ZOONOSES MONITORING

United Kingdom

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

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

IN 2018

PREFACE

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

The report contains information on trends and sources of zoonoses and zoonotic agents in United Kingdom during the year 2018.

The information covers the occurrence of these diseases and agents in animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and indicator 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 Union 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 European Union 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 European Union Summary Reports on zoonoses and antimicrobial resistance that are published each year by EFSA.

The national report contains two parts: tables summarising data reported in the Data Collection Framework and the related text forms. The text forms were sent by email as pdf files and they are incorporated at the end of the report.

---

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

List of Contents

ANIMAL POPULATION TABLES

Table Susceptible animal population

Animal species	Category of animals	Population		
		holding	animal	herd/flock
Cattle (bovine animals)	Cattle (bovine animals)		9,981,786	97,998
Deer	Deer - farmed		33,789	
Gallus gallus (fowl)	Gallus gallus (fowl) - breeding flocks, unspecified - adult		13,771,000	1,441
	Gallus gallus (fowl) - broilers		123,946,000	50,132
	Gallus gallus (fowl) - laying hens		53,623,000	4,677
Goats	Goats		108,401	
Pigs	Pigs	11,100	5,012,000	
Sheep	Sheep		22,506,000	
Sheep and goats	Sheep and goats	82,983	34,890,100	
Solipeds, domestic	Solipeds, domestic - horses		250,011	
Turkeys	Turkeys		4,149,000	
	Turkeys - breeding flocks, unspecified - adult			290
	Turkeys - fattening flocks			2,656

DISEASE STATUS TABLES

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

Region	Number of animals positive in microbiological testing under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Total number of herds	Number of herds tested under surveillance by bulk milk	Number of animals or pools tested under surveillance by bulk milk	Number of abortions due to Brucella infection under investigations of suspect cases	Number of animals tested by microbiology under investigations of suspect cases
UNITED KINGDOM	0	74,460	0	74,460	8,670	40,034	0	1,315
NORTHERN IRELAND (NUTS level 1)	0	23,932	0	23,550	2,950	3,359	0	37

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

Region	Number of animals serologically tested under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds	Number of animals tested by microbiology under investigations of suspect cases
UNITED KINGDOM	6,713	82,983	0	1,214	18,974	82,983	1,485

DISEASE STATUS TABLES

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

Region	Total number of animals	Number of animals to be tested under the program	Number of animals tested	Number of animals tested individually	Number of positive animals	Number of positive animals slaughtered	Total number of animals slaughtered
UNITED KINGDOM	5,372,241	4,305,261	4,305,261	4,305,261	32,206	32,206	32,923
WALES	1,221,563	1,221,563	1,221,563	1,221,563	8,329	8,329	11,234
Northern Ireland (NUTS level 2)	1,744,432	1,744,432	1,744,432	1,744,432	15,329	16,959	

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

Region	Number of new positive herds	Number of depopulated herds	Total number of herds	Number of herds under the program	Number of herds under the program tested/checked	Number of positive herds
UNITED KINGDOM	3,608	12	49,230	49,230	33,622	6,215
WALES	744	3	11,952	11,952	10,739	1,338
Northern Ireland (NUTS level 2)	2,088	30	23,550	23,550	22,656	2,806

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

Region	Total number of herds under the program, at the end of the period	Total number of animals under the program, at the end of the period	Number of herds with unknown status, at the end of the period	Number of animals with unknown status, at the end of the period	Number of herds with status not free or not officially free and last check positive, at the end of the period	Number of animals with status not free or not officially free and last check positive, at the end of the period	Number of herds with status not free or not officially free and last check negative, at the end of the period	Number of animals with status not free or not officially free and last check negative, at the end of the period	Number of herds with status free or officially free suspended, at the end of the period	Number of animals with status free or officially free suspended, at the end of the period	Number of herds with status free, at the end of the period	Number of animals with status free, at the end of the period	Number of herds with status officially free, at the end of the period	Number of animals with status officially free, at the end of the period
UNITED KINGDOM	49,230	5,372,241	0	0	1,997		0						45,234	4,413,824
WALES	11,952	1,134,137	0	0	621	154,799	0	0	404	48,560	0	0	10,927	930,778
Northern Ireland (NUTS level 2)	23,550	1,599,059	0		1,188		848		1,169		0		20,345	1,196,340

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

Region	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Total number of herds
SCOTLAND (NUTS level 1)	13,263	8	1,643,550	1,856	25	13,266

Table Tuberculosis in farmed deer

Region	Number of infected herds	Total number of herds
Northern Ireland (NUTS level 2)	2	18

PREVALENCE TABLES

Table Brucella:BRUCELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Alpacas - farmed - Artificial insemination station - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	2	0	Brucella	0
	Alpacas - farmed - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	467	0	Brucella	0
	Alpacas - farmed - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Unspecified	animal	1	0	Brucella	0
	Antelopes - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	3	0	Brucella	0
	Antelopes - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Unspecified	animal	4	0	Brucella	0
	Buffalos - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Unspecified	animal	2	0	Brucella	0
	Camels - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	6	0	Brucella	0
	Deer - farmed - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	91	0	Brucella	0
	Deer - farmed - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Unspecified	animal	1	0	Brucella	0
	Goats - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	20	0	Brucella	0
	Goats - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Unspecified	animal	20	0	Brucella	0
	Lamas - farmed - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	2	0	Brucella	0
	Pigs - Artificial insemination station - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	4279	0	Brucella	0
	Pigs - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	531	0	Brucella	0
	Pigs - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Unspecified	animal	286	0	Brucella	0
	Sheep - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Objective sampling	N_A	Unspecified	animal	1192	0	Brucella	0
	Sheep - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Unspecified	animal	243	0	Brucella	0
	Sheep and goats - Farm - Not Available - animal sample - blood - Monitoring - EFSA specifications - Official sampling - Objective sampling	N_A	Unspecified	animal	18974	0	Brucella	0
				herd/flock	1214	0	Brucella	0
	Sheep and goats - Farm - Not Available - animal sample - blood - Monitoring - EFSA specifications - Official sampling - Suspect sampling	N_A	Unspecified	animal	1485	0	Brucella	0

Table Campylobacter:CAMPYLOBACTER in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cats - Veterinary clinics - Not Available - animal sample - faeces - Clinical investigations - Private sampling - Suspect sampling	includes 20 C. upsaliensis, 3 jejuni, 3 c.spp	Not Available	animal	26	26	Campylobacter	26
	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	414	1	Campylobacter jejuni	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	N_A	Not Available	animal	17	17	Campylobacter	17
	Dogs - Veterinary clinics - Not Available - animal sample - faeces - Clinical investigations - Private sampling - Suspect sampling	includes 164 c. upsaliensis, 52 c.jejuni, 9 c.coli, 18 c.lari, 7 c.spp	Not Available	animal	250	250	Campylobacter	250
	Gallus gallus (fowl) - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	3	1	Campylobacter jejuni	1
							Campylobacter, unspecified sp.	1
	Goats - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	14	1	Campylobacter, unspecified sp.	1
	Pigs - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	14	2	Campylobacter, unspecified sp.	2
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	N_A	Not Available	animal	120	120	Campylobacter	120
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	585	17	Campylobacter jejuni	6
							Campylobacter lari	1
							Campylobacter, unspecified sp.	10

Table Campylobacter:CAMPYLOBACTER in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Meat from broilers (Gallus gallus) - carcase - chilled - Retail - United Kingdom - food sample - neck skin - Survey - national survey - Official sampling - Objective sampling	single (food/feed)	10	Gram	Survey of whole chicken carcass at retail - neck skin samples used but unit of interest is chicken carcass	ISO 10272-1:2006 Campylobacter	1460	873	Campylobacter, unspecified sp.	873

Table COXIELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sampling Details	Method	Total units tested	Total units positive	N of clinical affected herds	Zoonoses		N of units positive
Not Available	Cattle (bovine animals) - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	animal	N_A	Not Available	3	3			Coxiella	3
	Sheep - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	animal	N_A	Not Available	1	1			Coxiella	1

Table Echinococcus:ECHINOCOCCUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - calves (under 1 year) - Slaughterhouse - Not Available - Not Available - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	39276	13	Echinococcus, unspecified sp.	13
	Cattle (bovine animals) - Slaughterhouse - Not Available - Not Available - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	3374673	1150	Echinococcus, unspecified sp.	1,150
	Goats - Slaughterhouse - Not Available - Not Available - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	11828	138	Echinococcus, unspecified sp.	138
	Sheep - Slaughterhouse - Not Available - Not Available - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	26706654	23377	Echinococcus, unspecified sp.	23,377
UNITED KINGDOM	Foxes - Natural habitat - Not Available - Not Available - Survey - national survey - Official sampling - Selective sampling	N_A	Not Available	animal	827	0	Echinococcus multilocularis	0

Table Escherichia coli:ESCHERICHIA COLI in animal

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	total units tested	total units positive	Zoonoses	ANTH	VTX	AG	N units positive
Not Available	All animals - farmed - Farm - Not Available - environmental sample - Monitoring - Official sampling - Suspect sampling	holding	1	Gram	N_A	Unspecified	2	2	VTEC O157	H-antigen unknown	Verotoxin production, toxin type unknown	eae positive	2
	Cats - Farm - Not Available - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding	1	Gram	N_A	Unspecified	1	1	VTEC O157	H-antigen unknown	Verotoxin production, toxin type unknown	eae positive	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding	1	Gram	N_A	Unspecified	1	1	VTEC O157	H-antigen unknown	Verotoxin production, toxin type unknown	eae positive	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	animal		Not Available	N_A	OIE method for E.coli O157 in animal faecal samples	1	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Goats - Farm - Not Available - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding	1	Gram	N_A	Unspecified	1	1	VTEC O157	H-antigen unknown	Verotoxin production, toxin type unknown	eae positive	1
	Goats - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	animal		Not Available	N_A	OIE method for E.coli O157 in animal faecal samples	4	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Goats - milk goats - Farm - Not Available - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	herd/flock	1	Gram	N_A	Unspecified	15	0	Verocytotoxigenic E. coli (VTEC)	H-antigen unknown	Verotoxin production not applicable	Adhesion genes investigation not applicable	0
	Goats - milk goats - Farm - Not Available - environmental sample - Monitoring - Official sampling - Suspect sampling	holding	1	Gram	N_A	Unspecified	5	0	Verocytotoxigenic E. coli (VTEC)	H-antigen unknown	Verotoxin production not applicable	Adhesion genes investigation not applicable	0
	Pigs - Farm - Not Available - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding	1	Gram	N_A	Unspecified	1	1	VTEC O157	H-antigen unknown	Verotoxin production, toxin type unknown	eae positive	1
	Sheep - Farm - Not Available - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding	1	Gram	N_A	Unspecified	3	3	VTEC O157	H-antigen unknown	Verotoxin production, toxin type unknown	eae positive	3
	Sheep - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	animal		Not Available	N_A	OIE method for E.coli O157 in animal faecal samples	3	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Solipeds, domestic - donkeys - Farm - Not Available - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding	1	Gram	N_A	Unspecified	2	2	VTEC O157	H-antigen unknown	Verotoxin production, toxin type unknown	eae positive	2

Table FLAVIVIRUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Vaccination status	Sampling Details	Method	Total units tested	Total units positive	Zoonoses		N of units positive
Not Available	Birds - wild - Natural habitat - Not Available - Not Available - Unspecified - Official sampling - Not specified	animal	Not Available	N_A	Reverse-transcription PCR (RT-PCR)	561	0		West Nile virus	0
	Solipeds, domestic - horses - Unspecified - Not Available - Not Available - Clinical investigations - Official sampling - Not specified	animal	Not Available	N_A	Reverse-transcription PCR (RT-PCR)	6	0		West Nile virus	0

Table Listeria:LISTERIA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	414	3	Listeria monocytogenes	3
	Cattle (bovine animals) - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	herd/flock	29	29	Listeria	29
	Cattle (bovine animals) - Farm - Not Available - Not Available - Unspecified - Private sampling - Not specified	N_A	Not Available	animal	29	29	Listeria	29
	Goats - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	herd/flock	13	13	Listeria	13
	Goats - Farm - Not Available - Not Available - Unspecified - Private sampling - Not specified	N_A	Not Available	animal	13	13	Listeria	13
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	585	9	Listeria monocytogenes	9
	Sheep - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	585	1	Listeria spp., unspecified	1
	Sheep - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	herd/flock	102	102	Listeria	102
	Sheep - Farm - Not Available - Not Available - Unspecified - Private sampling - Not specified	N_A	Not Available	animal	102	102	Listeria	102

Table Lyssavirus:LYSSAVIRUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Bats - wild - Natural habitat - United Kingdom - animal sample - Monitoring - Official sampling - Objective sampling	N_A	Not Available	animal	404	8	European bat lyssavirus 2	8
	Bats - wild - Natural habitat - United Kingdom - animal sample - Monitoring - Official sampling - Suspect sampling	N_A	Not Available	animal	404	2	European bat lyssavirus 1	2
	Bats - zoo animal - Zoo - United Kingdom - animal sample - Surveillance - Official sampling - Suspect sampling	N_A	Not Available	animal	26	0	Lyssavirus	0
	Dogs - pet animals - Official kennel - United Kingdom - animal sample - Surveillance - Official sampling - Suspect sampling	N_A	Not Available	animal	5	0	Rabies virus	0

Table Mycobacterium:MYCOBACTERIUM in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Alpacas - farmed - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	58	24	Mycobacterium avium subsp. paratuberculosis	1
							Mycobacterium bovis	21
							Mycobacterium microti	2
	Antelopes - zoo animal - Zoo - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	2	1	Mycobacterium bovis	1
	Capybaras - Zoo - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	1	0	Mycobacterium	0
	Cats - pet animals - Veterinary clinics - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	12	5	Mycobacterium bovis	5
	Deer - farmed - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	29	20	Mycobacterium bovis	19
							Mycobacterium caprae	1
	Deer - Unspecified - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	2	1	Mycobacterium bovis	1
	Deer - wild - Natural habitat - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	35	19	Mycobacterium bovis	19
	Deer - zoo animals - Zoo - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	2	0	Mycobacterium	0
	Dogs - pet animals - Veterinary clinics - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	2	1	Mycobacterium bovis	1
	Elephants - zoo animals - Zoo - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	2	0	Mycobacterium	0
	Goats - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	17	12	Mycobacterium bovis	12
	Lamas - farmed - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	3	1	Mycobacterium bovis	1
	Pigs - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	260	30	Mycobacterium avium	5
							Mycobacterium bovis	25
	Sheep - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	16	0	Mycobacterium	0
	Wallabies - zoo animals - Zoo - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	1	1	Mycobacterium avium	1

Table Salmonella:SALMONELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - adult cattle over 2 years - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella spp., unspecified	1
	Cattle (bovine animals) - adult cattle over 2 years - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella spp., unspecified	1
	Cattle (bovine animals) - calves (under 1 year) - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	4	4	Salmonella Dublin	2
									Salmonella Typhimurium, monophasic	2
	Cattle (bovine animals) - calves (under 1 year) - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	34	34	Salmonella Agama	1
									Salmonella Dublin	29
									Salmonella Mbandaka	2
									Salmonella spp., unspecified	2
	Cattle (bovine animals) - calves (under 1 year) - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	22	22	Salmonella Dublin	19
									Salmonella Mbandaka	1
									Salmonella Montevideo	1
									Salmonella spp., unspecified	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	12	12	Salmonella Dublin	11
									Salmonella Montevideo	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	2	2	Salmonella Dublin	2
	Cattle (bovine animals) - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	3	3	Salmonella Dublin	1
									Salmonella Newport	1
									Salmonella spp., unspecified	1
	Cattle (bovine animals) - Farm - Not Available - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	492	492	Salmonella 4,12:i:-	7
									Salmonella 4,5,12:i:-	6
									Salmonella 6,7:-:e,n,z15	4
									Salmonella 6,7:z10:-	3
									Salmonella 61:-:1,5	1
									Salmonella 9,12:-:-	1
									Salmonella Agama	4
									Salmonella Anatum	5
									Salmonella Coeln	4
									Salmonella Dublin	316
									Salmonella enterica subsp. enterica rough	4
									Salmonella Enteritidis	3
									Salmonella I 4,12:b:-	1
									Salmonella IIIb 61:-:1,5,7	2
									Salmonella Kottbus	1
									Salmonella Mbandaka	35
									Salmonella Mokola	1
									Salmonella Montevideo	21
									Salmonella Newport	4
									Salmonella Oslo	1
									Salmonella Rissen	1
									Salmonella Stourbridge	1
									Salmonella Typhimurium	64
									Salmonella Virchow	1
									Salmonella Wangata	1
	Deer - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	1	1	Salmonella Dublin	1
	Deer - farmed - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Dublin	1
	Dogs - Farm - Not Available - animal sample - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Agama	1
	Ducks - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	430	430	Salmonella 13,23:i:-	1
									Salmonella 3,15:-:-	2

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Ducks - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	430	430	Salmonella 4,12:i:-	1
									Salmonella 4,12:z:-	7
									Salmonella 6,7:r:-	1
									Salmonella Albert	1
									Salmonella Bovismorbificans	8
									Salmonella Derby	2
									Salmonella enterica subsp. enterica rough	1
									Salmonella Give	111
									Salmonella Hadar	44
									Salmonella Indiana	123
									Salmonella Istanbul	1
									Salmonella Kottbus	24
									Salmonella Lexington	6
									Salmonella Mapo	1
									Salmonella Monschaui	4
									Salmonella Newport	3
									Salmonella Orion	70
									Salmonella Oslo	3
									Salmonella Rissen	1
									Salmonella spp., unspecified	4
									Salmonella Typhimurium	11
	Gallus gallus (fowl) - breeding flocks, unspecified - adult - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	305	Y	N_A	Not Available	305	3	Salmonella Montevideo	1
									Salmonella spp., unspecified	1
									Salmonella Typhimurium, monophasic	1
	Gallus gallus (fowl) - breeding flocks, unspecified - adult - Farm - United Kingdom - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	1136	Y	N_A	Not Available	1136	12	Salmonella 13,23:i:-	9
									Salmonella Kedougou	1
									Salmonella Mbandaka	1
									Salmonella spp., unspecified	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	7089	N	N_A	Not Available	7042	50	Salmonella Agama	2
									Salmonella Anatum	7
									Salmonella Derby	1
									Salmonella Dublin	2
									Salmonella Enteritidis	2
									Salmonella Mbandaka	18
									Salmonella Montevideo	1
									Salmonella Muenster	4
									Salmonella Newport	1
									Salmonella Senftenberg	1
									Salmonella spp., unspecified	7
									Salmonella Tennessee	1
									Salmonella Toulon	1
									Salmonella Typhimurium	1
									Salmonella Typhimurium, monophasic	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	7089	Y	N_A	Not Available	7089	54	Salmonella Agama	2
									Salmonella Anatum	7
									Salmonella Derby	1
									Salmonella Dublin	2
									Salmonella Enteritidis	2
									Salmonella Mbandaka	19
									Salmonella Montevideo	1
									Salmonella Muenster	5
									Salmonella Newport	1
									Salmonella Senftenberg	1
									Salmonella spp., unspecified	9

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	7089	Y	N_A	Not Available	7089	54	Salmonella Tennessee	1
									Salmonella Toulon	1
									Salmonella Typhimurium	1
									Salmonella Typhimurium, monophasic	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	7089	N	N_A	Not Available	47	4	Salmonella Mbandaka	1
									Salmonella Muenster	1
									Salmonella spp., unspecified	2
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - Control and eradication programmes - Industry sampling - Census	herd/flock	7089	N	N_A	Not Available	7042	1	Salmonella Anatum	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - Control and eradication programmes - Official and industry sampling - Census	herd/flock	7089	Y	N_A	Not Available	7089	1	Salmonella Anatum	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - United Kingdom - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	43043	N	N_A	Not Available	42927	1265	Salmonella 1,4,12:d:-	17
									Salmonella 13,23:i:-	434
									Salmonella 3,10:l,v:-	1
									Salmonella 4,12:i:-	5
									Salmonella 4,5,12:i:-	1
									Salmonella 6,7:b:-	1
									Salmonella 6,7:z10:-	3
									Salmonella Agona	4
									Salmonella Anatum	1
									Salmonella Derby	18
									Salmonella Enteritidis	7
									Salmonella Give	4
									Salmonella Havana	3
									Salmonella Idikan	8
									Salmonella Indiana	1
									Salmonella Infantis	1
									Salmonella Isangi	1
									Salmonella Kedougou	189
									Salmonella Kottbus	5
									Salmonella Livingstone	9
									Salmonella Mbandaka	348
									Salmonella Montevideo	69
									Salmonella Newport	4
									Salmonella Nottingham	3
									Salmonella Ohio	87
									Salmonella Orion	13
									Salmonella Oslo	1
									Salmonella Other serovars	11
									Salmonella Poona	1
									Salmonella Senftenberg	17
									Salmonella spp., unspecified	3
									Salmonella Stanley	1
									Salmonella Typhimurium	3
	Gallus gallus (fowl) - broilers - before slaughter - Farm - United Kingdom - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	43043	Y	N_A	Not Available	43043	1283	Salmonella 1,4,12:d:-	17
									Salmonella 13,23:i:-	445
									Salmonella 3,10:l,v:-	1
									Salmonella 4,12:i:-	5
									Salmonella 4,12:z:-	1
									Salmonella 4,5,12:i:-	1
									Salmonella 6,7:b:-	1
									Salmonella 6,7:z10:-	3
									Salmonella Agona	4
									Salmonella Anatum	1
									Salmonella Derby	18
									Salmonella Enteritidis	7

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Gallus gallus (fowl) - broilers - before slaughter - Farm - United Kingdom - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	43043	Y	N_A	Not Available	43043	1283	Salmonella Give	4
									Salmonella Havana	3
									Salmonella Idikan	8
									Salmonella Indiana	2
									Salmonella Infantis	1
									Salmonella Isangi	1
									Salmonella Kedougou	189
									Salmonella Kottbus	5
									Salmonella Livingstone	9
									Salmonella Mbandaka	350
									Salmonella Montevideo	69
									Salmonella Newport	4
									Salmonella Nottingham	3
									Salmonella Ohio	87
									Salmonella Orion	13
									Salmonella Oslo	1
									Salmonella Other serovars	11
									Salmonella Poona	1
									Salmonella Senftenberg	17
									Salmonella spp., unspecified	5
									Salmonella Stanley	1
									Salmonella Typhimurium	4
	Gallus gallus (fowl) - broilers - before slaughter - Farm - United Kingdom - Not Available - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	43043	N	N_A	Not Available	116	18	Salmonella 13,23:i:-	11
									Salmonella 4,12:z:-	1
									Salmonella Indiana	1
									Salmonella Mbandaka	2
									Salmonella spp., unspecified	2
									Salmonella Typhimurium	1
	Gallus gallus (fowl) - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	1838	1838	Salmonella 1,4,12:d:-	19
									Salmonella 13,23:i:-	681
									Salmonella 3,10:l,v:-	1
									Salmonella 4,12:i:-	8
									Salmonella 4,12:z:-	1
									Salmonella 4,5,12:i:-	2
									Salmonella 6,7:-:e,n,z15	1
									Salmonella 6,7:b:-	1
									Salmonella 6,7:d:-	1
									Salmonella 6,7:z10:-	5
									Salmonella Agama	1
									Salmonella Agona	6
									Salmonella Anatum	1
									Salmonella Budapest	1
									Salmonella Derby	26
									Salmonella enterica subsp. enterica rough	7
									Salmonella Enteritidis	27
									Salmonella Give	8
									Salmonella Havana	3
									Salmonella I 6,7:-:-	2
									Salmonella Idikan	13
									Salmonella Indiana	3
									Salmonella Infantis	2
									Salmonella Isangi	1
									Salmonella Kedougou	197
									Salmonella Kentucky	1
									Salmonella Kingston	1
									Salmonella Kottbus	6

