% of the average market value subject to a ceiling based on market returns obtained two months prior to the month in which the animal is valued. In the case of contact animals 100% of the value is paid with no upper limit. The payment which could otherwise be made under Commission Regulation 716/96 is used to determine the market value of cattle aged over 30 months unless their value on the open market would be greater. 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 2004:
In March 2004 Brucella abortus was from cattle in a single herd in Cornwall, England, following an abortion investigation. The beef breeding herd of 129 cattle was slaughtered (17 reactors and 112 contacts). Epidemiological investigation established that infection was most likely to have been introduced into the herd during the twelve month period between the spring of 2002 and 2003; however the origin of infection may never be confirmed. Although infection had persisted in this single herd, it is likely that it was introduced by a single infected animal which was slaughtered or died before its infected status could be detected. Tracing of all herds at risk was carried out; no other infected herd has been identified.
In addition to the single incident described above, seventeen (17) cattle were slaughtered as serological reactors in seventeen (17) herds, following routine testing or post import testing; all

were negative for Brucella abortus - See table 2.1.1 Bovine brucellosis (GB).
During the year the Veterinary Laboratories Agency tested 1,020,961 blood samples from 35,949 herds as part of the national surveillance programme; in addition 449 bulls were tested as part of the approval programme for Artificial Insemination.
Routine monitoring of 8,650 cattle abortions and premature calvings was carried out; with exception of four animals from the single infected herd in Cornwall (see above), all results were negative.
Nine (9) ELISA positive bulk milk samples were reported from 210,814 bulk milk samples collected from 19,378 dairy herds. 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. 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. In March 2004, Brucella abortus was confirmed in cattle from in a single herd in England, (see below). As this was an isolated cases with no further spread, Great Britain has retained its Officially Brucellosis Free Status.

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 GB 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.
All the infections acquired in people in 2004 are considered to have been acquired abroad. 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

England, Wales, Scotland
During 2004 surveillance for freedom from B. melitensis was provided for by routine surveillance of samples submitted from cases of abortions and by structured survey.
Northern Ireland

Continuing evidence of freedom from Br. melitensis in Northern Ireland is normally provided by monitoring carried out as part of a sheep and goat health scheme. According to the 2004 June Agricultural census, there were 8,869 farms with 2.2 million sheep with 226 flocks (4,195 samples) being monitored for Br. melitensis along with 18 goat herds (106 samples - also monitored for Br. ovis). 61 of these sheep flocks were also monitored for Br. ovis. The results of this monitoring programme were yielded all negative results.

Vaccination policy

No vaccination is permitted.

Results of the investigation

England Wales and Scotland
Results of the investigations in 2004:
During the year surveillance for brucellosis was provided by the national sheep and goat survey; 13,632 blood samples from 1,584 flocks or herds were tested, all with negative results. In addition 156 sheep were tested post import; one ram was seropositive; but on further investigation there was no evidence that this was the result Brucella ovis infection.
Northern Ireland
Continuing evidence of freedom from Br. melitensis is normally provided by monitoring carried out as part of a sheep and goat health scheme. According to the 2004 June Agricultural census, there were 8,869 farms with 2.2 million sheep with 226 flocks (4,195 samples) being monitored for Br. melitensis along with 18 goat herds (106 samples also monitored for Br. ovis). 61 of these sheep flocks were also monitored for Br. ovis. The results of this monitoring programme were yielded all negative results.

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.

C. 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 the year 921 boars were tested; all with negative results.
In Northern Ireland 269 pigs destined for export were tested with negative results.

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

Brucella suis has never been recorded in the UK.

D. 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. Cull cattle being slaughtered at OTMS (Over Thirty Month Scheme) slaughter plants are routinely blood sampled. 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 the autumn of 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. During 2004, 2,064 cattle were blood sampled following the report of an abortion.

Frequency of the sampling

As described in sampling strategy.

Type of specimen taken

Other: blood, milk, tissues/organs

Case definition

Culture and isolation of the organismsl

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 (APHIS), incorporating an animal movement and test management system is used for all aspects of TB 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 (hereafter referred to as on-farm sampling), ELISA testing of bulk milk tank samples from dairy herds and sampling at slaughter of all cattle older than 30 months. Serological samples are screened using the Serum Agglutination Test (MSAT) and non-negative results confirmed with the Complement Fixation Test (CFT).

During the period 1994 to 2000, the mean annual number of MSAT tests in on-farm sampling was 774,000 but this increased to an annual mean of over 1 million for the last two years.

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 commenced in 2001; 48,000 samples per annum have been tested in the last 4 years.

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.

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

Historical data on the epidemiological evolution of the disease:
There are 1.7 million cattle in Northern Ireland with the population remaining at a fairly constant level in recent years following a reduction from 1997 to 2001. Dairy cows/heifers account for 21% of the national herd while beef cows/heifers account for 20%.
There are 47,000 herds registered in the province but less than 30,000 are active at any one time. Based on cattle tested in herds, the mean herd size has increased from 56 cattle in 1990 to 74 in 2004, an increase of 32%. However, the data are strongly skewed to the right and the median, which describes the central point better than the mean, was 36 for all herd tests in 2004. Almost two-thirds of herds (60%) in Northern Ireland have fewer than 50 cattle.
Herd and cattle density is highest in the south and west, with the highest concentration, 6.6.herds per square kilometre, in Counties Armagh and Down. Conversely, herds in the north and east tend to be larger than those in the south or west (median 20.4 and 15.2 eligible cattle, respectively).
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 herd incidence within the regions, particularly in the southern and western parts. There has been a decline in seropositive herds each year since the peak in 2002.
Contiguous spread, or spread between herds within the same locality is responsible for 44% of outbreaks while post-abortion account for 18%. To address the former, movement out of herds that neighbour infected cattle are restricted and the herd subjected to repeated, short-interval testing. For the latter, DARD has undertaken a number of initiatives to encourage reporting of abortions by farmers.

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. Further details are given in the section on brucellosis in humans in Northern Ireland.

Additional information

Uni- and bivariate analyses have been undertaken to identify risk factors for brucellosis, and a case control study is to be undertaken in the worst-affected area. The risk of a breakdown has been shown to be associated with herd size (positive association) and type (beef-cow herds at greater risk than diary), while spatial analyses have described 3 clusters in the 10-year period up to 2001 i.e. consistent with the nature of spread between herds . The nature of farming in Northern Ireland (mall, fragmented farms with high between- and within-herd movement) is regarded as a major factor in exacerbating disease spread and a number of studies have been commissioned to explore these further.
Other epidemiological studies in progress include the following:
A field trial utilising 6 serological tests is currently underway to compare the diagnostic parameters of the tests. To date, over 31,000 samples have been tested and the findings will be available in the next few months.

Foxes are suspected of acting as mechanical vectors in spread of disease within areas. A seroprevalence survey of foxes submitted for Trichinella testing has been completed with no evidence of infection in foxes.

A survival analysis to assess possible latent infection is about to commence; its purpose is to detect if cattle exposed to infection but which are serologically negative, pose any long term risk to herds later in life.

Table 2.1.3 Brucellosis in animals

	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	B. melitensis	B. abortus	B. suis
Pigs (1)	NRL	AI testing	Animal	921	0			
(Northern Ireland)	NRL	AI testing	Animal	269	0			
Solipeds								
(Northern Ireland)	NRL		Animal	3	0		0	
Pet animals								
dogs								
(Northern Ireland)	NRL		Animal	2	0			
Other animals								
(Northern Ireland)	NRL		Animal	114	0		0	

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

Footnote

Great Britain - England, Wales, Scotland unless where indicated as Northern Ireland

2.1.1 Bovine brucellosis

MANDATORY	CATTLE		
Number of herds under official control:	87000	Number of animals under official control:	8500000
	OBF bovine herds	**OBF bovine herds with status suspended**	**Bovine herds infected with brucellosis**
Status of herds at year end (a):	87000	0	0
New cases notified during the year (b):	1	1	1
	Animals tested	**Animals suspected**	**Animals positive**
Notification of clinical cases, including abortions (c):	8650	4	4
	Units tested	**Units suspected**	**Units positive**
Routine testing (d1) - data concerning herds:	55327	11	0
Routine testing (d2) - number of animals tested:	3000000	11	0
Routine testing (d3) - number of animals tested individually:	1020961	11	0
		Herds suspected	**Herds confirmed**
Follow-up investigation of suspected cases: trace, contacts (e):		11	0
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (f):	0	0	0
Other routine investigations: tests at AI stations (g):	449	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (h):	146	34	112
Animals slaughtered (i):	0	0	0
VOLUNTARY	**CATTLE**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):	4361	6	0
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):	0	0	0
	Samples tested	**Brucella isolated**	
Bacteriological examination (m):	0	0	

Footnote

Great Britain (England, Wales, Scotland)

2.1.1 Bovine brucellosis - Northern Ireland

MANDATORY	CATTLE		
Number of herds under official control:	27766	Number of animals under official control:	930586
	OBF bovine herds	**OBF bovine herds with status suspended**	**Bovine herds infected with brucellosis**
Status of herds at year end (a):	27694	4	68
New cases notified during the year (b):		529	73
	Animals tested	**Animals suspected**	**Animals positive**
Notification of clinical cases, including abortions (c):	2064	225	17
	Units tested	**Units suspected**	**Units positive**
Routine testing (d1) - data concerning herds:	20991	5435	148
Routine testing (d2) - number of animals tested:	930221		
Routine testing (d3) - number of animals tested individually:	860674	20309	620
		Herds suspected	**Herds confirmed**
Follow-up investigation of suspected cases: trace, contacts (e):		2506	37
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (f):	597	6	0
Other routine investigations: tests at AI stations (g):	88	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (h):	0	0	0
Animals slaughtered (i):	6655	620	6035
VOLUNTARY	**CATTLE**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):	0	0	0
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):	5912	2897	61
	Samples tested	**Brucella isolated**	
Bacteriological examination (m):	499	232	

Footnote

Northern Ireland

2.1.2 Ovine and caprine brucellosis

MANDATORY	SHEEP AND GOATS		
Number of holdings under official control:	280000	Number of animals under official control:	35000000
	OBF ovine and caprine holdings	**OBF ovine and caprine holdings with status suspended**	**OBF ovine and caprine holdings infected with brucellosis**
Status of herds at year end (a):	280000	0	0
New cases notified during the year (b):	0	0	0
	Animals tested	**Animals suspected**	**Animals positive**
Notification of clinical cases, including abortions (c):	0	0	0
	Units tested	**Units suspected**	**Units positive**
Routine testing (d) - data concerning holdings:	1584	0	0
Routine testing (d) - data concerning animals:	13632	0	0
		Holdings suspected	**Holdings confirmed**
Follow-up investigation of suspected cases: trace, contacts (e):		0	0
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (f):	0	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (g):	0	0	0
Animals slaughtered (h):	0	0	0
VOLUNTARY	**SHEEP AND GOATS**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (i):	958	1	0
	Holdings tested	**Holdings suspected**	**Holdings positive**
Other investigations: farms at risk (j):	0	0	0
	Samples tested	**Brucella isolated**	
Bacteriological examination (k):	0	0	

Footnote

Great Britain (England, Wales, Scotland)