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Gallus gallus (fowl) - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	1838	1838	Salmonella Livingstone	12
									Salmonella Mbandaka	472
									Salmonella Montevideo	113
									Salmonella Newport	8
									Salmonella Nottingham	9
									Salmonella Ohio	94
									Salmonella Orion	29
									Salmonella Oslo	2
									Salmonella Poona	2
									Salmonella Rissen	2
									Salmonella Senftenberg	56
									Salmonella Soerenga	1
									Salmonella spp., unspecified	2
									Salmonella Stanley	1
									Salmonella Typhimurium	9
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - animal sample - eggshells - Clinical investigations - Industry sampling - Suspect sampling	herd/flock		N_A	N_A	Not Available	2	2	Salmonella Kentucky	2
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - animal sample - faeces - Control and eradication programmes - Official and industry sampling - Census	herd/flock	571	Y	N_A	Not Available	571	1	Salmonella Idikan	1
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	571	Y	N_A	Not Available	571	7	Salmonella Agama	1
									Salmonella enterica, subspecies diarizonae	1
									Salmonella Kedougou	1
									Salmonella Mbandaka	1
									Salmonella spp., unspecified	3
	Gallus gallus (fowl) - laying hens - adult - Farm - United Kingdom - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	4106	Y	N_A	Not Available	4106	26	Salmonella 13,23:i:-	5
									Salmonella Agama	1
									Salmonella Budapest	1
									Salmonella Enteritidis	3
									Salmonella Idikan	1
									Salmonella Indiana	1
									Salmonella Kingston	1
									Salmonella Mbandaka	2
									Salmonella Newport	3
									Salmonella Nottingham	1
									Salmonella Oslo	1
									Salmonella Rissen	2
									Salmonella Senftenberg	2
									Salmonella Soerenga	1
									Salmonella Typhimurium	1
	Gallus gallus (fowl) - laying hens - during rearing period - flocks under control programme - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	150	N	N_A	Not Available	150	2	Salmonella Montevideo	1
									Salmonella Senftenberg	1
	Gallus gallus (fowl) - laying hens - during rearing period - flocks under control programme - Farm - Not Available - environmental sample - delivery box liner - Control and eradication programmes - Official and industry sampling - Census	herd/flock	150	N	N_A	Not Available	150	1	Salmonella Senftenberg	1
	Gallus gallus (fowl) - laying hens - during rearing period - flocks under control programme - Farm - Not Available - environmental sample - dust - Clinical investigations - Industry sampling - Suspect sampling	herd/flock		N_A	N_A	Not Available	1	1	Salmonella Senftenberg	1
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - hatching eggs - Hatchery - Not Available - environmental sample - Clinical investigations - Industry sampling - Suspect sampling	herd/flock		N_A	N_A	Not Available	2	2	Salmonella spp., unspecified	2
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	1	Y	N_A	Not Available	1	0	Salmonella	0
	Geese - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	4	4	Salmonella 4,12:i:-	1
									Salmonella Indiana	2
									Salmonella Kottbus	1
	Partridges - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	5	5	Salmonella Orion	1
									Salmonella Senftenberg	1

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Partridges - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	5	5	Salmonella Soerenga	1
									Salmonella Typhimurium	2
	Pheasants - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	10	10	Salmonella Gallinarum biovar Pullorum	1
									Salmonella Orion	1
									Salmonella Senftenberg	4
									Salmonella Typhimurium	4
	Pigeons - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	9	9	Salmonella 4,12:i:-	2
									Salmonella Typhimurium	7
	Pigs - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	169	169	Salmonella 4,12:i:-	37
									Salmonella 4,5,12:i:-	33
									Salmonella 61:-:1,5	1
									Salmonella Bardo	1
									Salmonella Bovismorbificans	5
									Salmonella Derby	12
									Salmonella I 4,12:b:-	1
									Salmonella Kedougou	1
									Salmonella Nchanga	1
									Salmonella Newport	4
									Salmonella Panama	3
									Salmonella Reading	2
									Salmonella Rissen	3
									Salmonella Typhimurium	65
	Pigs - unspecified - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Rissen	1
	Pigs - unspecified - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	10	10	Salmonella spp., unspecified	2
									Salmonella Typhimurium	5
									Salmonella Typhimurium, monophasic	3
	Quails - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	2	2	Salmonella Typhimurium	2
	Sheep - animals under 1 year (lambs) - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	6	6	Salmonella Dublin	2
									Salmonella enterica, subspecies diarizonae	2
									Salmonella Ruiru	1
									Salmonella spp., unspecified	1
	Sheep - animals under 1 year (lambs) - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	3	3	Salmonella Dublin	1
									Salmonella enterica, subspecies diarizonae	1
									Salmonella Typhimurium, monophasic	1
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	4	4	Salmonella Agama	4
	Sheep - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	109	109	Salmonella 4,12:i:-	1
									Salmonella 6,7:-:e,n,z15	4
									Salmonella 6,7:z10:-	3
									Salmonella 61:-:1,5	9
									Salmonella 9,12:-:-	1
									Salmonella Agama	2
									Salmonella Dublin	13
									Salmonella enterica subsp. enterica rough	1
									Salmonella I 4,12:b:-	1
									Salmonella IIIb 61:-:1,5,7	35
									Salmonella IIIb 61:k:1,5,(7)	14
									Salmonella Mbandaka	1
									Salmonella Montevideo	9
									Salmonella Typhimurium	15

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Solipeds, domestic - horses - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	21	21	Salmonella 3,10: y:-	1
									Salmonella Anatum	2
									Salmonella Bovismorbificans	7
									Salmonella Enteritidis	1
									Salmonella London	1
									Salmonella Newport	2
									Salmonella Typhimurium	7
	Turkeys - breeding flocks, unspecified - adult - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	12	Y	N_A	Not Available	12	0	Salmonella	0
	Turkeys - breeding flocks, unspecified - adult - Farm - United Kingdom - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	278	Y	N_A	Not Available	278	22	Salmonella 4,5,12:i:-	6
									Salmonella Mbandaka	4
									Salmonella Senftenberg	12
	Turkeys - breeding flocks, unspecified - adult - Farm - United Kingdom - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	N_A	Not Available	30	1	Salmonella 4,5,12:i:- - DT 193	1
	Turkeys - breeding flocks, unspecified - adult - Hatchery - United Kingdom - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	N_A	Not Available	178	12	Salmonella Senftenberg	12
	Turkeys - breeding flocks, unspecified - adult - Unspecified - United Kingdom - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N	N_A	Not Available	290	4	Salmonella Mbandaka	4
	Turkeys - breeding flocks, unspecified - adult - Unspecified - United Kingdom - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	N_A	Not Available	196	13	Salmonella	13
	Turkeys - Farm - United Kingdom - Not Available - Surveillance - Not applicable - Not specified	herd/flock		N	N_A	Not Available	497	497	Salmonella 4,12:i:-	1
									Salmonella 4,12:z:-	1
									Salmonella 4,5,12:i:-	14
									Salmonella Agona	11
									Salmonella Albert	1
									Salmonella Anatum	2
									Salmonella Bovismorbificans	4
									Salmonella Derby	171
									Salmonella enterica subsp. enterica rough	2
									Salmonella group B	230
									Salmonella I 6,7:-:-	1
									Salmonella Kedougou	5
									Salmonella Kottbus	1
									Salmonella Mbandaka	6
									Salmonella Newport	5
									Salmonella Orion	1
									Salmonella Senftenberg	28
									Salmonella Soerenga	6
									Salmonella Typhimurium	6
									Salmonella Wangata	1
	Turkeys - fattening flocks - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	216	N	N_A	Not Available	204	9	Salmonella Agona	1
									Salmonella Derby	5
									Salmonella Kingston	2
									Salmonella Montevideo	1
	Turkeys - fattening flocks - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	216	Y	N_A	Not Available	216	9	Salmonella Agona	1
									Salmonella Derby	5
									Salmonella Kingston	2
									Salmonella Montevideo	1
	Turkeys - fattening flocks - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	216	N	N_A	Not Available	12	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - United Kingdom - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	2440	N	N_A	Not Available	2400	295	Salmonella 4,12:i:-	1
									Salmonella 4,5,12:i:-	3
									Salmonella Agona	7
									Salmonella Albert	1
									Salmonella Anatum	2
									Salmonella Bovismorbificans	3
									Salmonella Derby	87

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Turkeys - fattening flocks - before slaughter - Farm - United Kingdom - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	2440	N	N_A	Not Available	2400	295	Salmonella group B	172
									Salmonella Kedougou	5
									Salmonella Kottbus	1
									Salmonella Senftenberg	12
									Salmonella spp., unspecified	2
									Salmonella Typhimurium	4
	Turkeys - fattening flocks - before slaughter - Farm - United Kingdom - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	2440	Y	N_A	Not Available	2440	296	Salmonella 4,12:i:-	1
									Salmonella 4,5,12:i:-	3
									Salmonella Agona	7
									Salmonella Albert	1
									Salmonella Anatum	2
									Salmonella Bovismorbificans	3
									Salmonella Derby	87
									Salmonella group B	172
									Salmonella Kedougou	5
									Salmonella Kottbus	1
									Salmonella Senftenberg	12
									Salmonella spp., unspecified	2
									Salmonella Typhimurium	4
									Salmonella Wangata	1
	Turkeys - fattening flocks - before slaughter - Farm - United Kingdom - Not Available - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	2440	N	N_A	Not Available	40	1	Salmonella Wangata	1

Table Salmonella:SALMONELLA in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Meat from bovine animals - carcase - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	400	Square centimetre	N_A	Not Available	2	2	Salmonella Typhimurium	2
	Meat from bovine animals - fresh - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Paratyphi B	1
	Meat from bovine animals - minced meat - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	3	3	Salmonella Dublin	3
	Meat from broilers (Gallus gallus) - fresh - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	7	7	Salmonella Dublin	1
									Salmonella Enteritidis	2
									Salmonella Indiana	1
									Salmonella Infantis	2
									Salmonella spp., unspecified	1
	Meat from broilers (Gallus gallus) - fresh - frozen - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Infantis	2
	Meat from broilers (Gallus gallus) - fresh - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Infantis	1
	Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	4	4	Salmonella Infantis	4
	Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	13	13	Salmonella Anatum	1
									Salmonella Dublin	3
									Salmonella Infantis	6
									Salmonella spp., unspecified	2
									Salmonella Ughelli	1
	Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Typhimurium, monophasic	1
	Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Infantis	1
	Meat from duck - carcase - Slaughterhouse - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Infantis	1
	Meat from duck - fresh - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Schwarzengrund	1
	Meat from other animal species or not specified - carcase - Slaughterhouse - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella enterica, subspecies diarizonae	1
	Meat from other animal species or not specified - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	3	3	Salmonella Abony	1
									Salmonella Enteritidis	1
									Salmonella Typhimurium	1
	Meat from other animal species or not specified - meat products - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Dublin	1
									Salmonella Typhimurium	1
	Meat from other animal species or not specified - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Mbandaka	2
	Meat from other animal species or not specified - Unspecified - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Derby	1
	Meat from pig - carcase - Slaughterhouse - Not Available - food sample - carcase swabs - Surveillance - based on Regulation 2073 - Official, based on Regulation 854/2004 - Objective sampling	single (food/feed)	400	Square centimetre	Data from FSA England, Wales, FSA NI and FSS	Not Available	3839	110	Salmonella spp., unspecified	110

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Meat from pig - carcase - Slaughterhouse - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	400	Square centimetre	N_A	Not Available	17	17	Salmonella Derby	2
									Salmonella Goldcoast	1
									Salmonella Rissen	1
									Salmonella Typhimurium	1
									Salmonella Typhimurium, monophasic	12
	Meat from pig - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Typhimurium, monophasic	1
	Meat from pig - fresh - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	11	11	Salmonella Rissen	1
									Salmonella Typhimurium, monophasic	10
	Meat from pig - fresh - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Typhimurium, monophasic	2
	Meat from pig - meat products - fresh raw sausages - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	16	16	Salmonella Bovismorbificans	1
									Salmonella Mbandaka	1
									Salmonella Typhimurium	3
									Salmonella Typhimurium, monophasic	11
	Meat from pig - meat products - raw but intended to be eaten cooked - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Typhimurium	1
	Meat from pig - minced meat - Unspecified - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Typhimurium, monophasic	1
	Meat from sheep - carcase - Slaughterhouse - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	400	Square centimetre	N_A	Not Available	1	1	Salmonella enterica, subspecies diarizonae	1
	Other food - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Liverpool	1
	Seeds, dried - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Mikawasima	1
									Salmonella Muenchen	1
	Seeds, dried - Unspecified - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Thompson	2
	Vegetables - leaves - Processing plant - Not Available - Not Available - Unspecified - Not applicable - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Brandenburg	1
	Vegetables - products - dried - Processing plant - Not Available - Not Available - Unspecified - Not applicable - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Liverpool	1
	Vegetables - products - Processing plant - Not Available - Not Available - Unspecified - Not applicable - Not specified	single (food/feed)	25	Gram	N_A	Not Available	4	4	Salmonella Brandenburg	2
									Salmonella Calabar	1
									Salmonella spp., unspecified	1

Table Salmonella:SALMONELLA in feed

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Compound feedingstuffs for cattle - Unspecified - United Kingdom - feed sample - Surveillance - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	11	11	Salmonella Idikan	1
									Salmonella Infantis	1
									Salmonella Kentucky	1
									Salmonella Mbandaka	1
									Salmonella Montevideo	2
									Salmonella Ohio	1
									Salmonella Rissen	1
									Salmonella Senftenberg	1
									Salmonella Tennessee	2
	Compound feedingstuffs for fish - Unspecified - United Kingdom - feed sample - Surveillance - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	3	3	Salmonella Kedougou	2
									Salmonella Ohio	1
	Compound feedingstuffs for horses - Unspecified - United Kingdom - feed sample - Surveillance - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Enterica, unspecified	1
	Compound feedingstuffs for pigs - Unspecified - United Kingdom - feed sample - Surveillance - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	19	19	Salmonella 13,23:i:-	1
									Salmonella Agona	1
									Salmonella Cubana	2
									Salmonella Livingstone	1
									Salmonella Ohio	1
									Salmonella Other serovars	1
									Salmonella Rissen	10
									Salmonella Senftenberg	1
									Salmonella Tennessee	1
	Compound feedingstuffs for poultry (non specified) - Unspecified - United Kingdom - feed sample - Surveillance - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	46	46	Salmonella 13,23:i:-	13
									Salmonella 6,8:e,h:-	1
									Salmonella Bonn	1
									Salmonella Corvallis	1
									Salmonella I 4,12:d:-	1
									Salmonella I 6,7:-:-	1
									Salmonella Infantis	3
									Salmonella Isangi	1
									Salmonella Kedougou	7
									Salmonella Kottbus	2
									Salmonella Liverpool	1
									Salmonella Livingstone	3
									Salmonella Mbandaka	1
									Salmonella Ohio	3
									Salmonella Senftenberg	5
									Salmonella Telelkebir	1
									Salmonella Tennessee	1
	Compound feedingstuffs for sheep - Unspecified - United Kingdom - feed sample - Surveillance - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Kedougou	1
	Compound feedingstuffs, not specified - process control - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	161	161	Salmonella Agona	1
									Salmonella Bardo	1
									Salmonella Derby	1
									Salmonella Durban	1
									Salmonella Eimsbuettel	1
									Salmonella Enterica, unspecified	4
									Salmonella Infantis	1
									Salmonella Johannesburg	1
									Salmonella Leeuwarden	1
									Salmonella Liverpool	9

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Compound feedingstuffs, not specified - process control - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	161	161	Salmonella Livingstone	7
									Salmonella Mbandaka	51
									Salmonella Montevideo	1
									Salmonella Newport	1
									Salmonella Senftenberg	54
									Salmonella spp., unspecified	13
									Salmonella Tennessee	10
									Salmonella Typhimurium	2
									Salmonella Typhimurium, monophasic	1
	Compound feedingstuffs, not specified - process control - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Nottingham	1
									Salmonella Typhimurium, monophasic	1
	Compound feedingstuffs, not specified - Unspecified - United Kingdom - feed sample - Surveillance - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	5	5	Salmonella Bonn	1
									Salmonella Ealing	1
									Salmonella Idikan	1
									Salmonella Isangi	1
									Salmonella Kentucky	1
									Salmonella Mbandaka	1
									Salmonella Newport	1
									Salmonella Soerenga	1
									Salmonella Tennessee	2
	Feed material of cereal grain origin - barley derived - Feed mill - Not Available - Not Available - Unspecified - Official sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Other serovars	1
	Feed material of cereal grain origin - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	13	13	Salmonella Agama	1
									Salmonella Cerro	1
									Salmonella Emek	1
									Salmonella Kingston	1
									Salmonella Mbandaka	5
									Salmonella Orion	1
									Salmonella spp., unspecified	1
									Salmonella Stourbridge	2
	Feed material of cereal grain origin - Feed mill - Not Available - Not Available - Unspecified - Official sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	4	4	Salmonella Other serovars	1
									Salmonella spp., unspecified	2
									Salmonella Tennessee	1
	Feed material of land animal origin - blood products - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	8	8	Salmonella Typhimurium, monophasic	8
	Feed material of land animal origin - blood products - Unspecified - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	3	3	Salmonella Typhimurium	2
									Salmonella Typhimurium, monophasic	1
	Feed material of land animal origin - blood products - Unspecified - United Kingdom - feed sample - Unspecified - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	6	6	Salmonella Kedougou	1
									Salmonella Mbandaka	1
									Salmonella Tennessee	4
	Feed material of land animal origin - meat and bone meal - Unspecified - United Kingdom - feed sample - Unspecified - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella 4,12:i:-	1
									Salmonella Livingstone	1
	Feed material of land animal origin - poultry offal meal - Unspecified - United Kingdom - feed sample - Unspecified - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	4	4	Salmonella 13,23:i:-	1
									Salmonella Kedougou	1
									Salmonella Mbandaka	1
									Salmonella Orion	1
	Feed material of land animal origin - protein meal - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	35	35	Salmonella Agona	1
									Salmonella Bredeney	1
									Salmonella Cerro	4
									Salmonella enterica	1
									Salmonella Livingstone	6
									Salmonella Mbandaka	8

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Feed material of land animal origin - protein meal - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	35	35	Salmonella Montevideo	1
									Salmonella Newport	1
									Salmonella Oslo	1
									Salmonella Senftenberg	5
									Salmonella spp., unspecified	6
	Feed material of land animal origin - protein meal - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	31	31	Salmonella Bredeney	1
									Salmonella Cerro	1
									Salmonella Eimsbuettel	2
									Salmonella Goldcoast	1
									Salmonella Grampian	1
									Salmonella Infantis	1
									Salmonella Kentucky	1
									Salmonella Livingstone	9
									Salmonella Mbandaka	2
									Salmonella Montevideo	3
									Salmonella Nottingham	1
									Salmonella Senftenberg	4
									Salmonella spp., unspecified	4
	Other feed material - Unspecified - United Kingdom - feed sample - Unspecified - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	7	7	Salmonella Livingstone	4
									Salmonella Mbandaka	1
									Salmonella Oslo	1
									Salmonella Tennessee	1
	Pet food - final product - Unspecified - United Kingdom - feed sample - Surveillance - Not applicable - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	16	16	Salmonella 4,12:e,h:-	4
									Salmonella Anatum	1
									Salmonella Havana	3
									Salmonella IIIb 61:k:1,5,(7)	1
									Salmonella Indiana	1
									Salmonella Infantis	1
									Salmonella Mbandaka	1
									Salmonella Montevideo	3
									Salmonella Ohio	1
	Pet food - process control - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	3	3	Salmonella Infantis	1
									Salmonella spp., unspecified	1
									Salmonella Typhimurium	1

Table Toxoplasma:TOXOPLASMA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Alpacas - Farm - Not Available - animal sample - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	herd/flock	1	1	Toxoplasma	1
	Alpacas - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	herd/flock	1	1	Toxoplasma	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	45	28	Toxoplasma gondii	28
	Goats - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	23	2	Toxoplasma	2
	Pigs - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	2	0	Toxoplasma	0
	Reindeers - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	1	1	Toxoplasma	1
	Sheep - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	857	430	Toxoplasma gondii	430
	Sheep - Farm - Not Available - animal sample - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	herd/flock	154	154	Toxoplasma	154
	Sheep - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	herd/flock	154	154	Toxoplasma	154

Table Trichinella:TRICHINELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Foxes - wild - Game handling establishment - Not Available - animal sample - organ/tissue - Surveillance - Official sampling - Objective sampling	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	360	0	Trichinella	0
	Pigs - breeding animals - not raised under controlled housing conditions - sows and boars - Slaughterhouse - Not Available - animal sample - organ/tissue - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	496715	0	Trichinella	0
	Pigs - breeding animals - raised under controlled housing conditions - sows and boars - Slaughterhouse - Not Available - animal sample - organ/tissue - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	14722	0	Trichinella	0
	Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Not Available - animal sample - organ/tissue - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	456915	0	Trichinella	0
	Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Not Available - animal sample - organ/tissue - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	6007436	0	Trichinella	0
	Solipeds, domestic - Slaughterhouse - Not Available - animal sample - organ/tissue - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	2771	0	Trichinella	0
	Wild boars - farmed - Slaughterhouse - Not Available - animal sample - organ/tissue - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	841	0	Trichinella	0
	Wild boars - wild - Game handling establishment - Not Available - animal sample - organ/tissue - Surveillance - Official sampling - Census	Data from FSA England, Wales, FSA NI and FSS	Not Available	animal	581	0	Trichinella	0

Table Yersinia:YERSINIA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	All animals - unspecified - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	2	2	Yersinia	2
	Birds - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	2	2	Yersinia	2
	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	1578	71	Yersinia enterocolitica	29
							Yersinia pseudotuberculosis	30
							Yersinia, unspecified sp.	12
	Goats - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	14	3	Yersinia enterocolitica	2
							Yersinia pseudotuberculosis	1
	Goats - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	1	1	Yersinia	1
	Pigs - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	6	6	Yersinia	6
	Sheep - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	93	15	Yersinia enterocolitica	7
							Yersinia pseudotuberculosis	5
							Yersinia, unspecified sp.	3
	Sheep - Farm - Not Available - Not Available - Clinical investigations - Not applicable - Suspect sampling	N_A	Not Available	animal	7	7	Yersinia	7
	Solipeds, domestic - horses - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	10	2	Yersinia enterocolitica	1
							Yersinia, unspecified sp.	1
	Starlings - Zoo - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	1	1	Yersinia enterocolitica	1

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

		Outbreak strenght	Strong			Weak			
Causative agent	**Food vehicle**	**N outbreaks**	**N human cases**	**N hospitalized**	**N deaths**	**N outbreaks**	**N human cases**	**N hospitalized**	**N deaths**
Campylobacter, unspecified sp.	Sheep meat and products thereof					1	4	4	0
	Broiler meat (Gallus gallus) and products thereof	1	43	0	0	3	51	0	0
	Other, mixed or unspecified poultry meat and products thereof	1	32	2	0				
	Unknown					1	10	0	0
Clostridium perfringens	Bovine meat and products thereof	1	31	0	0	2	23	0	0
	Sheep meat and products thereof	1	32	1	1				
	Other or mixed red meat and products thereof	1	186	0	0				
	Unknown					1	21	0	0
Listeria monocytogenes	Vegetables and juices and other products thereof	1	12	12	2				
	Unknown					1	5	5	4
Norovirus	Crustaceans, shellfish, molluscs and products thereof	2	65	0	0	2	50	0	0
	Mixed food					3	106	0	0
	Unknown					4	149	0	0
Salmonella Agona	Vegetables and juices and other products thereof	1	76	0	0				
Salmonella Bovismorbificans	Other or mixed red meat and products thereof					1	8	1	0
Salmonella Enteritidis	Eggs and egg products	2	282	0	0				
Salmonella Newport	Cheese	1	6	0	0				
Salmonella Stanley	Unknown					1	3	0	0
Salmonella Typhimurium	Pig meat and products thereof	1	29	10	2				
	Sheep meat and products thereof	1	235	19	0				
	Unknown					1	3	0	0
Salmonella Typhimurium, monophasic	Pig meat and products thereof					1	31	1	0
Scrombotoxin	Fish and fish products					1	5	3	0
Shigella sonnei	Herbs and spices	1	34	4	0				
Unknown	Bovine meat and products thereof					1	19	0	0
	Other or mixed red meat and products thereof					1	9	0	0
	Turkey meat and products thereof					1	5	0	0
	Fish and fish products					1	3	0	0
	Crustaceans, shellfish, molluscs and products thereof					2	19	0	0
	Mixed food					2	44	0	0
	Unknown					1	20	1	0
VTEC O157	Vegetables and juices and other products thereof	1	33	15	0				
	Unknown					1	22	5	0

Strong Foodborne Outbreaks: detailed data

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Campylobacter, unspecified sp.	Not Available	2018/3572	General	Broiler meat (Gallus gallus) and products thereof	Chicken liver pate	Descriptive epidemiological evidence;Analytical epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Inadequate heat treatment	13 human cases laboratory confirmed	1	43	0	0
		2018/3575	General	Other, mixed or unspecified poultry meat and products thereof	Duck liver parfait	Descriptive epidemiological evidence;Analytical epidemiological evidence	Others	Not Available	Unknown	Inadequate heat treatment;Cross-contamination	6 human cases laboratory confirmed. Setting college catering	1	32	2	0
Clostridium perfringens	Not Available	2018/3514	General	Bovine meat and products thereof	Beef	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence;Analytical epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Inadequate heat treatment	8 human cases laboratory confirmed. CLP.218. Analytical epidemiological evidence: case control study	1	31	0	0
		2018/3516	General	Other or mixed red meat and products thereof	Turkey, beef and lamb carvery	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Storage time/temperature abuse;Inadequate heat treatment;Cross-contamination	26 human cases laboratory confirmed. CLP.127	1	186	0	0
		2018/3569	General	Sheep meat and products thereof	Shepherds pie	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Storage time/temperature abuse;Inadequate heat treatment	20 human cases laboratory confirmed. FAFLP TYPE CLP.132	1	32	1	1

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Listeria monocytogenes	Not Available	2018/3517	General	Vegetables and juices and other products thereof	Frozen sweetcorn	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in more than one country	Not Available	European Union	Inadequate heat treatment	12 human cases laboratory confirmed. LINKED BY WHOLE GENOME SEQUENCING CC6, SNP address 1.2.2.2.2.2.%	1	12	12	2
Norovirus	Not Available	2018/3581	General	Crustaceans, shellfish, molluscs and products thereof	Natural oysters with cucumber rice wine and Japanese dressing	Descriptive epidemiological evidence;Analytical epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	United Kingdom	Unprocessed contaminated ingredient;Other contributory factor	1 human case laboratory confirmed.	1	37	0	0
		2018/3606	General	Crustaceans, shellfish, molluscs and products thereof	Shellfish	Descriptive epidemiological evidence;Analytical epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	1 human case laboratory confirmed.	1	28	0	0
Salmonella Agona	Not Available	2018/0003* 2018-2-3	General	Vegetables and juices and other products thereof	Cucumber used in ready to eat food products	Product-tracing investigations;Descriptive environmental evidence;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in one country	Not Available	European Union	Unprocessed contaminated ingredient	76 human cases laboratory confirmed - LINKED BY WHOLE GENOME SEQUENCING - SNP address 1.1.1.29.32.37.%	1	76	0	0

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Salmonella Enteritidis	Not Available	2018/0002	General	Eggs and egg products	N_A	Descriptive environmental evidence;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in one country	Not Available	United Kingdom	Other contributory factor;Inadequate heat treatment	26 human cases laboratory confirmed - LINKED BY WHOLE GENOME SEQUENCING - 5-SNP DESIGNATION 1.2.3.18.2180.2669.%	1	26	0	0
		2018/3547* 2018/3549* 2018/0001* 2018/3605* 2018-1-2	General	Eggs and egg products	N_A	Product-tracing investigations;Descriptive environmental evidence;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in one country	Not Available	European Union	Unprocessed contaminated ingredient;Storage time/temperature abuse;Inadequate heat treatment;Cross-contamination	256 human cases laboratory confirmed - LINKED BY WHOLE GENOME SEQUENCING - 5-SNP DESIGNATION 1.2.3.18.359.360.% AND 1.2.3.18.175.175.%	1	256	0	0
Salmonella Newport	Not Available	2018-3-7	General	Cheese	Unpasteurised goats milk cheese	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in more than one country	Not Available	European Union	Unprocessed contaminated ingredient	6 human cases laboratory confirmed - LINKED BY WHOLE GENOME SEQUENCING - SNP address 67.174.183.195.205.209.%	1	6	0	0

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Salmonella Typhimurium	Not Available	2017/56* 2018-1-3	General	Sheep meat and products thereof	Lamb	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in one country	Not Available	United Kingdom	Inadequate heat treatment;Cross-contamination	235 human cases laboratory confirmed - LINKED BY WHOLE GENOME SEQUENCING - SNP address 1.43.67.992.2703.3225.% (animal samples, environmental samples on farm and slaughterhouse)	1	235	19	0
		2018/3543	General	Pig meat and products thereof	Cooked pork	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence;Analytical epidemiological evidence	Multiple places of exposure in one country	Not Available	Unknown	Infected food handler;Cross-contamination	Outbreak setting butcher. 28 human cases laboratory confirmed - LINKED BY WHOLE GENOME SEQUENCING - SNP 1.1.1.124.3255.4475.5876.	1	29	10	2
Shigella sonnei	Not Available	2018/3603	General	Herbs and spices	Fresh coriander leaves served as garnish on kebab or shawarma meals	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Other contributory factor	15 human cases laboratory confirmed. Clonal Complex 152. 5-SNP designation 1.1.29.49.547.1303.%. Contributory factor infected food handler	1	34	4	0
VTEC O157	Not Available	2018/3576* 2018-3-4	General	Vegetables and juices and other products thereof	Rocket salad leaves	Descriptive epidemiological evidence;Analytical epidemiological evidence	Multiple places of exposure in one country	Not Available	Unknown	Other contributory factor	33 human cases laboratory confirmed. PT8 STX1A AND STX2C. 5-SNP address designation 2.8.327.1718.3264.%. Contributory factors contamination at production or at processing	1	33	15	0

Weak Foodborne Outbreaks: detailed data

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Campylobacter, unspecified sp.	Not Available	2018/3504	General	Unknown	No food identified	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	3 human cases laboratory confirmed	1	10	0	0
		2018/3541	General	Broiler meat (Gallus gallus) and products thereof	Chicken liver crostini	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Inadequate heat treatment	1 human case laboratory confirmed	1	12	0	0
		2018/3583	General	Broiler meat (Gallus gallus) and products thereof	Chicken liver pate	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Inadequate heat treatment	5 human cases laboratory confirmed	1	12	0	0
		2018/3587	General	Broiler meat (Gallus gallus) and products thereof	Chicken liver pate	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Inadequate heat treatment	6 human cases laboratory confirmed	1	27	0	0
	VTEC O157	2018/3577	General	Sheep meat and products thereof	Lambs liver	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Inadequate heat treatment	4 human cases laboratory confirmed	1	4	4	0
Clostridium perfringens	Not Available	2018/3560	General	Bovine meat and products thereof	Beef carvery	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Storage time/temperature abuse	2 human cases laboratory confirmed.	1	11	0	0

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Clostridium perfringens	Not Available	2018/3574	General	Bovine meat and products thereof	Roast beef	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Storage time/temperature abuse;Inadequate heat treatment	7 human cases laboratory confirmed.	1	12	0	0
		2018/3579	General	Unknown	No food identified	Descriptive epidemiological evidence	Take-away or fast-food outlet	Not Available	Unknown	Storage time/temperature abuse;Other contributory factor;Infected food handler;Cross-contamination	6 human cases laboratory confirmed. CLP.135	1	21	0	0
Listeria monocytogenes	Not Available	2018/3601	General	Unknown	No identified food	Descriptive epidemiological evidence	Multiple places of exposure in one country	Not Available	Unknown	Unknown	5 human cases laboratory confirmed. LINKED BY WHOLE GENOME SEQUENCING CC220/1.1.1.1.9.9.%	1	5	5	4
Norovirus	Adenoviridae	2018/3585	General	Unknown	No identified food	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unprocessed contaminated ingredient;Other contributory factor;Cross-contamination	7 human cases laboratory confirmed. Other contributory factor infected food handler	1	50	0	0
	Not Available	2018-3-6	General	Unknown	No identified food	Descriptive epidemiological evidence	Temporary mass catering (fairs or festivals)	Not Available	Unknown	Other contributory factor	4 human cases laboratory confirmed. Multiple modes of transmission including foodborne and person to person	1	60	0	0
		2018/3540	General	Crustaceans, shellfish, molluscs and products thereof	Oysters	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	United Kingdom	Unprocessed contaminated ingredient	9 human cases laboratory confirmed.	1	47	0	0

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Norovirus	Not Available	2018/3544	General	Mixed food	Sandwiches	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Other contributory factor;Cross-contamination	3 human cases laboratory confirmed. Other contributory factor person to person transmission	1	49	0	0
		2018/3546	General	Unknown	No identified food	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	7 human cases laboratory confirmed	1	9	0	0
		2018/3548	General	Unknown	No identified food	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	4 human cases laboratory confirmed.	1	30	0	0
		2018/3558	General	Mixed food	Lamb, vegetables and fruit	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	1 human case laboratory confirmed. Possible contamination of all food items rather than an individual food item	1	15	0	0
		2018/3564	General	Mixed food	Cheese burger and chips	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	N_A	1	42	0	0
		2018/3584	General	Crustaceans, shellfish, molluscs and products thereof	Raw oysters	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	United Kingdom	Unprocessed contaminated ingredient	1 human case laboratory confirmed.	1	3	0	0
Salmonella Bovismorbificans	Not Available	2018/3561* 2018-4-2	General	Other or mixed red meat and products thereof	Mixed red meat	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Other contributory factor;Cross-contamination	8 human cases laboratory confirmed. Contributory factors: Positive environmental isolates - thought due to cross contamination from carvery ovens. LINKED BY WHOLE GENOME SEQUENCING - 5 SNP address designation 4.6.7.71.90.175.%	1	8	1	0

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Salmonella Stanley	Not Available	2018/3555	General	Unknown	No food identified	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	3 human cases laboratory confirmed - LINKED BY WHOLE GENOME SEQUENCING - 5-SNP 3.28.410.497.579.619.%	1	3	0	0
Salmonella Typhimurium	Not Available	2018/3573	General	Unknown	No identified food	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	3 human cases laboratory confirmed	1	3	0	0
Salmonella Typhimurium, monophasic	Not Available	2018/3591	General	Pig meat and products thereof	Pork tapas	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Inadequate heat treatment;Cross-contamination	15 human cases laboratory confirmed - LINKED BY WHOLE GENOME SEQUENCING - 5-SNP designation 1.1.1.124.464.465.%	1	31	1	0
Scrombotoxin	Not Available	2018/3538	General	Fish and fish products	Tuna fish steaks	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Other contributory factor	Suspected scrombotoxin	1	5	3	0
Unknown	Not Available	2018/3509	General	Bovine meat and products thereof	Beef	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	N_A	1	19	0	0
		2018/3513	General	Unknown	No identified food	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	Suspected norovirus	1	20	1	0
		2018/3515	General	Mixed food	Chilli con carne and boiled rice	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	N_A	1	25	0	0

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Unknown	Not Available	2018/3557	General	Turkey meat and products thereof	Turkey carvery	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	United Kingdom	Unknown	N_A	1	5	0	0
		2018/3562	General	Fish and fish products	Tuna	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Storage time/temperature abuse;Other contributory factor	Suspected scrombotoxin	1	3	0	0
		2018/3563	General	Other or mixed red meat and products thereof	Venison loin and peppered smoked venison sauce	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	Suspected toxin	1	9	0	0
		2018/3570	General	Mixed food	Potable water, barbeque beef, chicken and pork	Descriptive epidemiological evidence;Analytical epidemiological evidence	Others	Not Available	United Kingdom	Untreated drinking water;Storage time/temperature abuse;Inadequate heat treatment;Cross-contamination	Setting: buffet/barbeque at a commercial farm	1	19	0	0
		2018/3589	General	Crustaceans, shellfish, molluscs and products thereof	Oysters and mixed fish grill	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	Suspected norovirus	1	5	0	0

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Unknown	Not Available	2018/3604	General	Crustaceans, shellfish, molluscs and products thereof	Oysters	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unknown	Unknown	Suspected norovirus	1	14	0	0
VTEC O157	Not Available	2018/0000* 2018-4-1	General	Unknown	No identified food	Descriptive epidemiological evidence	Multiple places of exposure in one country	Not Available	Unknown	Unknown	22 human cases laboratory confirmed. PT8 STX1A AND STX2C. 5-SNP address designation 2.8.327.1718.3859.4662.%	1	22	5	0

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

Sampling Stage: Slaughterhouse | Sampling Type: animal sample - caecum | Sampling Context: Monitoring

Sampler: Official sampling | Sampling Strategy: Objective sampling | Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling details:

	AM substance	Ciprofloxacin	Erythromycin	Gentamicin	Nalidixic acid	Streptomycin	Tetracycline
	ECOFF	**0.5**	**4**	**2**	**16**	**4**	**1**
	Lowest limit	**0.12**	**1**	**0.12**	**1**	**0.25**	**0.5**
	Highest limit	**16**	**128**	**16**	**64**	**16**	**64**
	N of tested isolates	**172**	**172**	**172**	**172**	**172**	**172**
MIC	**N of resistant isolates**	**83**	**1**	**2**	**84**	**6**	**112**
<=0.12		75		7			
<=0.25						2	
0.25		10		85			
<=0.5							59
0.5		4		68		16	
<=1			171		2		
1				10		116	1
2					10	24	1
4		8		1	54	8	
8		26	1	1	18	2	
16		37			4		4
>16		12				4	
32							4
64					24		46
>64					60		57

Table Antimicrobial susceptibility testing of Campylobacter jejuni in Turkeys - fattening flocks

Sampling Stage: Slaughterhouse | Sampling Type: animal sample - caecum | Sampling Context: Monitoring

Sampler: Official sampling | Sampling Strategy: Objective sampling | Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling details:

	AM substance	Ciprofloxacin	Erythromycin	Gentamicin	Nalidixic acid	Streptomycin	Tetracycline
	ECOFF	**0.5**	**4**	**2**	**16**	**4**	**1**
	Lowest limit	**0.12**	**1**	**0.12**	**1**	**0.25**	**0.5**
	Highest limit	**16**	**128**	**16**	**64**	**16**	**64**
	N of tested isolates	**174**	**174**	**174**	**174**	**174**	**174**
MIC	**N of resistant isolates**	**54**	**1**	**0**	**55**	**3**	**78**
<=0.12		92		13			
0.25		20		68			
<=0.5							94
0.5		8		71		24	
<=1			170				
1				21		103	2
2		2	3	1	17	40	
4		1			70	4	
8		23			31		1
16		18			1	1	
>16		10				2	
32					3		15
64					8		12
>64					44		50
128			1				

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella 1,13,23:i:- in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**9**	**0**	**0**	**0**	**5**	**1**	**0**	**0**	**1**
<=0.03										57					
0.03							49								
0.064							2			3					
<=0.25				60										7	42
<=0.5					56				58						
0.5							9							45	16
<=1	43							20							
1					4				2					8	1
<=2													60		
2	16							40							
<=4											49				
4			6												
<=8						40									
8			54								2				
16						20					4	1			
32											5	14			
>32															1
64												33			
>64	1														

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**9**	**0**	**0**	**0**	**5**	**1**	**0**	**0**	**1**
128												11			
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella 1,13,23:i:- in Gallus gallus (fowl) - laying hens

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
<=0.03										4					
0.03							3								
0.064										1					
<=0.25				5											2
<=0.5					5				5						
0.5							2							3	3
<=1		5						5							
1														2	
<=2													5		
<=4											3				
4			2												
<=8						5									
8			3												
16											1	4			
32											1	1			

Table Antimicrobial susceptibility testing of Salmonella 1,13,23:i:- in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										6					
0.03							5								
0.064							1								
<=0.25				6											
<=0.5					6				6						
0.5														6	6
<=1		1						4							
<=2													5		
2		5						2							
<=4											5				
4													1		
<=8						3									
8			6								1				
16						3									
32												5			
64												1			

Table Antimicrobial susceptibility testing of Salmonella 1,4,5,12:i:- in Gallus gallus (fowl) - laying hens

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1								1							
<=4											1				
<=8						1									
8			1												
64		1											1		
1024												1			

Table Antimicrobial susceptibility testing of Salmonella 13,23:i:- in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0.03							1								
0.064										1					
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
64												1			

Table Antimicrobial susceptibility testing of Salmonella 4,12:z:- in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							2								
<=0.03										4					
0.03							2								
<=0.25				4										2	3
<=0.5					4				4						
0.5														2	1
<=1		4													
<=2													4		
2								4							
<=4											4				
4			2												
<=8						4									
8			2												
32												4			

Table Antimicrobial susceptibility testing of Salmonella 6,7:e,h:- in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										2					
0.03							1								
<=0.25				2											1
<=0.5					2				2						
0.5														2	1
<=1		1						1							
<=2													2		
2		1						1							
<=4											2				
4			1												
<=8						2									
8			1												
32												1			
64												1			

Table Antimicrobial susceptibility testing of Salmonella 6,7:z10:- in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1										1	
<=0.5					1										
0.5															1
<=1		1													
1									1						
<=2													1		
2								1							
<=4											1				
<=8						1									
8			1												
32												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										2					
0.03							2								
<=0.25				2											2
<=0.5					2				2						
0.5														2	
<=1		2						2							
<=2													2		
<=4											2				
4			2												
<=8						2						1			
16												1			

Table Antimicrobial susceptibility testing of Salmonella Agona in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
<=0.015							1								
<=0.03										5					
0.03							3								
0.064							1								
<=0.25				5											3
<=0.5					5				5						
0.5														3	2
<=1		2													
1														2	
<=2													3		
2		2						5							
<=4											3				
4													2		
<=8						5						1			
8			4								2				
16			1												
32												3			
64		1													
1024												1			

Table Antimicrobial susceptibility testing of Salmonella Albert in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1													
<=2													1		
2								1							
<=4											1				
<=8						1									
8			1												
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							2								
0.064										1					
<=0.25				2											2
<=0.5					2				2						
0.5														2	
<=1		2						2							
<=2													2		
<=4											2				
<=8						2									
8			2												
32												2			

Table Antimicrobial susceptibility testing of Salmonella Anatum in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**
<=0.03										1					
0.064							1								
<=0.25				1										1	1
<=0.5					1										
2								1							
<=4											1				
4			1												
<=8						1									
16												1			
32									1						
64		1											1		

Table Antimicrobial susceptibility testing of Salmonella Bovismorbificans in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1										1	1
<=0.5					1				1						
<=2													1		
2		1						1							
<=4											1				
<=8						1									
8			1												
32												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											
<=0.5					1				1						
0.5														1	1
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
32												1			

Table Antimicrobial susceptibility testing of Salmonella Derby in Meat from turkey - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.015							1								
<=0.03										2					
0.03							1								
<=0.25				2											2
<=0.5					2				2						
0.5														1	
<=1		2													
1														1	
<=2													1		
2								2							
<=4											2				
<=8						2									
8			2												
16												1			
>64													1		
>1024												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
0.03							1								
0.064										1					
<=0.25				1											1
<=0.5					1				1						
0.5														1	
2								1							
<=8						1									
8			1								1				
>64		1											1		
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella Derby in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**
MIC	**N of resistant isolates**	**4**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**121**	**121**	**0**	**3**
<=0.015							14								
<=0.03										142					
0.03							125								
0.064							3			1					
<=0.25				143										24	87
0.25							1								
<=0.5					142				133						
0.5														98	51
<=1		123						59							
1					1				9					21	2
<=2													22		
2		15						84							
<=4											137				
4		1	3												
<=8						141						3			
8			138						1		5				
16			2			2						14			
32												4			2
>32															1
64		3										1	116		
>64		1											5		
128											1				

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**	**143**
MIC	**N of resistant isolates**	**4**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**121**	**121**	**0**	**3**
1024												116			
>1024												5			

Table Antimicrobial susceptibility testing of Salmonella Derby in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										19					
0.03							16								
0.064							2								
<=0.25				19										6	3
<=0.5					19				18						
0.5														12	16
<=1		8						5							
1									1					1	
<=2													18		
2		11						14							
<=4											17				
4													1		
<=8						18									
8			17								2				
16			2			1						4			
32												8			
64												6			
128												1			

Table Antimicrobial susceptibility testing of Salmonella enterica, subspecies diarizonae in Gallus gallus (fowl) - laying hens

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										3					
0.03							2								
<=0.25				3										3	
<=0.5					3				3						
0.5															3
<=1		2													
<=2													3		
2		1						1							
<=4											3				
4			2					1							
<=8						3									
8			1					1							
32												2			
64												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										4					
0.03							3								
<=0.25				4										2	4
<=0.5					4				4						
0.5														2	
<=1		4						1							
<=2													4		
2								3							
<=4											4				
4			4												
<=8						4									
16												1			
32												3			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	6	0.5	2	16	0.064	2	2	0.125	16	56	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1													
<=2													1		
2								1							
<=4											1				
<=8						1									
8			1												
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella I 4,12:d:- in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											1
<=0.5					1				1						
<=1		1													
1														1	
<=2													1		
2								1							
<=4											1				
4			1												
<=8						1									
64												1			

Table Antimicrobial susceptibility testing of Salmonella I 4,12:d:- in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	6	0.5	2	16	0.064	2	2	0.125	16	56	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	4	4	4	4	4	4	4	4	4	4	4	4	4	4
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.015							4								
<=0.03										4					
<=0.25				4											4
<=0.5					4				4						
0.5														4	
<=1	4							2							
<=2													4		
2								2							
<=4											4				
4		2													
<=8						4									
8		2													
16												2			
32												1			
64												1			

Table Antimicrobial susceptibility testing of Salmonella I 6,7:-:1,5 in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										2					
0.03							2								
<=0.25				2											
<=0.5					2				2						
0.5														2	2
<=1		1													
<=2													2		
2		1						2							
<=4											2				
4			2												
<=8						2									
32												1			
64												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
<=1		1						1							
1														1	
<=2													1		
<=4											1				
<=8						1									
8			1												
32												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										2					
0.03							2								
<=0.25				2											1
<=0.5					2				2						
0.5														2	1
<=1		1						2							
<=2													2		
2		1													
<=4											2				
<=8						2									
8			2												
32												2			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1										1	1
<=0.5					1				1						
<=1		1													
<=2													1		
2								1							
<=4											1				
4			1												
<=8						1						1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Indiana in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							14								
<=0.03										30					
0.03							21								
0.064										5					
<=0.25				35										10	20
<=0.5					35				35						
0.5														24	15
<=1		33						11							
1														1	
<=2													35		
2		1						24							
<=4											35				
4		1	30												
<=8						35									
8			5												
16												6			
32												28			
64												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**18**	**18**	**18**	**18**	**18**	**18**	**18**	**18**	**18**	**18**	**18**	**18**	**18**	**18**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**
<=0.03										17					
0.03							18								
0.064										1					
<=0.25				18										8	5
<=0.5					18				17						
0.5														10	10
<=1		11						5							
1									1						
<=2													18		
2		6						13							
<=4											18				
4		1	5												
<=8						18									
8			13												
16												2			
32												12			
>32															3
64												1			
>1024												3			

Table Antimicrobial susceptibility testing of Salmonella Kedougou in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										3					
0.03							3								
<=0.25				3											3
<=0.5					3				3						
0.5														3	
<=1		3													
<=2													3		
2								3							
<=4											3				
4			3												
<=8						3									
16												1			
32												2			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	6	0.5	2	16	0.064	2	2	0.125	16	56	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
32												1			

Table Antimicrobial susceptibility testing of Salmonella Kedougou in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**
<=0.03										2					
0.03							2								
<=0.25				2											
<=0.5					2				2						
0.5														1	1
<=1								1							
1														1	
<=2													2		
2		2						1							
<=4											2				
<=8						2									
8			2												
>32															1
64												1			
>1024												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	6	0.5	2	16	0.064	2	2	0.125	16	56	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.03										2					
0.03							2								
<=0.25				2											1
<=0.5					2				1						
0.5														2	1
<=1		2						2							
1									1						
<=2													2		
<=4											2				
4			2												
<=8						2									
32												1			
64												1			

Table Antimicrobial susceptibility testing of Salmonella Kingston in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										2					
0.03							2								
<=0.25				2										2	2
<=0.5					2				2						
<=1		2						2							
<=2			1										2		
<=4											2				
4			1												
<=8						2									
16												1			
32												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											
<=0.5					1				1						
0.5														1	1
<=1								1							
<=2													1		
2		1													
<=4											1				
4			1												
<=8						1									
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1								1							
<=4											1				
4			1												
<=8						1						1			
>64		1											1		

Table Antimicrobial susceptibility testing of Salmonella Kottbus in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1										1	1
<=0.5					1				1						
<=1		1													
<=2													1		
2								1							
<=4											1				
<=8						1									
8			1												
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	6	0.5	2	16	0.064	2	2	0.125	16	56	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.015							1								
<=0.03										2					
0.03							1								
<=0.25				2											
<=0.5					2				2						
0.5														2	2
<=2													2		
2		2						2							
<=4											1				
<=8						2						1			
8			2								1				
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**54**	**54**	**54**	**54**	**54**	**54**	**54**	**54**	**54**	**54**	**54**	**54**	**54**	**54**
MIC	**N of resistant isolates**	**2**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							12								
<=0.03										53					
0.03							40								
0.064							1			1					
0.12							1								
<=0.25				51										22	43
<=0.5					51				50						
0.5				3										26	10
<=1		32						33							
1					3				3					6	1
<=2													52		
2		18						21	1						
<=4											52				
4		2	2										2		
<=8						50						3			
8			50								2				
16			2			4						1			
32												26			
64												24			
>64		2													

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							3								
<=0.03										3					
<=0.25				3										1	2
<=0.5					3				3						
0.5														2	1
<=1		3						3							
<=2													3		
<=4											3				
<=8						3									
8			3												
32												3			