2.1.2 Ovine and caprine brucellosis - NORTHERN IRELAND

MANDATORY	SHEEP AND GOATS		
Number of holdings under official control:	8869	Number of animals under official control:	2226000
	OBF ovine and caprine holdings	**OBF ovine and caprine holdings with status suspended**	**OBF ovine and caprine holdings infected with brucellosis**
Status of herds at year end (a):	8869	0	0
New cases notified during the year (b):	0	0	0
	Animals tested	**Animals suspected**	**Animals positive**
Notification of clinical cases, including abortions (c):	0	0	0
	Units tested	**Units suspected**	**Units positive**
Routine testing (d) - data concerning holdings:	5687	0	0
Routine testing (d) - data concerning animals:	380	0	0
		Holdings suspected	**Holdings confirmed**
Follow-up investigation of suspected cases: trace, contacts (e):		0	0
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (f):	0	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (g):	0	0	0
Animals slaughtered (h):	0	0	0
VOLUNTARY	**SHEEP AND GOATS**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (i):	0	0	0
	Holdings tested	**Holdings suspected**	**Holdings positive**
Other investigations: farms at risk (j):	0	0	0
	Samples tested	**Brucella isolated**	
Bacteriological examination (k):	0	0	

Footnote

Northern Ireland

2.1.2 Ovine and caprine brucellosis - Northern Ireland

MANDATORY	SHEEP AND GOATS		
Number of holdings under official control:	8869	Number of animals under official control:	2226000
	OBF ovine and caprine holdings	**OBF ovine and caprine holdings with status suspended**	**OBF ovine and caprine holdings infected with brucellosis**
Status of herds at year end (a):	8869	0	0
New cases notified during the year (b):	0	0	0
	Animals tested	**Animals suspected**	**Animals positive**
Notification of clinical cases, including abortions (c):	0	0	0
	Units tested	**Units suspected**	**Units positive**
Routine testing (d) - data concerning holdings:	5687	0	0
Routine testing (d) - data concerning animals:	380	0	0
		Holdings suspected	**Holdings confirmed**
Follow-up investigation of suspected cases: trace, contacts (e):		0	0
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (f):	0	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (g):	0	0	0
Animals slaughtered (h):	0	0	0
VOLUNTARY	**SHEEP AND GOATS**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (i):	0	0	0
	Holdings tested	**Holdings suspected**	**Holdings positive**
Other investigations: farms at risk (j):	0	0	0
	Samples tested	**Brucella isolated**	
Bacteriological examination (k):	0	0	

Footnote

Northern Ireland

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

A. Yersinia entercolitica 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 is no obvious increase or decrease in the number of reports. A total of 68 were recorded in 2004 compared with 83 in 2003.
No food or animal surveys were conducted in 2004. A survey of cattle, sheep and pigs in GB eligible for slaughter was carried out in 2003 (see 2003 report).

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 2003 32 cases of Yersiniosis were recorded, compared with 28 cases in 2002, 29 in 2001, 43 cases in 2000, 88 cases in 1999 and 68 cases in 1998.
In Scotland laboratory reports of Yersinia enterocolitica have varied between 28 and 109 since 1986.
In Northern Ireland reports have fluctuated between 4 and 16 per annum from 1992-2003.

Results of the investigation

In 2004 in UK 68 cases were recorded. In England and Wales 18 cases of Yersiniosis were recorded in 2004 of which 17 were typed as Y. enterocolitica. In Scotland in 2004, 55 cases of yersiniosis were recorded, 50 of these infections were due to Y. enterocolitica. In Northern Ireland there was one case of Y. enterocolitica reported in 2004.

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 8.3.A Yersiniosis in man - species/serotype distribution

Yersinia	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
	74	0.12	55	0	0	0
Y. enterocolitica(1)	68	0.11	50			
Yersinia spp.(2)	6	0.01	5			
Y. enterocolitica O:3						
Y. enterocolitica O:9						

(1) : Autochtone and imported case status for 18 cases in England and Wales not known; one case in Northern Ireland status autochtone or imported not known.
(2) : Not including Y. enterolytica

Footnote

UK data

Table 8.3.B Yersiniosis in man - age distribution

Age Distribution	Y. enterocolitica			Yersinia spp.		
	All	M	F	All	M	F
<1 year	1	1	0			0
1 to 4 years	6	3	3			
5 to 14 years	8	7	1	1	1	0
15 to 24 years	3	1	2	2	0	2
25 to 44 years	14	7	7	1	0	1
45 to 64 years	14	5	9	1	1	0
65 years and older	21	7	14	1	0	1
Age unknown	1	1	0	0	0	0
Total :	68	32	36	6	2	4

Footnote

UK data
Yersinia spp excludes Y. enterolytica

Table 8.3.C Yersiniosis in man - seasonal distribution

Month	Y. enterocolitica	Yersinia spp.
	Cases	Cases
January	5	0
February	6	0
March	1	1
April	15	2
May	10	1
June	5	1
July	3	0
August	4	0
September	9	0
October	2	0
November	5	0
December	3	1
not known	0	0
Total :	68	6

Footnote

UK data
Yersinia spp excludes Y. enterolytica

2.7.3. Yersinia in foodstuffs

Table 8.2 Yersinia enterocolitica in food

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	Y. enterocolitica	Y. enterocolitica O:3	Y. enterocolitica O:9

Footnote

No information to report in 2004

2.7.4. Yersinia in animals

A. Yersinia entercolitica 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 statistically based survey and examination of faeces of pigs arriving for slaughter in GB abattoirs.

Table 8.1 Yersinia enterocolitica in animals

		Source of information	Remarks	Epidemiological unit	Units tested	Y. enterocolitica	Y. enterocolitica O:3	Y. enterocolitica O:9

Footnote

No information to report in 2004. Last survey of cattle sheep and pigs in 2003, see report for 2003

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 2000. 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, or 2004.
Animals
There was no evidence to indicate that trichinellosis exists in the UK domesticated pig population or in horses in 2004. 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.

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

Great Britain
There was no evidence in 2004 that Trichinellosis existed in pigs or horses in GB in 2004.
Northern Ireland
There is no evidence to indicate that trichinellosis exists in the Northern Ireland domestic pig population or in horses. No true wild boar exists in Northern Ireland.
Wildlife - foxes
A survey of trichinella in foxes was carried out in GB during September 2003 to March 2004. All were negative for trichinella. A similar survey was carried out in Northern Ireland. No trichinella were found.
Results are detailed in Table 4.1.

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).

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 2000. 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 and 2003.

Results of the investigation

No cases of trichinellosis in humans was recorded in 2004

Table 4.2.A Trichinellosis in man - species/serotype distribution

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

Footnote

UK data (England, Wales, Scotland, Northern Ireland

Table 4.2.B Trichinellosis in man - 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

UK data (England, Wales, Scotland, Northern Ireland)

2.8.3. Trichinella in animals

A. Trichinella in pigs

Monitoring system

Sampling strategy

Great Britain
Under the Fresh Meat (Hygiene and Inspection) Regulations 1995 all horse meat must be tested for trichinae in accordance with one of the methods specified in Council Directive 77/96/EEC (as amended). Under the same Regulations the appropriate Minister has powers to direct that where required pig meat be similarly tested. If fresh meat from swine is not examined for trichinellosis, the appropriate Minister has the power to direct where required that such meat is subjected to cold treatment in accordance with Annex 1 of Directive 77/96/EEC. Currently all pig meat destined for Germany or Denmark is required to be tested or cold treated. All pig meat used in meat preparations or minced meat destined for an EEA state is required to be tested or cold treated for trichinae.
Northern Ireland
Samples of pig meat and horse meat submitted for Trichinellosis testing are analysed with a method specified in Council Directive 77/96/EEC (as amended).

Case definition

Identification of Trichinella species

Results of the investigation

Great Britain
A number of govenrment veterinary laboratories (Veterinary Laboratories Agency) test samples for trichinellosis. In 2004 7736 samples were examined with negative results. The number of tests from other laboratories are not collated centrally, but procedures are in place for positive results to be reported to the competent authority.
Northern Ireland
867,612 pig carcases were tested for Trichinella. All tests gave negative results.

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

Great Britain
Collated data on total examinations carried out not reported. No trichinella were detected in 2004.
Northern Ireland
There is no evidence to indicate that trichinellosis exists in the Northern Ireland domestic pig population or in horses. 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. No true wild boar exists in Northern Ireland

B. Trichinella in horses

Monitoring system

Sampling strategy

Great Britain
Under the Fresh Meat (Hygiene and Inspection) Regulations 1995 all horse meat must be tested for trichinae in accordance with one of the methods specified in Council Directive 77/96/EEC (as amended).
Northern Ireland
Samples of pig meat and horse meat submitted for Trichinellosis testing are analysed with a method specified in Council Directive 77/96/EEC (as amended).

Case definition

Identification of Trichinella species

Results of the investigation

Great Britain
A number of samples are sent to government veterinary laboratories for examination for Tricinella species. In 2004 2257 samples were examined at government laboratries of the Veterinary Laboratories Agency and all were negative.
Northern Ireland
A horse slaughter facility was opened in Northern Ireland in 2000. During 2004, 832 horse muscle samples were examined, all of which were negative for trichinella.

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

There was no evidence that Trichinella species were present in the horse population of the UK in 2004.

Table 4.1 Trichinella in animals

	Source of information	Remarks	Epidemiological unit	Animals tested	Animals positive
Pigs (1)			Animal	867612	0
Solipeds			Animal	832	0
Wildlife					
foxes (2)	FSA/Defra		Animal	1048	0

(1) : Data from Norhthern Ireland. Figures for England, Wales and Scotland not available centrally
(2) : 104 foxes tested in Norhtern Ireland - all negative

Footnote

Data on pigs and solipeds from Northern Ireland - Fox survey in GB and Northern Ireland. In addition in government laboratories in GB there were 2257 horses and 7736 pigs tested with negative results. Testing in other laboratories is not collated centrally.

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 the incidence in humans is highest in mid-Wales. E. multilocularis is not known to be present in the UK .
In England and Wales in humans voluntary reports fluctuated between 5 and 26 per annum from 1989 to 1996 when 44 were recorded, the highest total in recent years. Laboratory reports totalled 14 in 1997, a large fall from 1996. In Scotland reports of cases are infrequent averaging less than 1 per year. A study covering hospital records over the period 1968-89 identified 66 cases of whom 36 were managed surgically. There were no deaths.
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 inspected for evidence of hydatid cysts.
No cases of hydatidosis (echinococcosis) were detected in Northern Ireland in 2004. The last cases recorded were from imported Alpacas over 10 years ago.

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

Humans
There were 8 cases of Echinococcus granulosus in UK in 2004 - all in England and Wales. This is similar to the 11 cases recorded in 2003.
Animals
In GB 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 2004. The last cases recorded were from imported Alpacas over 10 years ago.
E. multilocularis is not known to be present

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 in Scotland. Reports of cases are infrequent averaging less than 1 per year. A study covering hospital records over the period 1968-89 identified 66 cases of whom 36 were managed surgically. There were no deaths.

Results of the investigation

In UK 8 cases (decrease from 11 cases in 2003) of Echinococcus granulosus were recored - these were all in England and Wales and as in 2003 no cases were reported in Scotland or Northern Ireland. 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 2004. E. multilocularis is believed to be absent from animals in UK.

Table 9.2.A Echinococcosis in man - species/serotype distribution

	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
Echinococcus	8	0.01	0	0	0	0
E. granulosus	8	0.01				
E. multilocularis	0	0				
Echinococcus spp.						

Footnote

UK data
No cases reported in Scotland or Northern Ireland. No associated history of travel outside UK.