Table Antimicrobial susceptibility testing of Salmonella Mbandaka in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										3					
0.03							3								
0.064										1					
<=0.25				4											3
<=0.5					4				4						
0.5														4	1
<=1		3						1							
<=2													4		
2		1						3							
<=4											4				
4			1												
<=8						4									
8			3												
32												2			
64												2			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										8					
0.03							7								
<=0.25				8										2	7
<=0.5					8				6						
0.5														6	1
<=1		8						6							
1									1						
<=2													8		
2								2	1						
<=4											6				
<=8						7						2			
8			8								2				
16						1						1			
32												5			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
0.064										1					
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
32												1			

Table Antimicrobial susceptibility testing of Salmonella Montevideo in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										11					
0.03							14								
0.064										3					
<=0.25				14											10
<=0.5					14				13						
0.5														12	4
<=1		10						10							
1														2	
<=2													14		
2		4						4	1						
<=4											14				
<=8						14									
8			12												
16			2												
32												13			
64												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1										1	
<=0.5					1				1						
0.5															1
<=1								1							
<=2													1		
2		1													
<=4											1				
4			1												
<=8						1									
32												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							2								
<=0.03										3					
0.03							1								
<=0.25				3										2	3
<=0.5					3				3						
0.5														1	
<=1		2						2							
<=2													3		
2		1						1							
<=4											3				
4			3												
<=8						3									
16												3			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											
<=0.5					1				1						
0.5														1	1
<=1		1													
<=2													1		
2								1							
<=4											1				
4			1												
<=8						1									
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**5**	**0**	**2**
<=0.015							2								
<=0.03										7					
0.03							5								
<=0.25				7										2	5
<=0.5					7				7						
0.5														4	
<=1		7						3							
1														1	
<=2													2		
2								4							
<=4											7				
4			5												
<=8						7									
8			2												
32												2			
>32															2
64													1		
>64													4		
>1024												5			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	6	0.5	2	16	0.064	2	2	0.125	16	56	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	4	4	4	4	4	4	4	4	4	4	4	4	4	4
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.015							4								
<=0.03										4					
<=0.25				4										3	4
<=0.5					4				2						
<=1		4						2							
1									2					1	
<=2													4		
2								2							
<=4											3				
4			4												
<=8						4									
8											1				
16												3			
32												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
<=8						1						1			
8			1												

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**2**
<=0.015							2								
<=0.03										2					
<=0.25				2											
<=0.5					2				2						
<=1								2							
1														2	
<=4											2				
<=8						2									
8			2												
32															2
64		2											2		
1024												2			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	6	0.5	2	16	0.064	2	2	0.125	16	56	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.03										1					
0.03							2								
0.064										1					
<=0.25				2											
<=0.5					1				2						
0.5														2	2
<=1								1							
1					1										
<=2													2		
2		2						1							
<=8						1									
8			2								2				
16						1									
64												2			

Table Antimicrobial susceptibility testing of Salmonella Senftenberg in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**
<=0.03										6					
<=0.25				6										1	
0.25							2								
<=0.5					6				6						
0.5							4							5	5
<=1		5						3							
1															1
<=2													6		
2		1						3							
4			5												
<=8						6									
8			1												
16												6			
128											6				

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							3								
<=0.03										7					
0.03							4								
<=0.25				7										2	3
<=0.5					7				6						
0.5														5	4
<=1		6						6							
1									1						
<=2													7		
2		1						1							
<=4											7				
4			5												
<=8						7									
8			2												
16												3			
32												3			
64												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											
<=0.5					1				1						
0.5														1	1
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella spp., unspecified in Meat from turkey - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1													
2								1							
<=4											1				
<=8						1									
8			1												
>64													1		
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella spp., unspecified in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
<=0.25				1											1
<=0.5					1				1						
0.5							1							1	
<=1		1						1							
<=2													1		
4			1												
<=8						1									
16											1				
32												1			

Table Antimicrobial susceptibility testing of Salmonella spp., unspecified in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											
<=0.5					1				1						
0.5														1	1
<=1		1						1							
<=4											1				
<=8						1									
8			1												
64													1		
1024												1			

Table Antimicrobial susceptibility testing of Salmonella spp., unspecified in Gallus gallus (fowl) - laying hens

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	6	0.5	2	16	0.064	2	2	0.125	16	56	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	5	5	5	5	5	5	5	5	5	5	5	5	5	5
MIC	N of resistant isolates	2	0	0	0	1	0	0	1	0	0	1	1	0	1
<=0.015							1								
<=0.03										4					
0.03							4								
0.064										1					
<=0.25				5											3
<=0.5					5				4						
0.5														5	1
<=1	2							4							
<=2													4		
2	1							1							
<=4											4				
4		1													
<=8						4									
8		4									1				
16									1						
32												4			
>32															1
>64	2												1		
>128						1									
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella Stanley in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							7								
<=0.03										7					
<=0.25				7											4
<=0.5					6				7						
0.5														5	3
<=1		7													
1					1									2	
<=2													7		
2								7							
<=4											7				
4			7												
<=8						7									
32												6			
128												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
64												1			

Table Antimicrobial susceptibility testing of Salmonella Tennessee in Meat from broilers (Gallus gallus) - carcase - chilled

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Monitoring

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1											
<=0.5					1				1						
0.5														1	1
<=1		1													
<=2													1		
2								1							
<=4											1				
4			1												
<=8						1									
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
MIC	**N of resistant isolates**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**5**	**5**	**0**	**0**
<=0.015							3								
<=0.03										5					
<=0.25				5											5
0.25							2								
<=0.5					5				5						
0.5														3	
<=1		3						5							
1														2	
<=4											3				
4			5												
<=8						5									
8											2				
64		2											5		
1024												5			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										3					
0.03							3								
<=0.25				3											2
<=0.5					3				1						
0.5														3	1
<=1		2						3							
1									2						
<=2													3		
2		1													
<=4											3				
4			3												
<=8						3						2			
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**2**	**0**	**0**
<=0.03										1					
0.03							3								
0.064										2					
<=0.25				3											3
<=0.5					3				3						
0.5														3	
<=1								3							
<=2													1		
<=4											3				
4			3												
<=8						3									
>64		3											2		
>1024												3			

Table Antimicrobial susceptibility testing of Salmonella Wangata in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**56**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1										1	1
<=0.5					1				1						
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1						1			

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh - chilled

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
N of tested isolates	42	42	42	42	42	42	42	42	42	42	42	42
MIC **N of resistant isolates**	38	42	16	16	19	42	16	16	0	0	0	0
<=0.015									23			
<=0.03											41	
0.03									14			
<=0.064	2		24									
0.064									5		1	
<=0.12							16	1		12		
0.12	2											
0.25	10		2				7	1		23		
0.5	3							1		7		
1						7						
2	3			1		16		1				

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**		**Not Available**	**Not Available**	**Not Available**	**Not Available**
	Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.064**	**0.5**	**0.25**	**0.12**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**64**	**128**	**128**	**128**	**2**	**16**	**16**	**64**
	N of tested isolates	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**
MIC	**N of resistant isolates**	**38**	**42**	**16**	**16**	**19**	**42**	**16**	**16**	**0**	**0**	**0**	**0**
4		6	4		6	18	2		4				24
8		14	7		8	5	6		8				15
16		2	7		1	2	9		3				2
32			10			6	2						1
64			11			10							
>64			3			1							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh - chilled

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**
MIC	**N of resistant isolates**	**42**	**0**	**42**	**41**	**2**	**17**	**0**	**3**	**0**	**16**	**30**	**27**	**0**	**8**
<=0.015							17								
<=0.03										41					
0.03							8								
0.064										1					
0.12							7								
<=0.25														12	17
0.25							3								
<=0.5					1				18						
0.5							3							26	13
<=1								42							
1					6		1		19					4	3
<=2			4										14		
2				1	17				2						1
<=4											26				
4			30	2	1								1		
>4				39											
<=8						38						7			
8			8		7										
>8					10		3								
16						2						4			
32									3		1	1			

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**
MIC	**N of resistant isolates**	**42**	**0**	**42**	**41**	**2**	**17**	**0**	**3**	**0**	**16**	**30**	**27**	**0**	**8**
>32															8
64		2									4		11		
>64		40											16		
128											4				
>128						2					7				
1024												1			
>1024												29			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON pnl2

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
Cefotaxime synergy test	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**		**Not Available**	**Not Available**	**Not Available**	**Not Available**
Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
ECOFF	**0.125**	**0.25**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
Lowest limit	**0.064**	**0.25**	**0.064**	**0.064**	**0.5**	**0.25**	**0.12**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
Highest limit	**32**	**64**	**64**	**64**	**64**	**128**	**128**	**128**	**2**	**16**	**16**	**64**
N of tested isolates	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
MIC **N of resistant isolates**	**2**	**4**	**2**	**2**	**2**	**4**	**2**	**2**	**0**	**0**	**0**	**0**
<=0.015									3			
<=0.03											4	
0.03									1			
<=0.064	1		2									
<=0.12							2			1		
0.12	1											
0.25										2		
0.5										1		
1				1		2						
2	1	1										
4	1			1	2	1		1				1
8		1						1				3
16		2				1						
32					2							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**
MIC	**N of resistant isolates**	**85**	**0**	**4**	**4**	**5**	**29**	**0**	**19**	**0**	**27**	**74**	**49**	**0**	**50**
<=0.015							116								
<=0.03										182					
0.03							38								
0.064										1					
0.12							2								
<=0.25				179										81	89
0.25							15								
<=0.5					179				109						
0.5							4							78	42
<=1	3							182							
1					2		6		53					24	2
<=2		14											128		
2	40		1				1	1	2						
<=4											153				
4	51	96		1					1				6		
>4			3												
<=8						172						77			
8	4	64		1		1					1				
16		9			6				12		2	23			
32					2				5			9			
>32									1						50

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**
MIC	**N of resistant isolates**	**85**	**0**	**4**	**4**	**5**	**29**	**0**	**19**	**0**	**27**	**74**	**49**	**0**	**50**
64											2		24		
>64		85											25		
128											14				
>128						3					11				
512												2			
1024												1			
>1024												71			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	31	31	31	31	31	31	31	31	31	31	31	31
MIC	N of resistant isolates	22	31	19	19	19	31	19	19	0	0	0	0
<=0.015										17			
<=0.03												29	
0.03										13			
<=0.064		2		11									
0.064										1		2	
<=0.12								8			9		
0.12		7		1									
0.25		8						3	1		19		
0.5		2									3		
1					2		2						
2			3		2		7		1				
4		7	4		9	7	4		8				12
8		5	9		5	5	8		7				19
16			5		1	2	9		2				

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	31	31	31	31	31	31	31	31	31	31	31	31
MIC	N of resistant isolates	22	31	19	19	19	31	19	19	0	0	0	0
32			2			6	1		1				
64			7			10							
>64			1			1							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**
MIC	**N of resistant isolates**	**31**	**0**	**31**	**31**	**0**	**5**	**0**	**2**	**0**	**5**	**16**	**14**	**0**	**3**
<=0.015							15								
<=0.03										31					
0.03							11								
<=0.25														20	19
0.25							2								
<=0.5									16						
0.5							1							11	9
<=1								30							
1					4				12						
<=2			1										16		
2				2	6		1	1	1						
<=4											26				
4			21	7	5								1		
>4				22											
<=8						30						10			
8			8		9										
>8					7		1								
16			1			1			1			2			
32									1			3			
>32															3
64		4											12		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**
MIC	**N of resistant isolates**	**31**	**0**	**31**	**31**	**0**	**5**	**0**	**2**	**0**	**5**	**16**	**14**	**0**	**3**
>64		27											2		
128											3				
>128											2				
>1024												16			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Turkeys - fattening flocks

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**
MIC	**N of resistant isolates**	**99**	**0**	**0**	**0**	**7**	**19**	**0**	**1**	**0**	**11**	**31**	**81**	**0**	**24**
<=0.015							106								
<=0.03										175					
0.03							50								
0.12							3								
<=0.25				175										94	111
0.25							10								
<=0.5					175				105						
0.5							1							60	39
<=1		3						175							
1							1		61					21	1
<=2			21										85		
2		26							8						
<=4											159				
4		45	87										9		
<=8						160						83			
8		2	65				3				4				
>8							1								
16			2			8					1	53			
32						2			1		1	7	2		
>32															24
64		1										1	31		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**
MIC	**N of resistant isolates**	**99**	**0**	**0**	**0**	**7**	**19**	**0**	**1**	**0**	**11**	**31**	**81**	**0**	**24**
>64		98											48		
128						2					4				
>128						3					6				
>1024												31			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Turkeys - fattening flocks

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	14	14	14	14	14	14	14	14	14	14	14	14
MIC	N of resistant isolates	9	14	5	5	4	11	5	5	0	0	0	0
<=0.015										13			
<=0.03												14	
0.03										1			
<=0.064		2		6									
<=0.12								3	2		6		
0.12		3		3									
0.25								2	2		6		
0.5							3				2		
1			3		5		3						
2		1	2			2	2		4				1
4		5				5	5		1				4
8		3	2			3							6
16			2			3	1						3
32			1			1							

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	14	14	14	14	14	14	14	14	14	14	14	14
MIC	N of resistant isolates	9	14	5	5	4	11	5	5	0	0	0	0
64			3										
>64			1										

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Turkeys - fattening flocks

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method:

Country of Origin: United Kingdom

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**
MIC	**N of resistant isolates**	**14**	**0**	**14**	**12**	**0**	**4**	**0**	**0**	**0**	**3**	**9**	**4**	**0**	**6**
<=0.015							8								
<=0.03										14					
0.03							2								
<=0.25														9	5
<=0.5					2				10						
0.5							1							2	3
<=1								14							
1				5	5				3					3	
<=2			1										10		
2					4				1						
<=4											9				
4			6		2										
>4				9											
<=8						14						1			
8			7		1		1				2				
>8							2								
16												3			
32												1			
>32															6
64													3		
>64		14											1		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**6**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**
MIC	**N of resistant isolates**	**14**	**0**	**14**	**12**	**0**	**4**	**0**	**0**	**0**	**3**	**9**	**4**	**0**	**6**
>128											3				
>1024												9			

OTHER ANTIMICROBIAL RESISTANCE TABLES

Specific monitoring of ESBL-/AmpC-/carbapenemase-producing bacteria and specific monitoring of carbapenemase-producing bacteria, in the absence of isolate detected

Programme Code	Matrix Detailed	Zoonotic Agent Detailed	Sampling Strategy	Sampling Stage	Sampling Details	Sampling Context	Sampler	Sample Type	Sampling Unit Type	Sample Origin	Comment	Total Units Tested	Total Units Positive
CARBAMON	Gallus gallus (fowl) - broilers	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring	Official sampling	animal sample - caecum	slaughter animal batch	United Kingdom	N_A	302	0
	Meat from broilers (Gallus gallus) - fresh	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring	Official sampling	food sample - meat	batch (food/feed)	United Kingdom	N_A	309	0
	Turkeys - fattening flocks	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring	Official sampling	animal sample - caecum	slaughter animal batch	United Kingdom	N_A	373	0

Specific monitoring of ESBL-/AmpC-/carbapenemase-producing bacteria and specific monitoring of carbapenemase-producing bacteria, in the absence of isolate detected

Latest Transmission set

Table Name	Last submitted dataset transmission date
Antimicrobial Resistance	24-Jul-2019
Esbl	24-Jul-2019
Animal Population	12-Sep-2019
Disease Status	26-Jul-2019
Food Borne Outbreaks	24-Jul-2019
Prevalence	12-Sep-2019

UK text to accompany 2018 Trends and Sources data reported to EFSA

Table of contents

1. Institutions and Laboratories involved in zoonoses monitoring and reporting

The National Reference Laboratories (NRLs) within the UK are divided into:

NRLs for feed and food (UK Competent Authorities are FSA, FSS and Defra)

NRLS for animal health and live animals (UK Competent Authority is Defra)

Institutions and Laboratories involved in zoonoses monitoring and reporting:

Agri Food and Biosciences Institute

Agriculture, Food and Environmental Science Division, Shellfish Toxin Unit – Stormont, Newforge Lane, Belfast, BT4 3SD
www.afbini.gov.uk

Agri Food and Biosciences Institute

Veterinary Sciences Division, Stoney Road, Stormont, Belfast, BT4 3SD

www.afbini.gov.uk

Animal and Plant Health Agency (APHA)

New Haw, Addlestone, Surrey, KT15 3NB

https://www.gov.uk/government/organisations/animal-and-plant-health-agency

Animal and Plant Health Agency (APHA) (for *Trichinella* and *Echinococcus*)

Sand Hutton, York, YO41 1LZ

https://www.gov.uk/government/organisations/animal-and-plant-health-agency

Association of Public Analysts

c/o Aberdeen Scientific Services Laboratory, Old Aberdeen House, Dunbar Street, Aberdeen, AB24 3UJ

http://www.publicanalyst.com/about_us/the_laboratories/

Brucella reference unit (BRU)

Royal Liverpool and Broadgreen University Hospital, Prescott Street, Liverpool, L9 8XP

https://www.gov.uk/government/collections/brucella-reference-unit-bru

Centre for Environment, Fisheries and Aquaculture Science (CEFAS)
Barrack Road, The Nothe, Weymouth, DT4 8UB
www.cefas.defra.gov.uk/nrl.aspx

Chartered Institute of Environmental Health

Chadwick Court, 15 Hatfields, London, SE1 8DJ

Cryptosporidium Reference Unit (PHE Collaborating Laboratory) (for *Cryptosporidium* and *Giardia*)

Public Health Wales, Microbiology Swansea, Singleton Hospital, Swansea, SA2 8QA

www.wales.nhs.uk/sites3/page.cfm?orgId=457&pid=25284

https://www.gov.uk/guidance/cryptosporidium-reference-unit-cru

Department of Agriculture, Environment and Rural Affairs (Northern Ireland) (DAERA)

Ballykelly House, 111 Ballykelly Road, Ballykelly, Limavady, BT49 9HP

www.daera-ni.gov.uk

Department for Environment, Food and Rural Affairs (Defra)

Area 2B, Nobel House, 17 Smith Square, London, SW1P 3JR

https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs

Department of Health and Social Care (DHSC)

Richmond House, 79 Whitehall, London, SW1A 2NS

www.dh.gov.uk

Department of Health (Northern Ireland)

Castle Buildings, Stormont, Belfast, BT4 3SJ

www.health-ni.gov.uk

Food and Environment Research Agency (FERA)
Sand Hutton, York, YO41 1LZ
http://fera.co.uk/

Food Standards Agency (FSA)

Clive House, 70 Petty France, London, SW1H 9EX
www.food.gov.uk

Food Standards Scotland (FSS)

4th floor, Pilgrim House, Aberdeen, AB11 5RL

http://www.foodstandards.gov.scot/

Health Protection Scotland (HPS)

Meridian Court, 5 Cadogan Street, Glasgow, G2 6QE

www.hps.scot.nhs.uk

Hospital for Tropical Diseases (for *Echinococcus*,*Cyclospora* and other parasites)

2nd Floor Mortimer Market Centre, Mortimer Market, London, WC1E 6JB

https://www.lshtm.ac.uk/research/faculties/itd/teaching-and-diagnostic-unit/diagnostic-parasitology-laboratory

National Lyme Disease Testing Service (Scotland)

Microbiology department, Raigmore Hospital, Inverness, IV2 3UJ

http://www.hps.scot.nhs.uk/reflab/STRL.aspx

Public Health Agency (Northern Ireland)

Linenhall Street Unit, 12-22 Linenhall Street, Belfast, BT2 8BS

www.publichealth.hscni.net/

Public Health England (PHE)

PHE Colindale, 61 Colindale Avenue, London, NW9 5EQ

www.phe.gov.uk

Specialist and reference laboratory: laboratory tests and services
https://www.gov.uk/guidance/specialist-and-reference-microbiology-laboratory-tests-and-services

Public Health Wales (PHW)

Communicable Disease Surveillance Centre, Health Protection Division, Tyndall Street, Cardiff, CF10 4BZ

http://www.wales.nhs.uk/sitesplus/888/page/43899/

Rare and Imported Pathogens Laboratory (RIPL) (for Lyme borreliosis, Leptospirosis, Q fever, Anthrax, arthropod-borne diseases and imported fevers)

Public Health England Porton Down, Salisbury, Wiltshire, SP4 0JG

https://www.gov.uk/government/collections/rare-and-imported-pathogens-laboratory-ripl

Royal Environmental Health Institute of Scotland

19 Torphichen Street, Edinburgh, EH3 8HX

Scotland's Rural College

West Mains Road, Edinburgh, EH9 3JG

http://www.sruc.ac.uk/

SRUC Veterinary Services

Pentlands Science Park

Penicuik EH26 0PZ

https://www.sruc.ac.uk/info/120107/veterinary_services

Scottish *E. coli* O157/STEC Reference Laboratory (SERL)

Department of Laboratory Medicine, Royal Infirmary of Edinburgh, Edinburgh, EH16 4SA

http://www.hps.scot.nhs.uk/reflab/SERL.aspx

Scottish Government, Rural Directorate

Saughton House, Broom House Drive, Edinburgh, EH11 3XD

www.scotland.gov.uk

Scottish Parasite Diagnostic and Reference Laboratory

House-on-the-Hill, Stobhill Hospital, 133 Balornock Road, Glasgow, G21 3UW

http://www.nhsggc.org.uk/about-us/professional-support-sites/microbiology/scottish-microbiology-reference-laboratories/scottish-parasite-diagnostic-reference-laboratory/

Scottish *Salmonella* Reference Laboratory

North Glasgow University Hospitals NHS Trust, 133 Balornock Road, Glasgow, G21 3UW

http://www.nhsggc.org.uk/about-us/professional-support-sites/microbiology/scottish-microbiology-reference-laboratories/scottish-salmonella-shigella-c-difficile-reference-laboratory/

Scottish Toxoplasma Reference Laboratory

Microbiology department, Raigmore Hospital, Inverness, IV2 3UJ

http://www.hps.scot.nhs.uk/reflab/STRL.aspx

Toxoplasma Reference Unit (PHE Collaborating Laboratory)

Public Health Wales, Microbiology Swansea, Singleton Hospital, Swansea, SA2 8QA

www.wales.nhs.uk/sites3/page.cfm?orgId=457&pid=25359

Welsh Government (WG)

Cathays Park, Cardiff, CF10 3NQ

www.wales.gov.uk

2. Animal population

1. Sources of information and the date(s) (months, years) the information relates to

Animal population data primarily sourced from:

Data for England sourced from the December 2018 England Agricultural Census
Data for Northern Ireland from both the Agriculture Survey for 2018 and from APHIS records (the data was provided by Department of Agriculture, Environment and Rural Affairs Northern Ireland)
Date for Scotland sourced from the December 2018 Scottish Agricultural Census
Date for Wales sourced from the December 2017 Wales Agricultural Census (2018 data not due to be published until September 2019)

Some of the data provided was sourced from UK reports submitted by Defra to the European Commission:
Numbers of cattle and cattle herds from UK TB returns for 2018.
Numbers of sheep and goat holdings and overall number of sheep and goats from UK brucellosis survey return for 2018. (The specific number of sheep [only] in the UK is incorrect and should be 34,781,699).

Chicken and turkey flock numbers have been calculated from data collected as part of the administration of the UK's *Salmonella* national Control Programme (NCP) in 2018 and were previously submitted to the European Commission (*Salmonella* co-financing application).

3. General evaluation: Brucellosis

1. History of the disease and/or infection in the country

Humans: In the UK cases of brucellosis in humans usually occur as a result of infection acquired outside the UK although historically in Northern Ireland infection had been recorded in those whose work may bring them into close contact with infected cattle.

Animals: All livestock in the UK are officially free of infection from *Brucella abortus, Brucella melitensis, Brucella ovis* and *Brucella suis*. All cattle herds within Great Britain achieved Officially Brucellosis Free (OBF) status for *Brucella abortus* on 1 October 1985 and Great Britain achieved regional freedom in 1996, whilst Northern Ireland was granted Officially Free status for *Brucella abortus* on 6th October 2015 (Commission Implementing Decision (EU) 2015/1784). *Brucella melitensis, B. ovis* and *B. suis* have never been recorded in United Kingdom.