Table 9.2.B Echinococcosis in man - age distribution

Age Distribution	E. granulosus			E. multilocularis			Echinococcus spp.		
	All	M	F	All	M	F	All	M	F
<1 year									
1 to 4 years									
5 to 14 years	1	1	0						
15 to 24 years									
25 to 44 years	1	1	0						
45 to 64 years	6	6	0						
65 years and older									
Age unknown									
Total :	8	8	0	0	0	0	0	0	0

Footnote

UK data - no cases in Northern Ireland or Scotland

2.9.3. Echinococcus in animals

Table 9.1 Echinococcus sp. in animals

		Source of information	Remarks	Epidemiological unit	Units tested	Echinococcus spp.	E. multilocularis	E. granulosus

Footnote

No information to report in 2004

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 UK toxoplasmosis is not notifiable or reportable. In animals surveillance relates to examination of samples received for diagnostic reasons at government veterinary laboratories. In Northern Ireland in animals at present, Toxoplasmosis appears to be endemic in the Northern Ireland sheep population, and the situation is similar in the rest of the UK. The DARDNI Veterinary Sciences Division records and relates to the cases submitted for diagnostic purposes through their laboratories. They report that in 2004, 30% of all samples submitted as a result of ovine abortion were due to toxoplasma infection. Isolates from private laboratories are not reported. The situation is similar in the rest of UK where 328 incidents of abortion in sheep were recorded in 2004 at government or agent laboratories.

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

The number of laboratory reports recorded in the UK was 97, and there is no obvious trend. Toxoplasmosis remains the second most common cause of abortion in sheep when a diagnosis has been confirmed.

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 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 2004, 4 notifications were 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 voluntary reports have continued to fall. 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. In Northern Ireland one case was reported in 2004. This compares with 7 cases reported in 2003. Between 2000-02 there were 5-12 reports received each year.

Results of the investigation

In total in UK there were 97 laboratory reports. In England and Wales in 2004, 76 cases of toxoplasmosis were reported under the surveillance system, compared with 87 in 2003. Two cases were reported as congenitally-acquired infections. In Scotland in 2004 there were 20 laboratory reports compared with 17 in 2003, 32 in 2002, 16 in 2001, 20 in 2000, 24 in 1999 and 19 in 1998. In Northern Ireland there was one case reported in 2004.

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

There is no obvious trend in human cases of toxoplasmosis.

Table 10.2.A Toxoplasmosis in man - species/serotype distribution

	Cases	Cases Inc
Toxoplasma	97	0.16
Toxoplasma spp.	97	0.16
congenital cases	2	0.00

Footnote

UK data

Table 10.2.B Toxoplasmosis in man - age distribution

Age Distribution	Toxoplasma spp.		
	All	M	F
<1 year	3	2	0
1 to 4 years	0	0	0
5 to 14 years	1	1	0
15 to 24 years	18	6	12
25 to 44 years	49	19	29
45 to 64 years	23	11	12
65 years and older	1	0	1
Age unknown	2	0	1
Total :	97	39	55

Footnote

UK data (Sex unknown in some cases)

2.10.3. Toxoplasma in animals

Table 10.1 Toxoplasma gondii in animals

		Source of information	Remarks	Epidemiological unit	Units tested	Units positive

Footnote

No information to report in 2004

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

No cases of rabies in terrestrial animals were confirmed in the United Kingdom during 2004 and the country 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 human death from classical rabies occurred in 1902 and the last case of indigenous terrestial rabies in an animal was in 1922.

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

No cases of human rabies were recorded in 2004.
No cases of rabies in terrestrial animals were confirmed in the United Kingdom during 2004
Over 4,000 bats have been tested in the last 18 years, and by the end of 2004 EBLV 2 has been confirmed in only four bats in GB. Two of these cases were identified in 2004 and both were Daubenton's bats, one of which had died in 2003 but not tested until 2004.

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 a draft rabies contingency plans was published for consultation.
A targeted surveillance programme in a small number of bats and bat roosts was conducted in 2003 to try and establish the prevalence of EBLVs in the bat population in England. This mirrored the targeted surveillance carried out in Scotland. The results showed a low level of antibodies in Daubenton bats in some areas of England and Scotland. In order to investigate the incidence further, a three year longitudinal study commenced in England in 2004 and another study is in progress in Scotland. The full results of the longer term study will not become available until 2007.

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 Communicable Disease Surveillance Centre 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

No cases of human rabies were recorded in 2004.

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; 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 2004.

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, those animals being exported, and those undergoing quarantine.

Results of the investigation

No cases of rabies were confirmed in dogs in 2004.

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

No cases of rabies in terrestrial animals were confirmed in the United Kingdom during 2004 and the country is recognised as having rabies free status by the O.I.E.
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 a draft rabies contingency plans was published for consultation.

Additional information

At the end of 2004 EBLV 2 has been confirmed in only four bats in GB with over 4,000 bats being tested in the last 18 years. Two of these cases were identified in 2004.
In September 2004 EBLV2 was confirmed in a juvenile female Daubenton bat. The grounded bat was moved under cover by a member of the public, where it remained for several days. It was then taken into the care of an experienced bat conservation group volunteers but died. In the second case an injured Daubenton bat died in October 2003 and was stored in a freezer, until it was sent for testing in 2004. Tests undertaken confirmed EBLV 2.
Defra undertook a targeted surveillance programme in a small number of bats and bat roosts in 2003 to try and establish the prevalence of EBLVs in the bat population in England. This mirrored the targeted surveillance carried out in Scotland. The results showed a low level of antibodies in Daubenton bats in some areas of England and Scotland. In order to investigate the incidence further, a three year longitudinal study commenced in England in 2004 and another

study is in progress in Scotland. The full results of the longer term study will not become available until 2007.