2. Evaluation of status, trends and relevance as a source for humans

During the year 2018, there were no cases of brucellosis in cattle in the UK, which has retained its Officially Brucellosis Free Status. No sheep or goat herds were detected positive for *Brucella mellitensis* during the annual sheep and goat survey in 2018. No cases of *B. ovis* and *B. suis* were identified during 2018 in the United Kingdom.
Prevalence table data regarding testing has been amalgamated for two groups: antelope testing is listed as 3 animals but 2 of these were orynx and alpaca test numbers are stated as 467 but 10 of these tests were of vicuna**.**

4. Description of Monitoring/Surveillance/Control programmes system: *Brucella abortus*

1. Monitoring/Surveillance/Control programmes system

Brucellosis is a notifiable disease and there is a statutory surveillance programme for the disease across the UK. In Great Britain, as in previous years, the principle surveillance system in 2018 was quarterly testing of bulk milk samples from dairy herds by the ELISA test, together with the requirement for notification and investigation of abortions or premature calvings and post import testing. Farmers in Great Britain are legally required to notify the Animal and Plant Health Agency (APHA) of any abortions or premature calvings that take place in their herd under Article 10 of the Brucellosis (England) Order 2015 and equivalent legislation in Wales and Scotland. This applies to both dairy and beef herds. Abortions and premature calvings are investigated by a veterinary surgeon in all beef herds and in some dairy herds based on a risk assessment. Samples are taken from aborting animals and those calving prematurely (271 days or less since insemination) and tested both serologically and by culture. If a suspected Brucella organism has been cultured, it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991.

In Northern Ireland the Department of Agriculture, Environment and Rural Affairs (DAERA) carries out a programme of blood testing of all herds containing breeding stock (and milk testing of all dairy herds). Routine brucellosis blood sampling was carried out on beef cattle herds in Northern Ireland on an annual basis until June 2015, when testing frequency was changed to a triennial basis. Dairy herds were routinely blood sampled on a biennial basis until November 2015, when the frequency of testing was decreased to once every five years. Blood samples are also collected from animals presented for slaughter with a priority being given to older cull cows and all non-negative results are followed up as appropriate. Monthly bulk milk ELISA testing continues with non-negative results investigated.

2. Measures in place

Brucella abortus is a notifiable disease. Vaccination of animals is not allowed. If a clinical case is suspected or if a non-negative result is identified via the various surveys the situation will be investigated. Blood, milk, placental material and/ or swabs will be collected and tested as appropriate using serological and bacteriological methods. All methods are conducted in accordance with the requirements of the OIE Manual of Diagnostic Tests and Vaccines and Annex C of European Council Directive 64/432/EEC. The suspect animal or herd will be placed under official restrictions. If a positive case is identified it will be culled and an epidemiological investigation undertaken to identify how the infection came to be present given the UK's OBF status.

Herds giving non-negative results to the milk ELISA test are subjected to follow-up investigations by blood testing individual cattle and also epidemiological investigations to identify animal movement, reproductive history and health. Cattle sera are tested by a serology indirect ELISA and positive

samples are then tested by Complement Fixation Test (CFT). If both tests are positive (CFT equal to or greater than 20 International Units) then herd restrictions are applied. These will stop the movement of animals off the premises, except under the authority of a movement license, are imposed once a reactor is identified (on suspicion). The animal is required to be kept in isolation and retested (by indirect ELISA and CFT) or slaughtered within 21 days. Other animals on the farm can be sent, under license, to a slaughterhouse, but no other movements are permitted until the incident is resolved. Investigations into contact with contiguous herds are undertaken to assess the risk of the infection spreading. Tracing is carried out and animals which have left the infected herd since the last negative herd test are tested. Restrictions are lifted if all tests become negative and there are no epidemiological indicators of infection.

If positive serology persists then the animal is slaughtered and selected lymph nodes are subject to bacterial culture for identification of *Brucella*. Infection is confirmed on culture and isolation of the organism. For confirmed breakdowns a herd slaughter is usually carried out. All contiguous herds are tested as well as herds with cattle movements to and from the affected herd. Before restrictions can be lifted the premises has to be cleansed and disinfected with an approved disinfectant and subjected to veterinary inspection. Animals (reactors, infected and contact) are valued before compulsory slaughter. The amount of compensation paid for reactors and contacts is in accordance with a table of values based on the current average market price for the type of animal. Whenever the Officially Brucellosis Free (OBF) status of a dairy herd is suspended, the Environmental Health Department of the Local Authority is informed so that a heat treatment order may be served to ensure all milk is heat treated before human consumption.

At present in Northern Ireland the Serum Agglutination Test is used in accordance with Annex C of Directive 64/432/EEC as a screening test for low risk tests with the Complement Fixation Test (CFT) and ELISA Test used for confirmation (if any SAT reading greater than or equal to 30iu is detected at this test). Parallel testing with SAT and ELISA is carried out in all high risk tests: if any SAT results are greater than or equal to 30iu or any iELISA results are non-negative, CFT testing may be carried out. Any animal giving an SAT test result of 30iu or more or any CFT reading of greater than 20iu is classified as an inconclusive reactor and is required to be isolated and retested. A risk analysis is carried out and if significant risk factors exist, then an ELISA test is requested on subsequent tests. Where there are no significant risk factors derestriction of the animal's movements within Northern Ireland may occur if the iELISA and CFT results are negative and SAT remains less than 102iu at re-tests. Where there are significant risk factors animals with SAT readings of ≥ 102iu may be taken as reactors, as may animals with CFT readings of ≥ 20iu and those with iELISA positive results.

Abortions are required to be notified and a restriction notice is issued for these animals, prohibiting their movement off the premises and requiring them to be isolated. The animals are tested using SAT, CFT and ELISA tests until a negative test result at 21 days post-calving is obtained.
Herd restrictions are imposed once a reactor is identified. The reactor 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.

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

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

Where the presence of *Brucella abortus* is not confirmed by culture the herd remains restricted until two clear serological herd tests have been completed at 30 and 90 days post slaughter of the reactor.

3. Notification system in place to the national competent authority

Yes: *Brucella abortus* is a notifiable disease and cases of premature calvings and abortions must be notified to the Competent Authority. In addition if a suspected *Brucella* organism has been cultured by

a UK laboratory, it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

No cases of *Brucella abortus* were identified in animals in 2018. In Northern Ireland, the last part of the UK to be recognised as OBF, there have been no confirmed breakdowns since February 2012. Human cases of brucellosis that are diagnosed nowadays in the UK are associated with infection contracted during travel. Historically in Northern Ireland cases of *Brucella abortus* were occasionally acquired by those whose work brought them into close contact with infected cattle.

In the data tables, as Eurostat provides no specific code for Great Britain, the data row marked 'UNITED KINGDOM' is in fact the data for Great Britain. Data for Northern Ireland is detailed specifically in a separate row.

5. Description of Monitoring/Surveillance/Control programmes system: *Brucella melitensis*

1. Monitoring/Surveillance/Control programmes system

Brucellosis is a notifiable disease and there is a statutory surveillance programme for the disease across the UK in sheep and goats. The UK is officially free of ovine and caprine brucellosis. Neither *Brucella melitensis* or *Brucella ovis* have ever been recorded in the UK.

2. Measures in place

Brucellosis in sheep and goats is a notifiable disease under national legislation. Ovine epididymitis caused by *Brucella ovis* is also notifiable. Isolation of the *Brucella* organism in a laboratory must also be reported to the Competent Authority under the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991. A sample of flocks and herds is serologically checked each year using Complement Fixation Tests in the annual Sheep and Goat survey. No sheep or goat herds were detected positive for *Brucella mellitensis* during the annual sheep and goat survey in 2018. In addition, all investigations into sheep and goat abortions from which samples were submitted to Government laboratories for investigation were negative on testing for brucellosis.

3. Notification system in place to the national competent authority

Yes: Brucellosis is notifiable and suspect cases of disease in sheep and goats must be notified to the Competent Authority. This should mean that any disease caused by *Brucella melitensis* in these species in the UK will be identified. In addition if a suspected *Brucella* organism has been cultured by a UK laboratory, it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

No cases of *Brucella melitensis* or *Brucella ovis* were identified in animals in 2018. Human cases of brucellosis that are diagnosed nowadays in the UK are associated with infection contracted during travel.

6. Description of Monitoring/Surveillance/Control programmes system: *Brucella suis*

1. Monitoring/Surveillance/Control programmes system

Brucellosis is a reportable disease in pigs in Great Britain and a notifiable disease in Northern Ireland. The UK is officially free of *Brucella suis*: no cases have ever been recorded in the UK.

2. Measures in place

In Northern Ireland, *Brucella* in pigs is a notifiable disease under national legislation. Across the whole of the UK, investigations are undertaken by official vets if clinical disease is suspected or following non-negative serological test results. Serological testing is carried out for boars intended for use as donors for artificial insemination and for pigs for export according to the importer's requirements. Isolation of the organism in a laboratory must also be reported to the Competent Authority under the Zoonoses Order 1989 and the Zoonoses Order (Northern Ireland) 1991.

3. Notification system in place to the national competent authority

Yes: Brucellosis in swine is a reportable disease in GB. It is a notifiable disease in Northern Ireland, and suspect cases of disease must be notified to the Competent Authority. In addition if a suspected *Brucella* organism has been cultured by a UK laboratory, it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

No cases of *Brucella suis* were identified in pigs in 2018. Human cases of brucellosis that are diagnosed nowadays in the UK are associated with infection contracted during travel.

7. General evaluation: *Mycobacterium bovis*

1. History of the disease and/or infection in the country

National Statistics show that in 2018, the herd incidence of bTB in England decreased (from 11.0 to 9.4 new herd breakdowns per 100 herd-years at risk), and the herd prevalence also declined, although not as markedly (from 6.3% to 6.1% of all registered herds) compared to 2017. The longer-term data indicate that both epidemiological indicators of bTB have levelled off since 2012, reversing the historical increasing trend that began in the late 1980s and early 1990s. This is the case for England as a whole, and critically, for the High Risk Area (HRA), which accounts for the majority of TB breakdowns. As stated above, the disease is not uniformly distributed across the country. In the Low Risk Area (LRA) herd incidence and prevalence remained very low and stable in 2018, despite the fact that the number of TB tests in 2018 was more than double the equivalent figure for 2012 (864,452 *cf*. 325,962) after the introduction of targeted surveillance (radial testing) in 2013. In contrast with the LRA and HRA, the herd incidence and prevalence rose marginally in the Edge Area of England in 2018. In the data tables, as Eurostat provides no specific code for the country of England, the data row marked 'UNITED KINGDOM' is in fact the data for England only. (Data for Northern Ireland and Wales is also detailed specifically in separate rows).

The number of new bovine TB herd breakdowns in Wales peaked during 2008 and 2009. Subsequently, there were substantial decreases in 2010, 2013 and 2016. There was an 11% increase in the number of new herd incidents in 2018. The trajectory over this period is far from

stable, with short-term fluctuations, up and down. It is also important to note that apparent short-term increases in incidence may be at least partly attributable to intensified surveillance.

Scotland has had officially TB free status since 2009. In 2018 there were 36 new herd incidents and 498 animals were slaughtered for bTB disease control purposes.

In Northern Ireland (NI), herd incidence was relatively level from 2007 to 2010 followed by a sustained rise during 2011-2012, peaking at 7.46% in October 2012. Herd incidence then steadily declined to a low of 5.95% in September 2014, followed by another steep rise throughout 2017, to 9.73% in November 2017. Changes in annual animal incidence show a similar trend, steadily increasing during 2011-12 to a high of 0.674% in November 2012, followed by a decrease to a low of 0.502% in March 2014 and then a rise throughout 2015-6. Throughout 2017 animal incidence increased more steeply in line with the sharp rise seen in herd incidence, reaching a peak of 0.920% in November 2017. More recently animal incidence has fallen, reaching 9.22% by the end of 2018.

2. Evaluation of status, trends and relevance as a source for humans

There is a very low risk to human health posed by *M. bovis* in animals in the UK. Control of human TB was one of the great public health success stories of the twentieth century. In the late 19th century TB caused one in five deaths in the UK and even as late as the pre- and post-World War II period there were 50,000 TB notifications in England and Wales. Before World War II, approximately 2,000 children died in the UK every year due to *M. bovis* infection (zoonotic TB). The implementation of universal BCG vaccination of children of school age (replaced in 2005 by more targeted vaccination of certain high-risk groups of children), the gradual adoption of milk pasteurisation and the marked reduction of the prevalence of *M. bovis* infection in the cattle population between 1950 and 1980, contributed to the virtual elimination of the disease as a major public health issue in the UK. Nowadays, approximately 40 new culture-confirmed cases of human *M. bovis* infection are diagnosed each year in the UK (including cases in people who become infected abroad and UK-born elderly persons suffering reactivation of old latent infections contracted during childhood before widespread pasteurisation of the milk supply).
https://www.gov.uk/government/publications/mycobacterium-bovis-mbovis-tuberculosis-annual-data

3. Any recent specific action in the Member State or suggested for the European Union

Key policy developments in England during 2018:

Continued rollout of industry-led licensed badger control across the HRA and in parts of the Edge Area:

- Cull areas 1 and 2 licensed in 2013. Area 3 licensed in 2015. Areas 4 to 10 licensed in 2016. Areas 11 to 21 licensed in 2017 (including one in the Edge) and Areas 22 to 32 in 2018 (including one in the LRA).
- Exceptionally, badger culling was licensed for the first time in the LRA in the autumn of 2018. This was to supplement additional TB control measures in cattle in a defined section of East Cumbria, where endemic *M. bovis* infection was identified in badgers in 2017.
- The outcome of the badger culls completed in 2018 indicates that industry-led badger control operations licensed by the government continue to deliver the level of effectiveness required for achieving the expected disease control benefits (reduction of incidence in cattle herds).
- The first two cull areas licensed in 2013 are starting to see these benefits, with the number of new positive herds with OTW status withdrawn dropping by around 50% after the fourth annual cull compared to pre-cull levels.

Expansion of the Edge Area, whereby five counties formerly straddling the HRA and Edge Area were incorporated fully into the Edge Area from 1st January 2018.
http://www.tbhub.co.uk/tb-policy/england/expansion-of-the-edge-area-in-england-and-new-cattle-testing-arrangements/

Increasing the sensitivity of routine surveillance testing in the Edge Area by: (a) replacing annual herd tests with six-monthly herd tests in the higher incidence sections, and (b) supplementing annual tests with radial testing in the rest of the Area (from 1st January 2018).
http://www.tbhub.co.uk/tb-policy/england/expansion-of-the-edge-area-in-england-and-new-cattle-testing-arrangements/
https://www.gov.uk/guidance/bovine-tb-testing-intervals-2018

Decisions by Government to simplify the TB testing regime for cattle in the HRA and to introduce further TB control and cost-sharing measures in cattle herds, the implementation of which are now being planned.

Reductions in compensation rates paid for cattle compulsorily slaughtered for bTB control:

- A 50% cut for cattle that cannot be processed for human consumption at a slaughterhouse because of a dirty hide.

- A 50% reduction for animals moved into a bTB breakdown herd that are subsequently removed as test reactors or direct contacts before the herd regains OTF status.

The Tuberculosis (Non-bovine animals) Slaughter and Compensation (England) Order 2017 came into force on 2nd January 2018, introducing specific rates of statutory compensation for non-bovine farmed species that may be subject to compulsory slaughter for bTB control purposes.

Changes to encourage private slaughter of cattle removed for TB control purposes. Defra will now pay full compensation for privately slaughtered test reactors whose carcases are totally condemned by the slaughterhouse operator due to TB.

Defra secured alternative supplies of BCG vaccine for oral vaccination of badgers against bTB, which enabled the Badger Edge Vaccination Scheme (BEVS) to be re-launched in September 2017, for vaccination in summer 2018.

Publication of the joint government-farming industry bTB Biosecurity Progress Report and updated action plan in December 2018 (a joint England-Wales initiative):
https://www.gov.uk/government/publications/bovine-tb-biosecurity-progress-report-2018

During 2018, four years into the Government's bTB Strategy for England, the Secretary of State commissioned a forward-looking independent review to consider how to take the Strategy to the next phase. The review, led by Professor Sir Charles Godfray, considered what additional actions might be necessary now to ensure other tools and interventions are ready to deploy in later phases of the strategy. The Government will be responding to the Review in due course. For more information see:
https://www.gov.uk/government/consultations/bovine-tb-strategy-review-2018-call-for-evidence

Developments which took place in Wales during 2018 include:
Launch of an enhanced TB Eradication Programme and Delivery Plan which builds on the progress made under the Strategic Framework for TB Eradication. Key initiatives being implemented from 1 October 2017 include:

- Post-Movement Testing is required for all cattle moved into the Low TB Area;
- Pre-Movement Testing is no longer required for cattle moved within or from the Low TB Area;
- A cap of £5,000 per animal is now in place (reduced from £15,000). The TB compensation regime will be subject to a wider review;

- Exempt Finishing Units were phased out by 1 January 2018.

Implementation of a range of measures specifically targeted at chronic herd breakdowns, focussing initially on persistent herd breakdowns (those that have been under restriction for 18 months or longer). Each of these persistent TB breakdown herds now have an Action Plan drawn up which is agreed between the farmer, vet and APHA. The Action Plans are bespoke to the herd in question and include a range of practical and proportionate measures to help clear up infection, for example removal of all Inconclusive Reactors. The typical measures being implemented include:

- Increasing test sensitivity through more frequent use of the gamma interferon test;
- Removing Inconclusive Reactors in these herds;
- Reducing contact between cattle and badgers through improving biosecurity at high risk points;
- Increasing knowledge of local badger disease status by carrying out post mortem examination of dead badgers.

Additionally, with the coming into force of the Tuberculosis (Wales) Order 2017, the following measures are also being implemented in chronic herd breakdowns, focussing initially on persistent breakdowns:

- The clearing test that lifts TB movement restriction on a herd can no longer be used as a Pre-Movement Test (meaning that cattle need a further clear test before being able to be moved off the premises);
- Where cattle are moved under a licence within a TB restricted holding, WG will only pay 50% compensation if the moved animals are subsequently slaughtered during the breakdown as a result of TB;
- Biosecurity Requirements Notices (BRNs) are issued as necessary to OTFW chronic breakdown herds and compensation is reduced in cases on non-compliance;
- Where it is viewed that badgers are contributing to the persistence of disease in chronic herd breakdowns, badgers are trapped and tested. Positive testing badgers are humanely euthanased. In 2018, test negative badgers were BCG vaccinated prior to being released. A report on the delivery of the trap and test operations undertaken in 2017 can be found at: https://gweddill.llyw.cymru/docs/drah/publications/180712-delivery-of-badger-trap-and-test-operations-2017-report-en.pdf

Following review, it is the intention to extend this process to recurrent herd breakdowns.

Work towards removing all Sole Occupancy Authorities (SOAs) and Cattle Tracing System (CTS) links is nearing completion. A deadline of 30 April 2019 was set for keepers to transition their holding to the new CPH rules and they were notified that all existing SOAs and CTS links would be closed after this date. All movements to premises outside of the keeper's designated holding will then require pre-movement testing and 6 day standstills.

Specific initiatives have also been introduced in designated regions within Wales as appropriate. These have followed the implementation of the Wales TB Eradication Programme Delivery Plan in 2017, and a number of new measures have been introduced as set out below:

- Additional contiguous testing was introduced in the Intermediate TB Area North (ITBAN) with effect from November 2018, in response to a spike in incidence of bovine TB in the ITBAN. In 2018, there were 67 new incidents, which represents a 6% increase on the previous 12 months (63 incidents) and 86% increase on the number in 2016 (36 incidents).
- As part of the ITBAN programme, the Welsh Government has also opened veterinary Cymorth TB style "Keep it Out" biosecurity visits for herds that test negative to a contiguous test. A review has recently been carried out which considers new ways of working, delivery and engagement. Recommendations have been made and accepted by the TB Eradication Programme Board.

Programme developments in 2018 in Northern Ireland (NI):

- Since 12 March 2018 the threshold for Officially Tuberculosis Free Withdrawn (OTW) status has been reduced from more than 5 non-visibly lesioned reactors to more than 1 non-visibly lesioned reactor. This means that more breakdown herds are subject to enhanced disease controls including forward and backward tracing, assessment of risk to local herds and mandatory use of severe interpretation.
- Severe interpretation was used in all tests carried out on OTW herds since 12th March 2018 as a measure to remove infection earlier and reduce the risk of leaving undisclosed reactors in a herd at derestriction. The definition of positive at 'severe interpretation' was altered to include all animals which are inconclusive at standard interpretation, and it became a mandatory requirement to remove any animal which is a 'severe interpretation' reactor at all OTW tests. These measures would have been expected to result in an increase in disease incidence, however 2018 showed a slight decrease in herd and animal incidence.
- Case Veterinary Officers have continued to review previous skin test results in all new OTW herds. Any animal which was inconclusive at standard interpretation at a breakdown

test (where TB had been confirmed at slaughter and/ or laboratory, or more than 1 reactor during breakdown) within the past 3 years is compulsorily removed. Veterinary Officers also have discretion to remove any other animals now considered higher risk on the basis of historic skin test results.

- A Reactor Quality Assurance pilot to inform future counter fraud policy started in November 2017. Skin test reactions were assessed and blood samples taken for IFN-gamma testing. Field data collection completed in autumn 2018 and is being evaluated. In 2018, focus has been towards use of new mapping tools and better use of data to assess the disease situation throughout NI. Quarterly performance updates to private veterinarians inform them of the details of their disease outbreaks. This information can be shown on maps to indicate the relative geographical location of TB in the area. NI legislation allows information regarding disease outbreaks to be shared with any AVS (Approved Veterinary Surgeon).

- A biosecurity questionnaire is now carried out by an Approved Veterinary Surgeon (AVS) for all herds at least once a year. This is used as a framework for a discussion between the herd keeper and his vet around biosecurity and herd health to include specific risk factors regarding bTB and also other general disease risks. Herd keepers will be able to monitor changes in their biosecurity status from year to year and the AVS is able to provide herd specific advice. Guidance notes provided to AVSs are at:

  https://www.daera-ni.gov.uk/publications/tb-testing-services.

- DAERA have developed the discussion with private veterinary contracted suppliers at annual performance reviews which take place between the government authority VO and each contracted AVS. The interactive nature of the new mapping tools give better knowledge for disease control strategies in local areas**.**

- A mandatory half day training course provided by DAERA is a requirement for all AVSs and is now part of an Online TB Training package. Each AVS testing more than 500 cattle in a 12 month period is provided with 6 monthly report which provides their ranking in relation to 4 key metrics that assess aspects of their TB testing performance. Variations from normal parameters are targeted for field audit. DAERA continues to assure the ability and standard of contracted vets at the approval inspection. Random inspections carried out since 2016 have demonstrated improved compliance with the very particular standards set in the Annex B 64/462. Details of the public services contract for delivery of TB testing can be found at:
  https://www.daera-ni.gov.uk/publications/tb-testing-services

8. Description of Monitoring/Surveillance/Control programmes system: *Mycobacterium bovis* in cattle

1. Monitoring/Surveillance/Control programmes system

The *Mycobacterium tuberculosis* complex includes *M. tuberculosis, M. bovis* and *M. microti.* Bovine tuberculosis (bTB) is caused by *M. bovis*, a zoonotic organism that can give rise to tuberculosis in humans that is virtually indistinguishable from the disease caused by *M. tuberculosis,* the major cause of human tuberculosis (TB). Human infection with *M. bovis* most often occurs through inhalation of aerosols containing the organism, but can also occur by eating or drinking unpasteurised milk and dairy products. The consumption of such products from infected cattle was an important cause of childhood tuberculosis in the UK until pasteurisation became widespread in the mid-20th century.

Bovine TB is one of the most serious animal health problems for the cattle industry in the UK. *M. bovis* infection has also been reported in many mammalian species in the UK, including other livestock, wildlife and domestic animals. In the UK, cattle and badgers are considered the main maintenance hosts, with other mammals regarded as spill-over or dead-end hosts.

A compulsory area eradication campaign for bTB began in GB in 1950 and in NI in 1959. This remains underpinned by routine screening of herds using the comparative tuberculin skin test, slaughter of all test reactors and cattle movement restrictions in infected herds. This programme gradually reduced the incidence of infection in cattle herds to a very low level by the early 1980s. However, since then, the incidence and geographical distribution of bTB in cattle herds ('breakdowns') increased in England and Wales [Incidents of bovine TB are also known as 'breakdowns', i.e. herds in which at least one animal was identified as a reactor to the tuberculin skin test or where one or more *M. bovis* culture-positive tuberculous lesions were detected by post-mortem meat inspection during commercial slaughter of a non-reactor animal]. This increasing trend accelerated immediately after the foot and mouth disease outbreak in 2001, during which the routine bTB testing and slaughter programme was suspended for almost ten months.

M. bovis is currently endemic in cattle and badgers in most of NI and large tracts of south west England and south and mid-Wales. Herd incidence and prevalence of bTB are very low in most counties of the North and East of England (Low Risk Area), where pre- and post-movement testing of cattle entering this region from the rest of England and Wales are in force. In the data tables, as Eurostat provides no specific code for the country of England, the data row marked 'UNITED KINGDOM' is in fact the data for England only, and data for Northern Ireland and Wales is also

detailed specifically in separate rows. Scotland was declared an officially bTB free region of the UK by the European Commission in 2009 (Decision 2009/761/EC) and, as such, it also implements strict controls regarding the movement of cattle from the rest of the UK.

2. Measures in place

A compulsory area eradication campaign for bTB began in GB in 1950 and in NI in 1959. This continues to be underpinned by routine screening of herds using the comparative tuberculin skin test, slaughter of all test reactors and cattle movement restrictions in infected herds. Animals with suspect lesions identified by post-mortem meat inspection during commercial slaughter of a non-reactor animal are also investigated and the lesions cultured for *M. bovis.*

3. Notification system in place to the national competent authority

Yes: under the Tuberculosis (England) Order 2014 (as amended), the Tuberculosis (Wales) Order 2011 (as amended), and the Tuberculosis (Scotland) Order 2007 (as amended), there is a statutory requirement in GB to notify APHA of any bovines (and deer) with suspect clinical signs of tuberculosis. Furthermore, the identification of *Mycobacterium bovis* in samples taken from any mammal (other than man) must be notified to APHA Weybridge. In Northern Ireland, The Diseases of Animals Order (1981) (as amended) and the Tuberculosis Control Order (NI) 1999 (as amended) require similar reporting to DAERA.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Care should be taken not to read too much into changes in the figures over short periods of time. National Statistics show that in 2018, the herd incidence of bTB in England decreased (from 11.0 to 9.4 new herd breakdowns per 100 herd-years at risk), and the herd prevalence also declined, although not as markedly (from 6.3% to 6.1% of all registered herds) compared to 2017. The longer-term data indicate that both epidemiological indicators of bTB have levelled off since 2012, reversing the historical increasing trend that began in the late 1980s and early 1990s. This is the case for England as a whole, and critically, for the HRA, which accounts for the majority of TB breakdowns. As stated above, the disease is not uniformly distributed across the country. In the LRA herd incidence and prevalence remained very low and stable in 2018, despite the fact that the number of TB tests in 2018 was more than double the equivalent figure for 2012 (864,452 cf. 325,962) after the introduction of targeted surveillance (radial testing) in 2013. In contrast with the LRA and HRA, the herd incidence and prevalence rose marginally in the Edge Area of England in 2018.

In the data tables, as Eurostat provides no specific code for the country of England, the data row marked 'UNITED KINGDOM' is in fact the data for England only, and data for Northern Ireland and Wales is also detailed specifically in separate rows.

The number of new bovine TB herd breakdowns in Wales peaked during 2008 and 2009. Subsequently, there were substantial decreases in 2010, 2013 and 2016, with periods of relative stability in between each of these decreases. The number of new TB incidents in 2016 was the lowest annual figure recorded since 2004. There was a decrease of 5.7% in the number of new TB incidents in 2018. The trajectory over this period is, however, far from stable, with short-term fluctuations, up and down. It is also important to note that apparent short-term increases in incidence may be at least partly attributable to intensified surveillance. Indeed, there is a long-term upward trend in TB testing. Scotland has had officially TB free status since 2009. In 2018 there were 36 new herd incidents and 498 animals were slaughtered for bTB disease control purposes.

Northern Ireland (NI) is epidemiologically and geographically distinct from GB and has developed and implemented a separate programme since controls began. Measures of disease in NI are not directly comparable with those in GB. 2018 saw a slight reduction in herd incidence levels despite the introduction of stricter control measure in March 2018 that might have been expected initially have increased incidence due to less infected animals being left on farms post herd derestriction. This is an encouraging outcome and it is hoped that this downward trend will continue.

The epidemiological situation in 2018 in England could be summarised as follows:

- The number of registered cattle herds fell from 50,445 at the end of 2017 to 49,230 at the end of December 2018 (58,380 in 2008), continuing the long-term trend towards fewer (but larger) herds.
- The number of TB herd tests carried out in 2018 in OTF herds was 50,848 (61,698 in all herds), compared to 48,108 (59,706 in all herds) in 2017.
- The total number of new TB breakdowns (positive herds) detected in 2018 was 3,608 (of which 2,289 resulted in OTF herd status being withdrawn - OTFW); compared to 3,826 new breakdowns (2,617 with OTFW status) in 2017. Compared with 2017, the number of new TB herd breakdowns decreased by 283 (over 9%) in the HRA, from 3,043 to 2,760. The number of breakdowns in the Edge Area increased by 61 (9.3%), from 658 to 719. The number of new positive cases detected in the LRA increased by 4 (3%) in 2018 compared to 2017, whereas the number and incidence rate of OFW breakdowns nearly halved in 2018.
- Herd incidence in 2018 using the definition in Table 2A of the EU's report template (i.e. number of new bTB-positive herds as a percentage of the number of unique herds checked) was 10.7%, compared to 11.45% in 2017.

- The overall herd incidence rate in England, expressed as new herd breakdowns per 100 herd-years at risk decreased from 11.0 in 2017 to 9.4 in 2018. This rate was highest (at 18.5) in the HRA (a decrease from 19.8 in 2017) and lowest in LRA (0.8 in 2018 compared to 1.0 in 2017). In the Edge Area, the incidence rate increased from 9.0 new breakdowns per 100 herd-years at risk in 2017 to 9.2 in 2018. These figures reflect a 6% annual drop in the number of new positive herds and herds not OTF at the end of the year due to a TB incident; across England compared with 2017. The greatest percentage drops in positive herd numbers, herd incidence and prevalence were recorded in the HRA of England. There were minor fluctuations in the LRA, where the epidemiological indicators continued to reflect a very low and sporadic frequency of infection.
- At the end of 2018 there were 1,999 herds in England with OTF status suspended or withdrawn (i.e. under movement restrictions) due to an ongoing TB breakdown (of which 1,997 herds had a positive result at their last check test). Overall at the end of 2018 in England 2,979 herds were under a movement restriction for bTB control reasons, compared with 3,153 at the end of 2017. This means that herd point prevalence declined marginally from 6.3 to 6.1% at the end of 2018 compared to the end of 2017. Herd point prevalence was highest in the HRA at 11.6% (down from 12.7% at the end of 2017) and lowest in the LRA at 0.3% at the end of 2018 (unchanged from the end of 2017).
- The total number of individual animal TB tests performed in England in 2018 was 4,305,261 compared to the equivalent figure for 2017 of 4,413,073 tests.
- During 2018, APHA removed 32,923 cattle for bTB control purposes from positive (breakdown) herds in England, compared to 33,238 in 2017. The vast majority of such animals (32,206 and 32,416, respectively) were reactors to the tuberculin skin test and/ or interferon (IFN) gamma blood test positive. The remainder were inconclusive and negative-testing removed as direct contacts from positive herds with OTF status withdrawn.
- Animal-level incidence declined from 4.4 test reactors identified for every 1,000 tests in 2017 to 4.2 reactors per 1,000 tests in 2018. This small reduction reversed the trend toward increased reactor numbers and animal-level incidence observed in the previous three years.
- Finally, the number of suspect cases of bTB initially identified during routine post-mortem meat inspection of cattle at commercial slaughter (slaughterhouse cases) in 2018 was 1,102 (of which 582 were bacteriologically confirmed as *M. bovis* infections), compared to 980 (535 confirmed) in 2017. The reduction in the number of slaughterhouse cases that began in the second half of 2015 appeared to level off in 2018. However, numbers are still markedly lower than detected between 2010 and 2015, when the annual number of confirmed slaughterhouse cases was between 900 and 1100.
- Between 2016 and 2018, the steady decline in tuberculous cattle detected during routine slaughter seems consistent with an enhanced sensitivity of the on-farm TB testing regime.

This has been achieved through mandatory deployment of the supplementary IFN-gamma test in all OTFW breakdowns in the LRA and Edge Area; wider use of the IFN-gamma test in the HRA; adoption in April 2016 of a more rigorous TB herd testing regime to restore OTF status in all herds sustaining a TB breakdown in the HRA; and a more rigorous training, accreditation and audit scheme for TB testers (official veterinarians) introduced in 2013.

In the data tables, as Eurostat provides no specific code for the country of England, the data row marked 'UNITED KINGDOM' is in fact the data for England only. Data for Northern Ireland and Wales is also detailed specifically in separate rows.

The latest figures for Wales show that in 2018:

- There were 11,952 live herds, compared to 11,973 in 2017. The numbers of live herds have been decreasing during the long term but have increased slightly over the last couple of years.
- There were 744 new bTB breakdowns detected (of which 407 resulted in withdrawal of OTF status), compared with 789 in 2017 (433 OTFW). There are circumstances where OTFW status is applied to herds in Wales due to epidemiological reasons, without confirmation via post mortem examination or bacteriological culture. Such OTFW breakdowns are not included in these statistics.
- 15,910 tests were carried out on OTF herds, compared with 15,564 in the previous year. A further 2,396 tests were carried out on non-OTF herds, compared with 2,289 in 2017.
- 975 cattle herds were under movement restrictions at the end of December 2018 due to a bTB incident or overdue test, representing 8.2% of all herds in Wales. At the end of December 2017 914 herds were under restrictions (7.6% of all herds). Increases in the number of herds under TB restrictions can be largely attributable to more extensive use of severe interpretation of the skin tests, particularly in our long term TB breakdown herds. Further, these herds are subject to a more rigorous regime when they are close to coming off restrictions, to ensure disease is truly cleared from the herd.
- 11,234 animals were slaughtered due to bTB control, compared with 10,036 in 2017. The increase in animals slaughtered in recent years is largely attributable to increased use of high-sensitivity testing. For example, gamma-testing, removal of Inconclusive Reactors (IRs) and severe interpretation of the skin test have all been used with the intention of clearing up infection and reducing the risk of the disease spreading and breakdown recurring.
- There were 150 suspect cases of bTB initially identified during routine post-mortem meat inspection in abattoirs ('slaughterhouse cases') (of which 78 were subsequently confirmed via bacteriological culture). This compares with 109 slaughterhouse cases (56 confirmed) in 2017.

- Herd incidence (the number of new bTB incidents per 100 herd years at risk) was 7.5, compared with 7.8 in 2017.

The latest figures for Scotland show that in 2018:

- There were 36 new bTB breakdowns detected (of which 8 resulted in withdrawal of OTF status due to confirmation of disease), compared with 42 in 2017 (15 OTFW due to confirmation).
- 2,140 tests were carried out on OTF herds, compared with 1,815 in the previous year.
- 135 cattle herds were under movement restrictions at the end of December 2018 due to a bTB incident or overdue test, representing 1% of all herds in Scotland. At the end of December 2017 112 herds were under restrictions (< 1% of all herds).
- 498 animals were slaughtered due to bTB control, compared with 273 in 2017.
- There were 27 suspect cases of bTB initially identified during routine post-mortem meat inspection in abattoirs ('slaughterhouse cases') (of which 3 were subsequently confirmed via bacteriological culture). This compares with 25 slaughterhouse cases (8 confirmed) in 2017.
- Herd incidence (the number of new bTB incidents per 100 herd years at risk) was 0.7, compared with 0.9 in 2017.

In Northern Ireland (NI), herd incidence was relatively level from 2007 to 2010 followed by a sustained rise during 2011-2012, peaking at 7.46% in October 2012. Herd incidence then steadily declined to a low of 5.95% in September 2014, followed by another rise which was particularly steep throughout 2017, to 9.73% in November 2017. More recently the trend has been downward, and the herd incidence in December 2018 was 9.22%. Changes in annual animal incidence show a similar trend, steadily increasing during 2011-12 to a high of 0.674% in November 2012, followed by a decrease to a low of 0.502% in March 2014 and then a rise throughout 2015-6. Throughout 2017 animal incidence increased more steeply in line with the sharp rise seen in herd incidence, reaching a peak of 0.920% in November 2017. More recently animal incidence has fallen, the December 2018 figure being 0.879%.
In Northern Ireland during 2018:

- 22,656 herds (1.74 million cattle) were skin tested. Approximately 3.28M animal tests were carried out, a 4.5% increase from 2017 (3.14M).
- There were 15,329 tuberculin skin test reactors, a 3.9% decrease from 2017 (15,949 reactors). Overall 16,959 animals were slaughtered in 2018 for TB associated reasons, including skin test reactors and direct contacts.
- There were 2,088 new TB reactor herds, a 5.4% decrease from 2017 (2,208 herds).
- 3,490 herds were under movement restriction at the end of December 2018 due to a TB breakdown or overdue test, representing 11.6% of all herds. 3,617 herds (12.2%) were similarly affected at the end of December 2017.

- 23,400 animals were IFN-gamma tested, with 625 removed solely based on IFN-gamma results, compared with 22.256 animals tested and 677 removed solely based on IFN-gamma results in 2016.
- 999 animals were removed as direct contacts, compared with 891 during 2017.

Lesions at routine slaughter (figures exclude animals imported for direct slaughter):

- 1,826 animals were found with TB-like lesions at routine slaughter (0.41% of animals slaughtered). 1,095 of these (59.97%) were confirmed as TB by histology and/ or bacteriology. This compares with 1,703 animals found with TB-like lesions at routine slaughter in 2017 (0.40% of animals slaughtered) of which 1,074 (63.07 %) were confirmed.
- 370 new TB breakdowns were triggered by an animal found with TB-like lesions at routine slaughter which was subsequently confirmed by histology and/ or bacteriology, compared to 409 new TB breakdowns in 2017.
- 644 herds were restricted as a result of finding TB-like lesions at routine slaughter, compared to 656 herds in 2017. (This includes cases where laboratory testing gave an alternative diagnosis e.g. actinobacillosis.)
- In 247 herds a TB-like lesion at routine slaughter triggered a new breakdown where 1 or more reactor animals were disclosed at the resulting skin test. 287 herds were similarly affected in 2017.

TB confirmation in NI:

- TB was confirmed in 2,405 herds in the 12 months to the end of October 2018, a 1.4% decrease compared to the previous 12 months (2,440).
- TB was confirmed in 7,425 animals in the 12 months to the end of October 2018, a 6.9% decrease compared to the previous 12 months (7,972).

UK animal-associated *M. bovis* relevance as a source for humans:

There is a very low risk to human health posed by *M. bovis* in the UK and this can be further reduced by the programme. Control of TB was one of the great public health success stories of the twentieth century. In the late 19th century TB caused 1 in 5 of deaths in the UK and even as late as the pre- and post-World War II period there were 50,000 TB notifications in England and Wales. Before World War II, approximately 2,000 children died in the UK every year due to *M. bovis* infection (zoonotic TB). The implementation of universal BCG vaccination of children of school age (replaced in 2005 by targeted vaccination of high-risk), gradual adoption of milk pasteurisation and the reduction of the incidence of the disease in the cattle population in the 1950s, 1960s and 1970s contributed to the virtual elimination of the disease as a major health issue in the UK. Nowadays, approximately 40 new culture-confirmed

cases of human *M. bovis* infection are diagnosed each year in the UK (including cases in people who contracted the infection abroad and in UK-born elderly persons suffering reactivation of old latent infections contracted before the widespread adoption of milk pasteurisation).
https://www.gov.uk/government/publications/mycobacterium-bovis-mbovis-tuberculosis-annual-data

9. Description of Monitoring/Surveillance/Control programmes system: *Mycobacterium bovis* in badgers

1. Monitoring/Surveillance/Control programmes system

Specific badger bTB monitoring and/ or control schemes are in place in specific parts of the UK.

2. Measures in place

Since 2013, farmer/ landowner-led licensed culling (and to a lesser degree badger vaccination) of badgers in annual testing areas of England (High Risk and Edge Areas) has been a key element of the Government's bTB eradication strategy. In order to ensure that any cull of badgers is effective, safe and humane, badger population control licences must comply with stringent conditions set out in the Government's Guidance to Natural England. A badger cull area was licensed in the Edge area in 2017, and one in the LRA for the first time in 2018.

In Wales, there has been a badger vaccination policy in place since 2012. A Badger Found Dead Survey has been ongoing in the Intensive Action Area in South West Wales since 2012. On 20 June 2017, the Welsh Government announced a comprehensive set of enhancements as part of its strengthened approach to TB eradication. Many of the enhancements are associated with dealing with bovine TB in persistent and recurrent ('chronic') TB breakdown herds.

In Northern Ireland (NI), DAERA recognises that involvement of wildlife, mainly badgers, must be addressed if eradication is to be achieved. Deer are not currently considered significant in the epidemiology within NI but remain under review. A research project on the role of deer in TB in NI has been commissioned. The role of badgers in the epidemiology has not been quantified but DAERA continues to work in partnership with its science provider, Agri-Food and Biosciences Institute (AFBI), to identify knowledge gaps and to explore research and development options to complement current work. Both the unique 5-year 'Test and Vaccinate or Remove' (TVR) wildlife intervention research project, which was completed in 2018, and the long-standing Road Traffic Accident (RTA) survey (16.78% of the 429 RTA badgers submitted were *M. bovis* culture positive in 2018) have provided epidemiological information to inform the future approach. The TVR project field work finished in October 2018 and the resulting data is currently being evaluated. Badger sett surveying work in two areas of high cattle TB incidence and badger density in which TB has been confirmed in badger populations is currently being carried out and a third area is under consideration with a view to introducing targeted vaccination in these areas. Recommendations to address the role of wildlife in disease spread are included in the TB Strategic Partnership Group's Strategy which was published in December 2016 and resultant proposals are being considered.

3. Notification system in place to the national competent authority

Yes: In addition to any bovines and deer with suspect clinical signs of tuberculosis, under the Tuberculosis (England) Order 2014 (as amended), the Tuberculosis (Wales) Order 2011 (as amended), and the Tuberculosis (Scotland) Order 2007 (as amended), there is a statutory requirement in GB to notify APHA Weybridge of the identification of *Mycobacterium bovis* in samples taken from any mammal (other than man), i.e. including badgers. Notifying the suspicion of bTB in a living domestic animal in the course of clinical examination, surgery, by radiography or in biopsy material is not mandatory (except for cattle or deer), but submission of clinical samples from such cases to APHA is encouraged. In Northern Ireland, The Diseases of Animals Order (1981) (as amended) and the Tuberculosis Control Order (NI) 1999 (as amended) require similar reporting to DAERA.

10. Description of Monitoring/Surveillance/Control programmes system: *Mycobacterium bovis* in non-bovines (excluding badgers*)*

3. Notification system in place to the national competent authority

Yes: In addition to any bovines and deer with suspect clinical signs of tuberculosis, under the Tuberculosis (England) Order 2014 (as amended), the Tuberculosis (Wales) Order 2011 (as

amended), and the Tuberculosis (Scotland) Order 2007 (as amended), there is a statutory requirement in GB to notify to the APHA of the presence of suspect bTB legions in the carcases of any bovine animals or other farmed or companion (pet) mammals. Furthermore, identification of *Mycobacterium bovis* in samples taken from any mammal (other than man) must also be reported to APHA Weybridge (unless the organism was present in the sample as a result of an agreed research procedure). Notifying the suspicion of bTB in a living domestic animal in the course of clinical examination, surgery, by radiography or in biopsy material is not mandatory (except for cattle or deer), but submission of clinical samples from such cases to APHA is encouraged.

In Wales, any person suspecting that a deer, goat, guanaco, alpaca, llama, or vicuna may be affected with TB must notify APHA. Camelids, deer, pigs, sheep and goats co-located with restricted cattle may be tested or restricted and camelids, goats and deer may be subject to contiguous testing around a TB breakdown. Samples of wild deer shot by trained stalkers can be sent in for culture for TB. Most samples received are from staff from National Resource Wales and cover relatively small localised surveillance areas.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

M. bovis infection has been reported in many mammalian species in the UK, including other livestock, wildlife and domestic animals. In the UK, cattle and badgers are considered the main maintenance hosts, with other mammals regarded as spill-over or dead-end hosts. One hundred and five incidents of *M. bovis* infection in non-bovine domestic animals (mainly goats, pigs, camelids, cats and farmed deer) and wild deer in GB were confirmed by culture during 2018. In Northern Ireland in 2018 two farmed red deer were confirmed as *M. bovis* positive.

Deer surveillance in Wales has identified 18 *M. bovis* positive samples in wild deer out of 1,325 collected for culture between 2012 and November 2018. Most of the positive samples have been spoligotype 22 and have been found in the Monmouthshire area, where this spoligotype has a home range.

In summary for Wales in 2018, incidents confirmed on TB culture were:

- 1 incident in a companion animal.
- 2 deer in an incident on an open farm involving confirmed disease in several non-bovine and bovine species, which started in 2016.
- 2 incidents involving camelids.

11. General evaluation: *Campylobacter*

1. History of the disease and/or infection in the country

Campylobacter is the most commonly isolated bacterial gastrointestinal pathogen in the UK. Human campylobacteriosis due to thermophilic *Campylobacter* is a major cause of food poisoning, although non-thermophilic strains (such as *C. fetus*) can also (rarely) cause severe zoonotic illness. The route of transmission to humans in many sporadically occurring cases remains obscure. *Campylobacter* are commonly found in clinically healthy animals. Poultry have long been considered as a potential source of infection. Multi-locus Sequence Typing (MLST) studies support this view, identifying poultry meat as an important source of *Campylobacter* infections in humans.
(http://cid.oxfordjournals.org/content/48/8/1072.full.pdf+html

Sheppard et al., 2009;
http://www.plosgenetics.org/article/fetchArticle.action?articleURI=info:doi/10.1371/journal.pgen.1000203)

2. Evaluation of status, trends and relevance as a source for humans

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

3. Any recent specific action in the Member State or suggested for the European Union

The FSA has been running a *Campylobacter* Risk Management Strategy for a number of years which encompasses a range of projects targeted at different points across the food chain, from farm to fork. There has also been an industry-government collaboration to identify and implement interventions that will reduce *Campylobacter*. In 2017, the FSA announced that it had achieved the *Campylobacter* target of reducing the numbers of cases by 100,000 in 2016.

(http://webarchive.nationalarchives.gov.uk/20180411162846/https://www.food.gov.uk/news-updates/news/2017/16052/latest-figures-reveal-decline-in-cases-of-campylobacter).

With this achievement, the *Campylobacter* strategy was adjusted to business as usual and the focus moved to working with smaller retailers and processors. With this in mind, the FSA held discussions with the big retailers to publish their own *Campylobacter* testing data. Following the agreement in July 2017, the top 9 retailers agreed to publish the data from their own testing, performed according to

protocols set by the FSA. The first set was published in November 2017. The retailers submit their raw data to the FSA, who continue to engage with the top 9 retailers over achieving *Campylobacter* reductions. The FSA's *Campylobacter* retail survey has since shifted focus onto smaller retailers and the independent markets (from August 2017). The FSA has committed to carry out the survey in its current format until 2020, and will use the data from the revised survey to highlight issues within smaller retailers and smaller processors in order to improve the levels of *Campylobacter* contamination on chickens in this part of the sector.

12. Description of Monitoring/Surveillance/Control programmes system: *Campylobacter spp.* in animals

1. Monitoring/Surveillance/Control programmes system

During 2018, there were 159 reports of *Campylobacter* spp isolated in livestock in Great Britain and Northern Ireland, with diagnoses achieved via the submission of clinical material by private veterinarians for diagnostic investigation at the Animal and Plant Health Agency, Scotland's Rural College (SRUC) and the Agri-food and Biosciences Institute. Of the total, 137 livestock reports were from Great Britain and 22 from Northern Ireland. The total units tested are not recorded for GB data because the laboratories do not report negative results, unless part of an official control programme or survey. Scottish laboratories also had 250 reports in dogs and 26 reports in cats, but these animals were not necessarily resident in Scotland. *C. upsaliensis* has consistently been the most frequent campylobacter isolated in cats and dogs by the SRUC in recent years. In Northern Ireland *Campylobacter* was diagnosed as the primary cause of abortion in 11 ovine cases, but in no bovine abortion investigations during 2018.

3. Notification system in place to the national competent authority

Notification is not mandatory in animals.

13. Description of Monitoring/Surveillance/Control programmes system: *Campylobacter spp.* in food

1. Monitoring/Surveillance/Control programmes system

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

effects of processing changes on pathogens and to monitor high-risk foods linked to human cases/ outbreaks and the emergence of new pathogens. In addition to English surveillance, Wales, Scotland and Northern Ireland also have separate microbiological food surveillance programmes within their own regions. The UK government also collates returns from all UK food authorities on official food enforcement activities in line with Regulation (EC) No 882/2004 (now Regulation (EU) No. 2017/652) on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in the data included in this report.

A UK-wide microbiological survey of *Campylobacter* contamination in chickens at retail sale was carried out again in 2017/2018 as part of the Food Standards Agency's Strategic Plan to reduce *Campylobacter* contamination in whole raw chicken to a specified target. The aim of this national survey was to determine the prevalence and levels of *Campylobacter* spp. contamination on fresh whole chilled chickens produced in the UK and sold at UK retail outlets. The results are not yet published.