Table 5.1 Rabies in animals

	Source of information	Remarks	Animals tested	Animals positive
Cattle (bovine animals)				0
Sheep				0
Goats				0
Pigs				0
Solipeds				0
Wildlife				
bats (1)			760	2
- survey (Study in England and Scotland) (4)			622	0
foxes				0
other				0
all				0
Pet animals				
dogs (2)			11	0
cats (3)			11	0
other			0	0

(1) : European Bat Lyssavirus 2 (EBLV 2)
(2) : Animals routinely tested as they died in quarantine
(3) : Animals routinely tested as they died in quarantine.
(4) : Prelimiary results of 3 year European Bat Lyssavirus study. Antibodies detected but no live virus.

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. E. COLI INDICATORS

3.1.1. General evaluation of the national situation

A. E. 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.

Qualitative data on the susceptibility of E. coli from statistically-based surveillance of cattle, sheep and pigs at slaughter in abattoirs in Great Britain in 2003 and also from surveillance of clinical veterinary material in 2004 is provided. No resistance was detected to the third generation cephalosporin antimicrobials cefotaxime and ceftazidime. In the abattoir surveillance, the prevalence of resistance in commensal E. coli for most antimicrobials was higher in pigs than in cattle or sheep. The most common resistances seen in the abattoir surveillance considering isolates from pigs were to tetracyclines, sulphonamides, trimethoprim/ sulphonamide combinations, ampicillin, streptomycin and chloramphenicol. Resistance to nalidixic acid was very low in commensal E. coli isolates from cattle, sheep and pigs in the abattoir surveillance. Considering the E. coli from clinical veterinary samples (which will include coliforms presumptively identified as E. coli) low numbers of isolates resistant to enrofloxacin were detected in pigs, poultry and turkeys.

Quantitative data on the susceptibility of E. coli recovered from statistically-based surveillance of cattle after slaughter in abattoirs in Great Britain in 2003 is provided. As with the Salmonella quantitative data, it is interesting to note the decrease in separation between wild type (susceptible) and resistant strains for certain antimicrobials (for example some of the aminoglycosides). The selected breakpoint for these antimicrobials will be more critical in relation to the comparison of results between countries and regions than distributions where the separation of the susceptible and resistant populations is relatively large.

3.1.2. Antimicrobial resistance in *Escherichia coli* isolates

Table 13.1 Antimicrobial susceptibility testing of E.coli in animals

	E.coli															
	Cattle (bovine animals)		**Cattle (bovine animals) - at farm - surveillance (Clinical diagnostic samples)**		**Pigs**		**Pigs - at farm - surveillance (Clinical diagnostic samples)**		**Sheep - at slaughter - survey (2003)**		**Sheep - at farm - surveillance (Clinical diagnostic samples 2004)**		**Gallus gallus**		**Turkeys**	
Isolates out of a monitoring program	no		no		no		no		no		no		no		no	
Number of isolates available in the laboratory	1303		3576		1037		313		1387		446		177		23	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	1303	6%	3576	57%	1037	80%	313	82%	1387	3%	446	42%	177	65%	23	74%
Amphenicols																
Chloramphenicol(1)	1303	0.5%			1037	22%			1387	0.5%						
Cephalosporin																
Cefotaxim	1015	0%			807	0%			1119	0%						
Ceftazidim	1303	0%			1037	0%			1387	0%						
Fluoroquinolones																
Enrofloxacin			3576	0%			313	2%			446	0%	176	6%	23	4%
Quinolones																
Nalidixic acid(2)	1303	0.5%			1037	1%			1387	0.5%						
Sulfonamides																
Sulfonamide	1303	4%			1037	62%			1387	2%						
Aminoglycosides																
Streptomycin	1303	2%			1037	28%			1387	1%						
Gentamicin(3)	1303	0.5%			1037	0.5%			1387	0.5%						
Neomycin(4)	1303	0.5%	3576	30%	1037	8%	313	11%	1387	0.5%	446	12%	176	9%	23	0%
Trimethoprim + sulfonamides(5)	1303	1%	3576	28%	1037	42%	313	55%	1387	0.5%	446	13%	176	28%	23	35%
Penicillins																
Ampicillin	1303	3%	3576	53%	1037	28%	313	47%	1387	1%	446	30%	177	37%	23	57%

Number of multiresistant isolates																
fully sensitives	1303	92%			1037	14%			1387	95%						
resistant to 1 antimicrobial	1303	3%			1037	17%			1387	3%						
resistant to 2 antimicrobials	1303	3%			1037	14%			1387	1%						
resistant to 3 antimicrobials	1303	1%			1037	19%			1387	1%						
resistant to 4 antimicrobials	1303	1%			1037	15%			1387	1%						
resistant to >4 antimicrobials	1303	1%	3576	27%	1037	21%	313	33%	1387	1%	446	10%	177	14%	23	9%

(1) : 0.5% = <1%
(2) : 0.5% = <1%
(3) : 0.5% = <1%
(4) : 0.5% = <1%
(5) : 0.5% = <1%

Footnote

Isolates from survey of cattle, sheep and pigs arriving for slaughter at GB abattoirs in 2003, plus in 2004 examined 3576 cattle clinical isolates, 313 pig clinical isolates, 446 sheep clinical isolates, 177 poultry clinical isolates, 23 turkey clinical isolates

Table Antimicrobial susceptibility testing of E.coli in Cattle (bovine animals) - at slaughter - survey (2003) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	E.coli
	Cattle (bovine animals) - at slaughter - survey (2003)
Isolates out of a monitoring program	no
Number of isolates available in the laboratory	1303

Antimicrobials:	**N**	**%R**	**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**
Tetracycline	1303	6%	6	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	<1	<1	2	4	13	17	17	16	11	7	4	2	1	<1	<1
Amphenicols																																
Chloramphenicol(1)	1303	0.5	<1	0	0	<1	0	0	0	<1	0	<1	<1	1	3	6	10	11	13	11	10	9	5	3	4	2	2	1	1	1	1	1
Cephalosporin																																
Cefotaxim	1015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1	<1	<1	1	96
Ceftazidim	1303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1	<1	<1	1	1	5	91
Quinolones																																
Nalidixic acid(2)	1303	0.5	<1	0	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1	<1	1	4	8	11	16	14	13	9	7	5	5	6
Sulfonamides																																
Sulfonamide	1303	4	4	<1	<1	0	0	<1	<1	0	0	0	0	0	0	0	<1	<1	<1	1	<1	2	2	4	5	6	10	10	10	11	10	23
Aminoglycosides																																
Streptomycin	1303	2	<1	<1	0	<1	0	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	6	20	26	25	12	3	<1	<1	<1	<1	0	0	<1	<1	<1
Gentamicin(3)	1303	0.5	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1	1	8	23	38	19	7	2	1	<1	0	0	<1	0	0
Neomycin(4)	1303	0.5	0	0	<1	<1	<1	<1	0	0	0	0	<1	<1	13	43	31	9	3	<1	<1	0	0	0	0	0	0	0	0	0	<1	<1
Trimethoprim + sulfonamides	1303	1%	1	<1	<1	0	0	0	0	0	0	0	<1	0	0	<1	0	0	0	0	<1	<1	<1	<1	<1	<1	<1	2	4	9	11	70
Penicillins																																
Ampicillin	1303	3	3	0	0	<1	0	0	<1	0	0	<1	<1	<1	1	3	6	8	10	10	10	15	9	8	6	4	3	2	1	<1	<1	<1

(1) : % resistance was <1
(2) : % resistance was <1
(3) : % resistance was <1
(4) : % resistance was <1

Footnote

Isolates from statistically-based survey of animals arriving at slaughter in abattoirs in GB in 2003

Table Antimicrobial susceptibility testing of E.coli in Pigs - at slaughter - survey (2003) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	E.coli																														
	Pigs - at slaughter - survey (2003)																														
Isolates out of a monitoring program	no																														
Number of isolates available in the laboratory	1037																														
Antimicrobials:	**N**	**%R**	**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**
Tetracycline	1037	80%	79	<1	<1	0	0	<1	0	<1	<1	<1	0	0	<1	0	0	0	<1	<1	<1	3	4	5	4	2	<1	<1	<1	<1	0	0
Amphenicols																																
Chloramphenicol	1037	22	10	5	2	2	2	<1	<1	<1	<1	<1	<1	1	2	5	6	9	11	10	8	8	4	5	2	2	1	1	<1	<1	<1	<1
Cephalosporin																																
Cefotaxim	807	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1	<1	<1	1	98
Ceftazidim	1037	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1	<1	<1	1	3	7	89
Quinolones																																
Nalidixic acid	1037	1	1	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1	2	4	9	13	15	18	12	11	6	5	2	3
Sulfonamides																																
Sulfonamide	1037	62	58	2	<1	<1	<1	<1	0	0	<1	<1	0	<1	<1	0	0	<1	0	<1	<1	<1	<1	2	2	2	3	5	4	5	4	9
Aminoglycosides																																
Streptomycin	1037	28	8	3	<1	2	2	3	4	5	6	8	5	3	3	4	4	7	9	11	7	3	1	<1	<1	0	0	0	0	0	<1	0
Gentamicin(1)	1037	0.5	<1	0	0	0	0	<1	<1	<1	<1	<1	<1	<1	0	<1	<1	<1	2	10	23	39	15	6	2	<1	<1	<1	0	0	0	0
Neomycin	1037	8	2	<1	<1	<1	1	2	1	<1	<1	<1	<1	1	15	34	29	9	2	<1	<1	0	0	0	0	0	0	0	0	0	0	<1
Trimethoprim + sulfonamides	1037	42%	40	<1	<1	<1	0	<1	0	<1	0	<1	<1	0	<1	0	<1	<1	<1	<1	<1	1	2	2	2	3	3	3	3	6	7	25
Penicillins																																
Ampicillin	1037	28	27	<1	<1	<1	<1	0	0	<1	0	<1	<1	<1	2	3	4	6	7	8	8	9	7	6	5	2	2	1	<1	<1	0	<1

(1) : % resistance <1

Footnote

Isolates from survey of animals arriving for slaughter at abattoirs in GB in 2003

Table 13.7 Breakpoints used for antibiotic resistance testing of E.coli in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS
CASFM

Subject to quality control

Escherichia coli	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 <=
Tetracycline							10	13	0	13
Amphenicols										
Chloramphenicol							10	13		13
Florfenicol										
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin							5	13		13
Quinolones										
Nalidixic acid							30	13		13
Trimethoprim										
Sulfonamides										
Sulfonamide							300	13		13
Aminoglycosides										
Streptomycin							25	13		13
Gentamicin							10	13		13
Neomycin							10	13		13
Kanamycin										
Trimethoprim + sulfonamides							25	13		13
Cephalosporin										
Cefotaxim							30	13		13
Ceftazidim							30	13		13
3rd generation cephalosporins										
Penicillins										
Ampicillin							10	13		13

4. 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.

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

The full analysis of outbreak data are often not completed until some time after the outbreak has finished. A summary of the outbreaks in the UK is given in table 12. In addition to the general outbreaks listed there were 8 outbreaks where a causative agent was not known. The most common causative agent identified in the outbreaks was Salmonella species.

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

category combinations

A full evaluation is not yet available.