In November 2017, after a series of discussions with the top nine retailers, an agreement was reached where these retailers will publish their *Campylobacter* testing data online for consumers (http://webarchive.nationalarchives.gov.uk/20180411163053/https://www.food.gov.uk/news-updates/news/2017/16736/retailers-publish-campylobacter-results). This has meant that the FSA has now stopped sampling these retailers and is focusing their surveillance on small retailers and the independent market to try and tackle *Campylobacter* levels in that sector of the market. The results of this retailer sampling are now available: https://www.food.gov.uk/news-alerts/news/major-retailers-publish-campylobacter-results-for-january-march-2019

For October to December 2018 the campylobacter contamination levels in UK-produced fresh whole chickens as tested and published by the major retailers were as follows: 63.1% of sampled chicken carcases with <10 colony forming units per gram (cfu/g), 22.3% with 10-99 cfu/g, 11.4% with 100-1,000 cfu/g and 3.1% with >1,000 cfu/g.

2. Measures in place

A *Campylobacter* Risk Management Programme has been developed to reduce levels of *Campylobacter* in chicken. The programme encompasses a range of projects targeted at different points across the food chain, from farm to fork. The Food Standards Agency (FSA) has been working in partnership with the industry and Defra as part of the Acting on *Campylobacter* Together (ACT) campaign. This group took over from the more technical Joint Working Group on Campylobacter in

order to facilitate the installation of the most effective *Campylobacter* reduction interventions in the food production process. To measure progress on the reduction of the most heavily contaminated chicken, an industry-government target was set. The target was for the industry to reduce the numbers of the most contaminated carcases (>1,000 cfu/g) in UK poultry houses from 27% to 10% by 2016. The equivalent level for chickens sold at retail level was 7%. It was estimated that achievement of the reduction target could mean a reduction in *Campylobacter* food poisoning of up to 30% (about 111,000 cases per year).

3. Notification system in place to the national competent authority

Reporting of *Campylobacter* when isolated from human clinical diagnostic samples is mandatory.

Notification is not mandatory in food.

14. General evaluation: Q Fever

1. History of the disease and/or infection in the country

Humans: In the UK, most Q fever cases are thought to be associated with exposure to farm animals or farm environments, however the source and route of transmission for most sporadic cases is usually not determined.

Animals: Q fever is considered an endemic disease in UK livestock. A small number of cases of Q fever associated with abortion in cattle, sheep or goats are diagnosed each year.

Human disease: Although Q fever cases in humans are generally considered sporadic in the UK, outbreaks were reported in 2006, 2007 and 2011. The annual mean incidence rate of human infection in the UK (based on analysis of data from 1999 to 2008) was around 0.18 cases per 100,000 population/year. Mean annual incidence rates are usually higher in Northern Ireland (1.17 per 100,000/year for the period 1999 to 2008) than in England and Wales (0.14 per 100,000/year) and Scotland (0.37 per 100,000/year). The regional distribution of human cases is similar to the distribution and density of sheep populations, with the majority of cases reported from South West England, Wales, Scotland and Northern Ireland (although there were fewer human cases than might be expected in the northern regions of England).

Animal Disease: Between three and twelve incidents of clinical disease due to Q fever infection in livestock have been reported annually from 2008-2018. These incidents are where Q fever is considered to be the cause of abortion in livestock, usually ruminants. In addition, *C. burnetii* may be detected by

PCR in placental or uterine material from submissions where Q fever was not considered to be contributing to the clinical problem of abortion. Such incidents will not be recorded as Q fever abortion under the Veterinary Investigation Diagnostic Analysis (VIDA) system reports, but are still considered of zoonotic interest as the presence of *C. burnetii* had been confirmed.

2. Evaluation of status, trends and relevance as a source for humans

The organism is shed in the urine, faeces, milk and products of parturition of infected ruminants. The organism can survive in the environment for prolonged periods and withstand many disinfectants and extremes of temperature. Humans are usually infected through inhalation of dust or aerosols containing *C. burnetii*, most frequently at the time of calving, lambing or kidding (including abortion outbreaks) or at slaughter. Farm workers, veterinarians, and abattoir workers have historically been at high risk of infection, however the source and route of transmission for most sporadic cases is usually not determined. In the UK, cases generally peak during the spring/ early summer lambing season when infected animals shed high numbers of organisms during lambing. Other modes of transmission to humans, including tick bites and human to human transmission, are rare. There is a weight of evidence against the foodborne route of transmission for *C. burnetii. C. burnetii* can be excreted into milk but is destroyed by pasteurisation.

4. Additional information

Recent UK outbreaks and the large outbreak in humans in the Netherlands have raised awareness in the UK of the risks of contracting this disease, especially to those exposed to high concentrations of the organism from placenta or birth fluids. Advice to farmers on reducing the risks from infection are highlighted annually by the veterinary and public health authorities in the UK. Information for farmers on Q fever infection is available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/487806/Q_fever_information_for_farmers_2015.pdf

15. Description of Monitoring/Surveillance/Control programmes system: *Coxiella burnetii* in animals

1. Monitoring/Surveillance/Control programmes system

Some cases of *Coxiella burnetii* are identified in the UK each year by Government laboratories as part of scanning surveillance of material submitted from clinically affected animals. No official control programme of *C. burnetii* in animals is pursued in the UK.

2. Measures in place

Government funded scanning surveillance programmes are delivered by the Animal and Plant Health Agency (APHA), the Scottish Agricultural College Consulting, Veterinary Services (SACCVS) and the Agri-Food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. Through this scanning surveillance programme, a small number of cases of Q fever associated with abortion in cattle, sheep or goats are diagnosed each year. Clinical diagnostic samples may be submitted by private veterinarians during disease investigations to these government laboratories. Usually submissions received are for the investigation of ruminant abortion. Blood samples, tissue samples/ cotyledons and foetal fluid can be submitted for clinical diagnosis. Diagnosis of Q fever is undertaken using PCR to confirm the presence of *C. burnetii*, typically following the identification of suspicious acid-fast bodies in modified Ziehl Nielsen (MZN) stained smears of foetal tissues. ELISA and histopathology may also be carried out.

PCR method: Jones, R.M., Twomey, F., Hannon, S., Errington, J., Pritchard, G.C & Sawyer, J (2010) Detection of *Coxiella burnetii* in placenta and abortion samples from British ruminants using real-time PCR Veterinary Record 167, 965-967.

ELISA: Horigan, M.W., Bell, M.M., Pollard, T.R., Sayers, A.R. & Pritchard, G.C. Q fever diagnosis in domestic ruminants: comparison between Complement Fixation and commercial ELISA tests. Journal of Veterinary Diagnostic Investigation.

Vaccination for Q fever infection is not generally carried out in the UK but has been used following abortion storms in specific herds and flocks.

3. Notification system in place to the national competent authority

No: there is no requirement to notify a suspicion of Q fever infection in animals in the UK, or for a private veterinary laboratory to notify the Government should *Coxiella burnetii* be identified in samples derived from animals. In Northern Ireland, Q fever is a designated organism under the Zoonoses Order (NI) 1991. If found during post mortem, the Agri-Food and Biosciences Institute (AFBI) will notify DAERA, and an advisory letter (which includes public health advice) will be issued to the animal's owner.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

C. burnetii was confirmed by PCR on six occasions (five from England and Wales and one from Scotland) in 2018, but was considered the cause of fetopathy on only four occasions (three cattle and one sheep). There were no confirmed diagnoses in Northern Ireland during 2018.

In 2017, *C. burnetii* was confirmed by PCR on twelve occasions (seven from England and Wales and five from Scotland), but was considered the cause of fetopathy on only four occasions (all four in cattle). There were no confirmed diagnoses in Northern Ireland during 2017.

There were 12 incidents of Q fever diagnosed in 2016 (three in goats, four in sheep, and five in cattle) on farms in England, Wales and Scotland. There were no confirmed diagnoses in Northern Ireland during 2016.

There were seven incidents (three cattle, one sheep and three goats) of Q fever abortion in England and Wales confirmed in 2015. There were no confirmed diagnoses in Scotland or in Northern Ireland. In six of these incidents, *Coxiella burnetii* was the sole pathogen identified from the investigation. This contrasted to previous years where concurrent co-infections were identified more frequently. There were four incidents of Q fever reported in 2014, three in 2013, six in 2012, eight in 2011 and five in 2010. These incidents were all reported in England and Wales – there were no recorded incidents of Q fever diagnosis in Northern Ireland or Scotland during this period.

5. Additional information

Advice to farmers on preventing infection is regularly updated by the veterinary and public health authorities in the UK. Control of Q fever is aimed primarily at disease surveillance, and also provision of advice on disease control through management and good hygiene measures on farm. Information on Q fever and the guidance on measures to avoid infection is available on the Defra, Scottish Government, Welsh Government, Department for Agriculture, Environment and Rural Affairs, Public Health England and Health and Safety Executive websites. (A leaflet, entitled Q fever: information for farmers provides general advice for farmers and others involved with farm livestock, both for their own personal protection and to reduce health risks to the wider population – available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/487806/Q_fever_information_for_farmers_2015.pdf)

A now historic PCR survey using abortion material collected from randomly selected abortion submissions from farms in England and Wales where Q fever was not suspected was carried out in 2010/2011. During 2010, testing of 192 ovine cotyledons, all from different farms, did not reveal any positives which indicates that prevalence in the sample population is less than 1% (95% confidence). During 2011, *C. burnetii* was detected in nine (7.3%) of the 124 cattle cotyledons and in one of the nine goat samples. *C. burnetii* was not detected in any of the pig (4) or alpaca (2) samples tested in the survey. This survey highlighted the potential zoonotic risks of *C. burnetii* infection for people handing bovine abortion material. (Reference: Pritchard GC; Smith RP; Errington J; Hannon S; Jones RM; Mearns R (2011) Prevalence of *Coxiella burnetii* in livestock abortion material using PCR. Veterinary Record 169 (15) 391)

16. General evaluation: *Echinococcus*

1. History of the disease and/or infection in the country

Echinococcus granulosus is present in the UK.

E. multilocularis has not been found in the indigenous UK animal population. The UK has official disease free status in accordance with Commission Delegated Regulation (EU) No 2018/772.

2. Evaluation of status, trends and relevance as a source for humans

Animals: In the UK, *E. granulosus* (sheep strain) is present in the farmed livestock population in areas of Scotland, England and Wales. Identification of the cyst at meat inspection in animal tissues requires the condemnation of all or part of the carcase and/or the offal as may be judged appropriate to the circumstances of the case by an Official Inspector or Official Veterinarian. Meat inspection in all approved slaughterhouses is carried out by or is under the supervision of an Official Veterinarian in Great Britain and the post mortem findings are recorded centrally. In Northern Ireland, Veterinary Service staff are situated in all meat plants and carry out post mortem inspection of all carcases, including inspection for evidence of hydatid cysts.

E. multilocularis has not been found in indigenous animals in the UK. The UK has official disease free status in accordance with Commission Delegated Regulation (EU) No 2018/772.

17. Description of Monitoring/Surveillance/Control programmes system: *Echinococcus granulosus* in animals

1. Monitoring/Surveillance/Control programmes system

Carcases are inspected in slaughter houses in line with official controls legislation (Regulation 854/2004).

3. Notification system in place to the national competent authority

Hydatid disease in animals is not notifiable in the UK and the identification of the parasite in animal tissues is not reportable.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

As part of an annual, continuous monitoring programme in wild definitive hosts to demonstrate disease freedom in the UK, faecal samples are collected from red foxes (*Vulpes vulpes)* and tested for the presence of *E. multilocularis* and *E. granulosus*. In total in 2018, 476 faecal samples were collected in Great Britain and a further 351 were collected and tested in Northern Ireland. Of the total 827 foxes tested in the UK during the year, all tested negative for *E. multilocularis* and *E. granulosus*. These results are supported by previous surveys and give 95% confidence that *E. multilocularis* is not present in the UK red fox population at a prevalence of 1% or greater.

18. Description of Monitoring/Surveillance/Control programmes system: *Echinococcus granulosus* in meat

1. Monitoring/Surveillance/Control programmes system

The identification of cysts that are reported as the finding of hydatid disease at post mortem inspection of livestock slaughtered for human consumption at licensed abattoirs in the UK occurs regularly. However these cysts are not subject to further investigation and so their identification does not give a specific overview of hydatid prevalence, and therefore this data appears in the data tables as 'Echinococcus, unspecified sp.'. The impact of the disease on the health of the individual animal is negligible, with only marginal economic losses to the individual farmer from condemnation of affected organs, principally the liver.

3. Notification system in place to the national competent authority

Hydatid disease in animals is not notifiable in the UK and the identification of the parasite in animal tissues is not reportable.

19. Description of Monitoring/Surveillance/Control programmes system: *Echinococcus multilocularis* in animals

1. Monitoring/Surveillance/Control programmes system

Under EU Commission Delegated Regulation (EU) No 1152/2011, which came into force on the 1st January 2012, (superseded by Delegated Regulation (EU) no 2018/772 of 21 November 2017) surveillance of the wild definitive hosts (red foxes, *Vulpes vulpes*) is required to demonstrate disease

freedom to justify continued preventive health measures to control *E. multilocularis* infection in dogs and prevent further geographical spread of the parasite to free areas within the EU. That surveillance requires the testing each year of a specified number of foxes randomly sampled from across Great Britain and Northern Ireland.

2. Measures in place

The UK has official *E. multilocularis* free status. A survey is carried out each year of the definitive wildlife host, the European red fox, *Vulpes vulpes,* to verify that the UK remains free of *E. multilocularis.* In addition to keep the UK free of *E. multilocularis* all dogs entering the UK (except those coming from other countries with official disease free status in accordance with Commission Delegated Regulation (EU) No 2018/772) must be treated with praziquantal before entering the UK. This treatment must have been given no less than 24 hours and no more than 120 hours (5 days) before the dog enters the UK. If a dog is not treated it will be refused entry or put into quarantine.

3. Notification system in place to the national competent authority

There is a statutory requirement to report if an animal or carcass is known or suspected to be infected by *Echinococcus multilocularis,* under the Zoonoses Order 1989 (as amended). The finding of *E. multilocularis* in the wild definitive host, the European red fox, must be notified immediately to the EU.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

As part of an annual, continuous monitoring programme in wild definitive hosts to demonstrate disease freedom in the UK, faecal samples are collected from red foxes (*Vulpes vulpes)* and tested for the presence of *E. multilocularis* and *E. granulosus*. In total in 2018, 476 faecal samples were collected in Great Britain and a further 351 were collected and tested in Northern Ireland. Of the total 827 foxes tested in the UK during the year, all tested negative for *E. multilocularis* and *E. granulosus*. These results are supported by previous surveys and give 95% confidence that *E. multilocularis* is not present in the UK red fox population at a prevalence of 1% or greater.

20. General evaluation: Shiga toxin-producing Escherichia coli (STEC)

1. History of the disease and/or infection in the country

Shiga toxin-producing *Escherichia coli* (STEC), formerly known as Vero cytotoxin-producing *Escherichia coli* (VTEC), are a group of bacteria that may cause infectious gastroenteritis. The most frequently reported STEC strain to cause illness in the UK is *E. coli* O157, although non-O157s are thought to be responsible for around one third of STEC cases in Scotland. In England and Wales non-O157 testing has been enhanced in recent years, with a significant increase in the detection of non-O157 cases as a consequence, and the proportion of non O157 cases is now similar to that seen in Scotland. However, PCR is not used yet universally for detection of non-O157 STEC in England and Wales, so the true incidence remains unknown.

STEC infection is a relatively rare cause of gastrointestinal illness in England, with around 800 cases diagnosed in people annually. In Scotland however, there is a higher rate of STEC infection in the population, with around 200 clinical cases per year. On rare occasions, STEC infection in people can cause two serious conditions:

- haemolytic uraemic syndrome (HUS)
- thrombotic thrombocytopaenic purpura (TTP)

Both of these conditions affect the blood, kidneys and, in the most severe cases, the central nervous system.

Risk assessment, based on clinical symptoms and risk group of the patient and potential pathogenicity of the strain of STEC infecting the patient, is challenging. In response, new guidelines on the public health management of O157 and non-O157 STEC cases were published by the STEC Guidelines Update Working Group in August 2018 and are available at: www.gov.uk/government/publications/shiga-toxin-producingescherichia-coli-public-health-management

Ruminants, particularly cattle, are thought to be the main reservoirs for *E. coli* O157 in the UK although they display no obvious signs of disease. STEC is not notifiable in animals in the UK and is not subject to any monitoring surveys although occasional visits are undertaken if there appears to be an animal association with an outbreak of human STEC disease.

A farm-level survey of faecal cattle faeces conducted between 2014-2015 in England, Wales and Scotland demonstrated a herd level prevalence of *E. coli* O157 of around 20%: (https://www.foodstandards.gov.scot/downloads/Super-shedders_-FINAL_version_for_publication.pdf).

The last survey of STEC in sheep presented for slaughter in Scotland was undertaken in 2007: (https://www.foodstandards.gov.scot/downloads/Report_to_FSA_Scotland_On_Project_S14005.pdf)

Food: No specific STEC national surveys were carried out in 2018. 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 English surveillance, Wales, Scotland and Northern Ireland also have separate microbiological food surveillance programmes within their own regions. The UK government also

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

2. Evaluation of status, trends and relevance as a source for humans

Foodborne outbreaks have been well documented, but many cases of STEC O157 are sporadic and it is often difficult to confirm a source of infection in these circumstances. A number of case control studies in Great Britain have shown the importance of direct contact with animals and the animals' environment. This can result in occupational exposure but cases are also identified annually in members of the public who have had close contact with animals and their environment, quite often through visiting a farm open to the public.

21. Description of Monitoring/Surveillance/Control programmes system: STEC in ruminants

1. Monitoring/Surveillance/Control programmes system

Shiga toxin-producing *Escherichia coli* (STEC), formerly known as Vero cytotoxin-producing *Escherichia coli* (VTEC) may be identified in the UK by Government veterinary laboratories. However this is not usually as part of scanning surveillance but as a consequence of specific visits made at the request of a Consultant in Communicable Disease Control (CCDC) of Public Health England (PHE), Public Health Wales (PHW) or in Scotland by a Consultant in Public Health Medicine (CPHM). Requests are made by public health colleagues where an animal-associated source is suspected to be the cause of human disease. Determination of phage type (PT), Shiga toxin type, and comparison of human and animal isolates by whole genome sequencing (WGS) are performed by the Gastrointestinal Bacteria Reference Unit (GBRU), PHE Colindale, or the Scottish *E. coli* O157/STEC Reference Laboratory (SERL). If isolates from animals circumstantially implicated in outbreaks and human cases have the same PT and indistinguishable or closely related sequences, this is taken as confirmatory evidence of a causal association. STECs may be detected incidentally during the investigation of animal premises.

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

disease in cattle or other animal species, prevalence figures are of limited help in assessing the degree of risk to humans. For risk assessment, the general principle of assuming an animal is infected with STEC O157 is used. In England and Wales about 15% of general STEC outbreaks have been linked to direct or indirect animal contact. Prior to the large outbreak at an English open farm in 2009, involving 93 human cases, human disease outbreaks with direct animal contact links had generally each comprised fewer than ten cases. Most large outbreaks in the UK have been related to food rather than direct contact with animals. About 80% of human cases appear to be sporadic and unattributed to an identifiable source, although case-control studies suggest that contact with farm animals and the rural environment may be a major contributing factor.

2. Measures in place

Available controls for STEC, including STEC O157 in animals, rely on the application of good husbandry and hygiene measures particularly at the point of provision of food production. These principally require the hygienic production and pasteurisation of milk (compulsory in Scotland, but raw drinking milk can be sold in England and Wales with enhanced labelling requirements), the provision of clean animals to slaughter, the use of clean water for the irrigation of crops (particularly those that are ready to eat) and the application of hygiene practices in the processing of these animals and the products derived from them.

In addition, controls to minimise the risk of zoonotic spread on farms require the application of appropriate risk management procedures based upon those suggested for open farms. Visitors to livestock farms, including those open to the general public, ramblers and workers on commercial livestock farms are all at risk of exposure, and should ensure good hand hygiene is observed. Risk of foodborne human illness can be reduced by thoroughly cooking meat and meat products, and by avoiding cross-contamination of work surfaces and ready-to-eat foods. At abattoirs, Food Business Operators are required to check the hide or skins of livestock presented for slaughter for faecal contamination, and take the necessary steps to avoid contamination of the meat during slaughter and processing.

3. Notification system in place to the national competent authority

No: there is no requirement to notify a suspicion of STEC infection in animals in the UK, or for a private veterinary laboratory to notify the Government should STEC be identified in samples derived from animals.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018 APHA were involved in two STEC *E. coli* O157 on-farm outbreak investigations.

(1). In June, following the diagnoses of three human cases with STEC infection epidemiologically linked to an open [petting] farm, PHE requested support from APHA. The farm was visited in June and July when samples were collected from animals and the environment.

A number of samples collected had *E. coli* O157 isolated from them, which matched very closely to the *E. coli* O157 that was cultured from the three human cases. PHE concluded that it was highly likely that the human cases acquired *E. coli* O157 during their visits to the farm. During farm visits general hygiene and biosecurity advice was given to the farmer.

(2). In September, APHA was contacted by Public Health Wales (PHW) to assist in the investigation of two human cases of *E. coli* O157 thought to be linked to a goat milk product. The producer's main output is pasteurised but they had been providing a small and specific customer base with raw (unpasteurised) product at the request of the customers.

A sampling visit was carried out by a Veterinary Investigation Officer (VIO). No *E. coli* O157 was detected from any of the faecal or environmental samples collected. It was reinforced that shedding may be intermittent and these samples did not negate the risk associated with raw product or the potential for cross contamination.

Dairy hygiene and assessment of the production process was out of the VIO remit but was covered by the Local Authority Environmental Health Officers, Dairy Hygiene Inspectorate and the Food Standards Agency. Raw products are no longer being supplied.

5. Additional information

Analysis of outbreak investigations associated with open farms in Great Britain over a 10 year period revealed that STEC O157 was confirmed in 19 (60%) of 31 farm premises sampled, with the highest proportion of positive samples on positive premises (29%) in cattle, followed by sheep (24%), donkeys (15%), pigs (14%), horses (12%) and goats (10%). These premises were sampled because of perceived links with human case(s) and not as part of a survey so the results may not be representative of all open farms. Following the major outbreak of *E. coli* O157, phage type 21/28 in which microbiological, epidemiological and environmental investigations identified the main animal petting barn as the source of the outbreak at an open farm in Surrey, England in 2009, an independent review of the management of the outbreak, and the regulatory framework and control of risks relating to open farms was published. This is available at: http://www.griffininvestigation.org.uk/. As a result a code of practice for open farm operators and other individuals responsible for events where the public

can have direct contact with animals was subsequently created and this was itself updated in 2015 (see link below).

Information via leaflets and articles aimed at farmers, veterinarians and policy makers is available from the Animal and Plant Health Agency (APHA), the Health and Safety Executive and other Government departments' websites:
https://www.gov.uk/guidance/keeping-livestock-healthy-disease-controls-and-prevention,
http://www.scotland.gov.uk/Publications/2005/03/20839/54388.

The APHA also visits farmer and veterinary meetings on request to talk about STEC O157 and control of other zoonoses in farmed livestock. Reduction of the spread of *E.coli* O157 in animals relies on good hygiene, such as keeping any bedding clean and dry. A revised version of the industry Code of Practice on Preventing or Controlling Ill Health from Animal Contact at Visitor Attractions was released in 2015 and can be found at: http://www.visitmyfarm.org/component/k2/item/339-industry-code-of-practice. This Code of Practice provides advice to farmers and those responsible for other types of establishments where the public have direct access to animals, on practical steps to reduce the risk of ill health to visitors.

22. General evaluation: West Nile Virus

1. History of the disease and/or infection in the country

Humans: To date, locally acquired West Nile Virus (WNV) infection has not been reported in people in the UK although there have been occasional cases of travel associated infection. Historically therefore, the main risk of WNV for UK residents has been for those travelling abroad.

Animals: WNV is absent from mammals in Great Britain. The virus has never been isolated from birds or mosquito vectors in the UK.

2. Evaluation of status, trends and relevance as a source for humans

As in previous years, during 2018 neither the UK wild bird survey nor reports of notifiable disease in horses nor trade-associated testing of certain horses entering or leaving the UK led to any indication of the presence of WNV in animals or birds in the United Kingdom.

23. Description of Monitoring/Surveillance/Control programmes system: West Nile virus in birds

1. Monitoring/Surveillance/Control programmes system

WNV is not a notifiable disease in birds (kept domestically or wild). Annual wild bird surveillance is carried out across the UK by the Animal and Plant Health Agency (APHA).

2. Measures in place

Several hundred birds per year are sampled as part of the UK's WNV surveillance programme. Sampling is carried out from April to October during the mosquito season. Target species are sampled (small passerines, corvids, waterside birds and birds of prey), birds with neurological signs and mass mortality incidents. In 2018 561 wild birds were sampled, all with negative results. Serum samples are collected from live wild birds and brain and kidney samples for those sampled post mortem. PCR testing is undertaken on brain and kidney (dead birds). A WNV capture ELISA (cELISA) is used to test wild bird serum samples. WNV PCR testing includes TaqMan rtPCR and PanFlavivirus rtRTPCR.