Table 12. Foodborne outbreaks in humans

Causative agent	General outbreak	Family outbreak	Total Number in persons			Source			Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital		Suspected	Confirmed			
1	2	3	4	5	6	7			8	9	10
Campylobacter	1		4	0	0					Restaurant	Cross contamination . Poor washing of handwashing facilities.
Campylobacter	1		8	0	0	Side salad		Y	D	Restaurant	
Campylobacter	1		7	0	0					Hospital	Cross contamination
Escherichia coli(1)	1		14	0	4	Sandwiches cooked meat		Y	S	Shop retailer	Poor hygiene, cross contamination
Escherichia coli(2)	1		134	0	4	sandwich cooked meat		Y	S	Shop	Cross contamination poor personal hygiene
Food borne viruses(3)	1		9						D	Restaurant	
Food borne viruses	1		58						D	Hotel	
Food borne viruses	1		7						d	Restaurant	
Salmonella - S. Enteritidis(4)	1		9	0	0					Restaurant	Inadequate heat treatment, poor washing facilities, cross contamination
Salmonella - S. Give(5)	1		47	0	1	Rice, beef, chicken		Y	S	Private	Storage too long, too warm
Salmonella - S. Newport	1		146	0	6	lettuce		Y	S	Shop, retailer	Storge too long, too warm
Salmonella - S. Newport	1		21	0	5	lettuce		Y	S	community	
Salmonella - S. Newport	1		130		29	lettuce		Y	S	catering outlets	
Salmonella - S. Virchow	1		21			cooked chicken imported		Y	M	Shop retailer	cross contamination
Clostridium - C. perfringens	1		400	0		chicken and lamb, spinach, Shish kebab		Y	M S	Club	Inadequate heat treatment
Clostridium - C. perfringens	1		4	0	0	cooked chicken, Keema rice		Y	M	Restaurant	
Clostridium - C. perfringens	1		11	0	0	gravy		Y	D	Bar	
Clostridium - C. perfringens	1		13	1	0	roast lamb		Y	D	Residential	storage too long and too warm

Food borne viruses - calicivirus (including norovirus)	1		15	0	0	Oysters		Y	S D	Hotel	
Staphylococcus - S. aureus	1		18	0	2	rice chicken			D	Restaurant	Storage too long too warm
Staphylococcus - S. aureus(6)	1		14	0	6	chicken savoury rice			DM	Private house	
Food borne viruses - rotavirus	1		6	0	0						
Clostridium - C. perfringens	1		47	0	0	beef casserole		Y	D	Club	Storage too lon to warm
Salmonella - S. Enteritidis - PT 1	1		4	0	0	Crispy pork rice			D	Restaurant	
Salmonella - S. Enteritidis - PT 1	1		5	0	0					Restaurant	
Salmonella - S. Enteritidis - PT 1	1		3	0	0					Restaurant	Cross contamiantion
Salmonella - S. Enteritidis - PT 1	1		25	0	5	eggs			D	Restaurant	Cross contamination
Salmonella - S. Enteritidis - PT 12	1		7	0	0	egg sandwich		Y	D	Residential	Storage too long and too warm
Salmonella - S. Enteritidis - PT 14b	1		13	0	0					Restaurant	Inadequate heat treatment, cross contamination
Salmonella - S. Enteritidis - PT 14b	1		15	0	2					Restaurant	Storage too long and too warm
Salmonella - S. Enteritidis - PT 14b	1		7	0	0					Restaurant	cross contamiantion
Salmonella - S. Enteritidis - PT 14b	1		43	0	2	chicken, egg fries rice, veg spring rolls		Y	M,S,D	Restaurant	Inadequate heat treatment, cross conamination
Salmonella - S. Enteritidis - PT 14b	1		14	0	0	Egg, Foie gras		Y	MD	Restaurant	Poor washing facilities
Salmonella - S. Enteritidis - PT 14b	1		26	0	0	Prawn toasties		Y	S	Hotel	Inadequate heat treatment
Salmonella - S. Enteritidis - PT 14b	1		9	0	5	Sandwiches		Y	D	Shop caterer	Cross contamination
Salmonella - S. Enteritidis - PT 14b	1		3	0	0	Eggs (imported)		Y	D	restaurant	Infected food handler, cross contamination
Salmonella - S. Enteritidis - PT 14b(7)	1		25	0	0	Eggs (imported)		Y	M	Restaurant	Infected food handler, inadequate heat treatment, cross contamination, poor personal hygiene
Salmonella - S. Enteritidis - PT 4											
Salmonella - S. Enteritidis - PT 4	1		3	0	3					restaurant	
Salmonella - S. Enteritidis - PT 4	1		3	0	0					Restaurant	
Salmonella - S. Enteritidis - PT 4	1		7	0	1					Residential	Inadequate heat treatment
Salmonella - S. Enteritidis - PT 4	1		30	0	3	Bread and butter pudding		Y	D	Pub/Bar	Infected food handler

Salmonella - S. Enteritidis - PT 4	1		15	0	2	Coffee egg nog pie with rice		Y	D	Residential	
Salmonella - S. Enteritidis - PT 4	1		48	0	0	Southern fried chicken, roast potatoes		Y	S	Hotel	Inadequate heat treatment, cross contamination
Salmonella - S. Enteritidis - PT 4	1		6	0	0	Spanish Tortilla		Y	D	Restaurant	Inadequate heat treatment
Salmonella - S. Enteritidis - PT 4	1		17	0	1	Tiramisu		Y	S	Restaurant	Inadequate heat treatement
Salmonella - S. Typhimurium - DT 104	1		126	0	11					Restaurant	Infected food handler
Salmonella - S. Typhimurium - DT 104	1		174		10	egg mayonnaise		Y	M	Fast food outlet	raw shell egg used
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	1		16	0	0	Oysters		Y	M	Hotel	
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	1		30			Turkey Xmas pudding		Y		Restaurant	Infected food handler poor hygiene
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	1		8	0	0					Hotel	
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)											
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	1		60	0	0					Hotel	
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	1		18	0						Hospital	

(1) : VTEC O157
(2) : O157
(3) : Northern Ireland
(4) : PT57
(5) : Also S Ibadan and S. Shangani
(6) : and Bacillus cereus
(7) : plus PT59

Footnote

UK data. D = descriptive. M = Microbiological. S = statistical result of an analytical study