3. Notification system in place to the national competent authority

No: WNV is not a notifiable disease in birds (kept domestically or wild). However it is a notifiable disease in horses in the UK. Defra would be informed of any positive results detected as a consequence of wild bird surveillance.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Again in 2018, no cases of WNV were identified in animals or birds in the UK.

24. Description of Monitoring/Surveillance/Control programmes system: West Nile virus in horses

1. Monitoring/Surveillance/Control programmes system

WNV is a notifiable disease in horses in the UK and an Official Veterinarian will investigate any suspect cases that are reported and collect samples for laboratory investigation, when WNV cannot be ruled out on clinical examination. In addition certain horses are blood sampled for trade-associated reasons prior to export from the UK.

2. Measures in place

Horses are occasionally blood sampled for trade associated reasons or if clinical suspicion indicates sampling is necessary. In 2018, six horses showing neurological signs were blood tested for WNV, with negative results on serological testing. Testing is by WNV cELISA and IgM ELISA on horse serum samples.

3. Notification system in place to the national competent authority

Yes: WNV is a notifiable disease in horses in the United Kingdom. In addition, in recognition of the importance of surveillance for WNV disease in equids, a derogation exists to allow a private veterinary surgeon to submit samples to rule out WNV as a differential diagnosis, without invoking all the restrictions associated with a notifiable disease official investigation.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Again in 2018, no cases of WNV were identified in animals in the UK.

25. General evaluation: Listeriosis

1. History of the disease and/or infection in the country

Listeria monocytogenes is widely distributed in the environment, including in soil, decaying vegetation and fodder such as silage in which the bacteria can multiply. In humans the disease most commonly occurs in pregnant women, neonates, elderly people and those with a range of underlying medical conditions including cancer and diabetes. Consumption of foods contaminated with *L. monocytogenes* is the main route of transmission to humans. Zoonotic infection acquired directly from animals is also possible, although cases reporting animal contact are rare. In animals, listeriosis is chiefly a disease of farmed ruminants, with cattle and sheep considered the most frequently clinically infected species. Infection is opportunistic, and may occur through umbilical infection in the neonatal period, or more commonly though the ingestion of soil or soil-contaminated feed, notably poor quality silage.

Laboratory reports of listeriosis in humans in the UK have fallen from a peak in the late 1980s following targeted provision of advice to pregnant women to avoid ripened soft cheeses and pâtés. Listeriosis is a rare disease in the UK.

The potential link, if any, between listeriosis infection in animals and infection in humans still remains unclear. In animals in the UK, the majority of cases occur between January and April when animals are housed. This peak in cases is linked to the feeding of poorly fermented soil-contaminated silage.

2. Evaluation of status, trends and relevance as a source for humans

In animals, numbers of diagnoses of listeriosis vary between years, and are influenced by submission rates to diagnostic laboratories, but also by climatic factors which may influence silage quality or soil exposure for grazing animals. The data reported in the table for prevalence in animals summarises confirmed clinical diagnoses of listeriosis from specimens submitted to APHA, SRUC and AFBI laboratories during 2018. For Great Britain data, diagnoses use strict criteria and are recorded (once only per incident) using the Veterinary Investigation Diagnostic Analysis (VIDA) system.

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

3. Any recent specific action in the Member State or suggested for the European Union

To achieve the greatest impact, FSA's activities are being targeted at specific high-risk food industry sectors and particular vulnerable groups of the population and the places where they are cared for. More information is available at: https://www.food.gov.uk/business-guidance/listeria

26. Description of Monitoring/Surveillance/Control programmes system: *Listeria spp.*

1. Monitoring/Surveillance/Control programmes system

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

enforcement activities in line with Regulation (EC) No 882/2004 (now Regulation (EU) No. 2017/652) on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in this report.

3. Notification system in place to the national competent authority

Reporting of Listeria when isolated from human clinical diagnostic samples is mandatory.

Notification of the finding of Listeria in animals is not mandatory.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Animals: During 2018, there were 157 incidents of listeriosis confirmed in animals in Great Britain and Northern Ireland, with diagnoses achieved via the submission of clinical material by private veterinarians for diagnostic investigation at the Animal and Plant Health Agency, Scotland's Rural Colleges and the Agri-food and Biosciences Institute. Of the total, 144 incidents were recorded in Great Britain and 13 in Northern Ireland. In Great Britain there were 29 incidents in cattle (entered in data table twice in error), where Listeria spp was diagnosed as the cause of abortion, mastitis, iritis or encephalitis, usually associated with the feeding of poor quality silage. In sheep and goats, there were 115 incidents where listeriosis was diagnosed (also entered in data table twice in error), as the cause of meningitis, septicaemia or abortions. In Northern Ireland, there were 3 incidents reported in cattle and 10 incidents in sheep during 2018, compared with 5 incidents reported in cattle and 8 incidents reported in sheep during 2017 and 11 incidents reported in cattle and 14 incidents in sheep during 2016.

In the United Kingdom in 2017 there were 132 incidents of listeriosis confirmed in animals: 119 incidents were recorded in Great Britain and 13 in Northern Ireland. In 2016 there were 209 incidents of listeriosis confirmed in animals in the United Kingdom: 184 incidents were recorded in Great Britain and 25 in Northern Ireland. The UK total in 2015 was 157 confirmed incidents of listeriosis in animals: 121 incidents were recorded in Great Britain and 36 in Northern Ireland. In 2014 there were 206 incidents of listeriosis confirmed in animals in Great Britain and Northern Ireland: 151 incidents were recorded in Great Britain and 55 in Northern Ireland. In 2013 there were 201 incidents of listeriosis confirmed in animals in Great Britain and Northern Ireland: 178 incidents were recorded in Great Britain and 22 in Northern Ireland.

Relevance of findings to human cases:

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

27. General evaluation: Lyssa virus including rabies and European bat Lyssa viruses

1. History of the disease and/or infection in the country

The United Kingdom is recognised as having rabies-free status by the OIE. Human rabies is extremely rare in the UK. The last indigenous human death from classical rabies occurred in 1902. Since 1902, there have been 29 reported cases of human rabies in the UK. The last case of indigenous dog mediated human rabies occurred in 1902. Of the remainder, 27 resulted from infection whilst abroad, mainly associated with dogs. The most recent case of imported human rabies was in November 2018 and was associated with a rabid cat in Morocco. There was one human case of rabies caused by infection with European Bat Lyssavirus type 2 (EBLV-2) in 2002, following a bite from an indigenous Daubenton's bat in Scotland. The last case of indigenous terrestrial rabies in an animal in the UK was in 1922 (dog). Rare cases of rabies in animals in quarantine (the most recent in 2008) have not affected the UK's rabies-free status.

Between 1987 and 2018, 22 Daubenton's bats have tested positive for EBLV-2 (either live virus and/ or RNA) as part of the longstanding APHA bat passive surveillance programme in Great Britain. This programme involves testing dead bats usually submitted by bat workers and members of the public. In addition there was one saliva positive Daubenton's bat (EBLV-2 RNA) identified in Scotland via a now historical active surveillance scheme. Hence, 24 cases of EBLV-2 infection (23 Daubenton's bats and one human case) have been identified in the UK up to December 2018.

In October 2018, European bat lyssavirus type 1 (EBLV-1) was detected in two serotine bats in Dorset, England, again sampled as part of the APHA bat passive surveillance programme in Great Britain. Antibodies to EBLV-1 were detected in a single serotine bat in Sussex in 2004. But the two positive cases represent the first isolation of EBLV-1 in the UK.

If rabies is suspected on the basis of clinical signs in humans or animals, it is compulsory to notify the relevant government departments and further investigations are carried out.

2. Evaluation of status, trends and relevance as a source for humans

During the year 2018, there were no cases of rabies diagnosed in terrestrial mammals in the UK. There were 10 cases of bat rabies identified via passive surveillance in 8 wild Daubenton's bats (EBLV-2) and 2 wild serotine bats (EBLV-1). There was a confirmed death from rabies (November 2018) in a male GB resident bitten by a cat whilst on holiday in Morocco.

28. Description of Monitoring/Surveillance/Control programmes system: Rabies in terrestrial mammals

1. Monitoring/Surveillance/Control programmes system

If rabies is suspected on the basis of clinical signs in an animal, it is compulsory to notify the relevant government departments and further investigations are carried out. In England, Wales and Scotland, the Animal and Plant Health Agency (APHA) and in Northern Ireland the Department for Agriculture, Environment and Rural Affairs Veterinary Services must be notified. If disease cannot be ruled out by the Official Veterinarian then samples are collected (central nervous system tissue) for analysis. A number of tests may be used, including Fluorescent Antibody Test (FAT), Tissue culture test (RTCIT), RT-PCR etc. Rabies is confirmed if OIE prescribed tests confirm the presence of the rabies virus, antigen or RNA in the animal's tissues. Pet animals living in the UK can be vaccinated against rabies. The last case of indigenous terrestrial rabies in an animal in the UK was in 1922. Rare cases of rabies in animals in quarantine (the most recent in 2008) have not affected the UK's rabies-free status.

2. Measures in place

Rabies is a notifiable disease in the UK. If rabies is suspected on the basis of clinical signs in an animal, it is compulsory to notify the relevant government departments and further investigations are carried out. In England, Wales and Scotland, the Animal and Plant Health Agency (APHA) and in Northern Ireland the Department for Agriculture, Environment and Rural Affairs Veterinary Services

must be notified. If disease cannot be ruled out by the Official Veterinarian then samples are collected (central nervous tissue) for analysis. A number of tests may be used, including Fluorescent Antibody Test (FAT), Tissue culture test (RTCIT), RT-PCR etc. Rabies is confirmed if OIE prescribed tests confirm the presence of the rabies virus, antigen or RNA in the animal's tissues. Pet animals living in the UK can be vaccinated against rabies. The last case of indigenous terrestrial rabies in an animal in the UK was in 1922. Rare cases of rabies in animals in quarantine (the most recent in 2008) have not affected the UK's rabies-free status. Documentary checks of Pet Passports are routinely undertaken of animals entering the UK from other Member States that are not Officially Rabies Free and from third countries and any pet animal not fully compliant with the requirements will not be permitted to enter the UK or will be placed into quarantine until any issues are resolved.

3. Notification system in place to the national competent authority

Yes: If rabies is suspected on the basis of clinical signs in an animal, it is compulsory to notify the relevant government departments and further investigations are carried out. In England, Wales and Scotland, the Animal and Plant Health Agency (APHA) and in Northern Ireland the Department for Agriculture, Environment and Rural Affairs Veterinary Services must be notified.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

During the year 2018, there were no cases of rabies diagnosed in terrestrial mammals in the UK. Five dogs were investigated (1 rabies suspect and 4 deaths in quarantine) but all were negative for rabies. Exotic fruit bats (n=26) from UK zoos that had died were submitted for screening but were negative for lyssavirus. There were 10 cases of bat rabies identified via passive surveillance in 8 wild Daubenton's bats (EBLV-2) and 2 wild serotine bats (2 EBLV-1). There was a confirmed death from rabies (November 2018) in a male GB resident bitten by a cat whilst on holiday in Morocco.

29. Description of Monitoring/Surveillance/Control programmes system: European bat Lyssa viruses in bats

1. Monitoring/Surveillance/Control programmes system

European Bat Lyssaviruses (EBLVs) are lyssaviruses that also cause the disease rabies. These viruses have been known to infect not only the primary hosts (insectivorous bats) but, on very rare occasions, other animal hosts and humans. EBLV-1 and EBLV-2 have been identified in 12 bats species, with over 90% of EBLV-1 identified in serotine bats, with Myotis species (including Daubenton's) associated with EBLV-2. Both EBLV-1 and EBLV 2 have been detected in the UK. The

Animal and Plant Health Agency (APHA) has a longstanding programme of passive scanning surveillance for European Bat Lyssavirus (EBLV) in bats in Great Britain (GB). This programme involves testing dead bats usually submitted by bat workers and members of the public. This surveillance programme has been undertaken since 1987. Between 1987 and December 2018, approximately 13,000 bats were screened for Lyssavirus. Only 22 of 464 Daubenton's bats tested positive for EBLV-2 whilst only 2 of 183 serotine bats tested positive for EBLV-1 (both tested in 2018). In addition there was one saliva positive Daubenton's bat identified in 2004 via a now historic active surveillance scheme.

Other bat lyssaviruses detected in Europe (Bokeloh Bat lyssavirus, Lleida Bat Lyssavirus and Kotalahti bat lyssavirus) have not as yet been detected in bats in the UK.

2. Measures in place

As for other species, if rabies is suspected in a bat on the basis of clinical signs, and disease cannot be ruled out by the Official Veterinarian then the bat is euthanased and screened for lyssavirus.

The passive scanning surveillance for European Bat Lyssavirus (EBLV) in bats in Great Britain involves testing dead bats. These are usually submitted by bat workers, members of the Bat Conversation Trust or members of the public.

In addition, lyssavirus screening is undertaken under wildlife incident investigation scheme (WIIS) in high bat mortality events prior to toxicological screening in GB. Licenced zoos also submit dead exotic (frugivorous) bats to confirm maintenance of disease-free captive colonies.

3. Notification system in place to the national competent authority

Yes: If rabies is suspected on the basis of clinical signs in an animal, it is compulsory to notify the relevant government departments and further investigations are carried out. In England, Wales and Scotland, the Animal and Plant Health Agency (APHA) and in Northern Ireland the Department for Agriculture, Environment and Rural Affairs Veterinary Services must be notified.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

During the year 2018, there were 10 cases of bat rabies identified via passive surveillance. Eight of these positives were identified in wild Daubenton's bats (EBLV-2) in Sussex (n=5), Cambridgeshire (n=1), Northumberland (n=1) and West Lothian (n=1). In October 2018, European bat lyssavirus type 1 (EBLV-1) was detected in two serotine bats in Dorset, England, representing the first isolation of

EBLV-1 in the UK (one of the serotine bats had died in July 2018 and been frozen until submission in October 2018).

30. General evaluation: Salmonella

1. History of the disease and/or infection in the country

Most human non-typhoidal salmonellosis in the UK is acquired via the foodborne route. *Salmonella* Typhi and *S*. Paratyphi (typhoidal *Salmonella*) are adapted to humans and are thus not considered to be zoonotic.

The majority of *Salmonella* isolations in farm livestock in the UK are detected as a result of testing diagnostic samples from clinically diseased cattle, or as a result of statutory surveillance under legislative programmes to control salmonella in flocks of domestic fowl and turkeys. The poultry *Salmonella* National Control Programmes (NCPs) are required under EU regulation. All NCPs focus on reducing the prevalence of the most important serovars of *Salmonella* that can affect human health and, as such, specific reduction targets are set for *S.* Enteritidis and *S.* Typhimurium (including monophasic strains). In the NCP for breeding chicken flocks, *S.* Hadar, *S.* Infantis and *S.* Virchow are also included in the reduction target. *Salmonella* NCPs have been implemented in the breeding chicken, laying chicken, broiler chicken and turkey breeding and turkey fattening industry sectors.

For poultry populations (chickens and turkeys) subject to *Salmonella* NCPs, results are reported as the number of positive flocks detected under the programmes. Trends in the number of *Salmonella* reports in animal species not subject to an NCP also need to be treated with caution in view of the inherent biases associated with the data, e.g. the level of diagnostic and surveillance testing carried out.

2. Evaluation of status, trends and relevance as a source for humans

Together S. Enteritidis and S. Typhimurium constitute approximately 48% of all non-typhoidal Salmonellae reported in people in the United Kingdom. In addition to these, S. Newport, S. Infantis, S. Stanley and S. Java are within the top 10 most commonly identified serovars in all four countries.

Reporting of *Salmonella* spp in people shows a consistent seasonal pattern with a distinct peak of infection observed in the third quarter of the year.

31. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/animals/ birds

1. Monitoring/Surveillance/Control programmes system

Monitoring for Salmonella in most animal and bird species may be carried out (on a voluntary basis) by the food business operator. The exceptions are for chicken and turkey flocks which are subject to sampling as required by the respective Salmonella National Control Programme (NCP). Therefore (except for these NCPs) reports of Salmonella usually arise from samples sent by a private veterinarian for diagnostic purposes. Government funded scanning surveillance programmes are delivered by the Animal and Plant Health Agency (APHA), Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.

The samples submitted are usually either environmental samples or faeces or whole carcases or organs collected at post mortem. Reports of Salmonella isolates under the Zoonoses Order are classed as positive.

2. Measures in place

Specific and similar domestic legislation covering Salmonella in animals exists in Great Britain and in Northern Ireland. In Great Britain confirmed Salmonella cases are statutorily reportable to the Competent Authority under the Zoonoses Order 1989. This reporting requirement relates to isolations from a number of 'statutory' species (cattle, sheep, goats, pigs, horses, deer, rabbits, chickens, turkeys, ducks, geese, partridges, pheasants, guinea fowl, quail and pigeons). In Northern Ireland the Zoonoses Order 1991 lists any mammal except man; any four-footed beast which is not a mammal; snakes and all species of birds as species for which salmonella isolations must be reported. The Zoonoses Order and other domestic legislation also give powers to investigate a suspicion that Salmonella is present on a premises and also disease control powers. However the control powers (such as officially restricting the movement of positive animals or flocks) are rarely used to control salmonella when it is identified in animals or birds apart from in relation to the *Salmonella* National Control Programmes (NCPs) if a regulated serovar is identified in a breeding or laying flock of *Gallus gallus* or in a breeding turkey flock.

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be

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

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Results from Salmonella NCP testing undertaken in the UK are reported annually. In addition a more detailed report discussing the findings in Great Britain is also produced each year by the APHA. There were 3,798 isolations of *Salmonella* in livestock in GB in 2018 which represents an increase of 24.6% compared with 2017 (3,049 isolations). This comprised 3,587 isolations from species covered by the statutory reporting requirements of the Zoonoses Order 1989 (1,838 isolations from chickens, 497 isolations from turkeys, 492 isolations from cattle, 430 isolations from ducks, 169 isolations from pigs, 109 isolations from sheep, 21 isolations from horses, ten isolations from pheasants, nine isolations from pigeons, five isolations from partridges, four isolations from geese, two isolations from quail and one isolation from deer) plus 211 isolations from non-statutory species (e.g. cats, dogs and reptiles, which are not reported in detail in this publication).

Relative to 2017, there were fewer isolations from horses (21 vs. 39 isolations), pheasants (10 vs. 20 isolations), pigeons (9 vs. 15 isolations) and geese (4 vs. 6 isolations).

The GB surveillance data for 2018 shows that only 24.5% of the isolations of *Salmonella* reported to APHA resulted from samples taken due to clinical disease in livestock. This contrasts with data for *Salmonella* in humans where reports usually originate from cases of clinical disease.

The majority of the isolations reported from chicken and turkey flocks (74.5% and 87.3%, respectively) during 2018 were the result of statutory surveillance activities due to the NCPs that are in place for these sectors. This differs from years prior to the introduction of the NCPs when the majority of chicken and turkey isolations originated from voluntary surveillance.

Voluntary *Salmonella* surveillance of healthy flocks is common practice in the GB duck industry. In 2018, 98.6% of *Salmonella* isolations from ducks resulted from voluntary surveillance.

The number of *S*. Typhimurium isolations from cattle, sheep, pigs and poultry in GB increased by 38.2% in 2018 (170 isolations) relative to 2017 (123 isolations). This was primarily attributable to the number of reports of this serovar from pigs increasing by 58.5% (65 vs. 41 isolations) and a 12.3% increase in number of reports from cattle (64 vs. 57 incidents). Isolations of the monophasic strain *Salmonella* 4,5,12:i:- also increased (by 10.0%) in 2018 and *Salmonella* 4,12:i:- increased by 5.8% compared with 2017. Reports of *S*. Enteritidis decreased by 33.3% in 2018 compared with 2017 (30 vs.

45 isolations), but were considerably higher than during 2016 (4 isolations). Isolations of *S*. Enteritidis were only reported from cattle and chickens, in contrast to 2017 when there were isolations from cattle, chickens, ducks and turkeys.

In Northern Ireland there were 188 isolations of *Salmonella* in 2018 from animals and poultry (as covered by statutory reporting requirements in Northern Ireland). These were 74 isolations from chickens, 9 from turkeys, 79 from cattle, 11 from pigs, and 13 from sheep, one isolation from a deer and one from a dog were reported.

Therefore across the UK there were 3,986 isolations of *Salmonella* in the UK in 2018, compared with 3,194 in 2017 (an increase of 24.8%); of which 3,798 were reported by GB. This comprised 3,774 isolations from livestock species covered by statutory reporting requirements (1,912 from chickens, 506 from turkeys, 571 from cattle, 430 from ducks, 180 from pigs, 122 from sheep, 21 from horses, 10 from pheasants, 9 from pigeons, 5 from partridges, 4 from geese and 2 from quail) plus 212 isolations from non-livestock species (cats, dogs and reptiles).

5. Additional information

The majority of incidents reported are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. Therefore the sample submission rate and the number of Salmonella incidents recorded on an annual basis is subject to external influencing factors which can impact on observed trends (such as clinical presentation of disease, economic influences, awareness of a disease etc). However the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

32. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp*./cattle

1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Animal and Plant Health Agency (APHA), Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. Over 90% of the Salmonella isolates derived from cattle annually are from samples taken for diagnostic purposes and submitted for testing under this programme. The samples are usually faeces, or from organs collected at post mortem, and are voluntary samples usually sent by a private veterinarian for diagnostic purposes.

2. Measures in place

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

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

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

33. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/deer

1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Animal and Plant Health Agency (APHA), Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.

Voluntary samples usually sent by a private veterinarian for diagnostic purposes, which are usually faeces, or from organs collected at post mortem.

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

2. Measures in place

Vaccination of deer is rare, but may be used, on a voluntary basis. There is no restriction on using any authorised Salmonella vaccine.

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority. Units tested are not known because the laboratories do not report negative results unless as part of an official control programme or survey.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

There is no routine Salmonella monitoring of deer in the UK, therefore isolates come from farmed animals with clinical disease. The number of reports is dependent on the total population and the

number of diagnostic submissions to veterinary laboratories. The majority of laboratory submissions in deer were from samples taken for clinical diagnostic purposes.

34. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ducks

1. Monitoring/Surveillance/Control programmes system

Monitoring for Salmonella in duck breeding, fattening and commercial egg laying flocks is carried out on a voluntary basis by the food business operator, according to the food business operator's own protocol. Samples include faeces, boot swabs, hatchery debris, cull birds, hatcher tray liners, organs at post mortem etc. Voluntary environmental samples are usually sent by the operator to a private testing laboratory/ government testing laboratory to monitor Salmonella status of the flock. Post mortem samples are submitted by the private veterinarian for diagnostic purposes.

2. Measures in place

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

Operators are encouraged to monitor in the same way as done for *Gallus gallus* under Regulation (EC) No. 2160/2003, but there is no statutory national Salmonella control programme in the duck industry sector in the UK. All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the Salmonella is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of Salmonella from ducks. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm. An Industry Assurance Scheme, similar to those already in place for the broiler, turkey and layer chicken sectors has been developed by representatives of the UK duck industry and was published in 2011. The Duck Assurance Scheme is owned and administered by the British Poultry Council and is managed by an independently chaired Technical Advisory Committee. It covers all areas relating to quality and welfare in duck production: breeding, hatching, rearing, catching, transport, slaughter, free-range and table eggs, and includes guidance on control of Salmonella by means of biosecurity, farm hygiene and vaccination.

Advice is given on control of Salmonella and farm visits may be made by the veterinary and public health authorities. Restrictions may be placed on the premises under the powers available in national legislation.

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Voluntary monitoring for Salmonella is carried out by a significant proportion of the UK duck industry, but because this is done on a voluntary basis, the number of submissions for Salmonella testing from UK duck flocks can vary from year to year. *Salmonella* Indiana is again the most frequently isolated salmonella from ducks in 2018. However *Salmonella* Indiana is reported rarely in humans. All isolations were made in Great Britain.

35. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ *Gallus gallus* – breeding flocks

1. Monitoring/Surveillance/Control programmes system

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

All consignments of day old chicks are sampled on arrival at the holding. According to the requirements of the Salmonella NCP, mandatory sampling is required on the day of arrival – samples must be taken from each flock within 72 hours of hatching, comprising of at least the following from each hatchery supplying the chicks:

- Hatcher tray liners or chick box liners: one liner for each 500 chicks delivered, up to a maximum of 10 liners.
- All chicks dead on arrival and culls at day old, up to a maximum of 60.

Operator voluntary monitoring may also be undertaken and can include hatchery debris, dust, fluff, meconium samples etc.

The rearing flocks are sampled according to the requirements of the Salmonella NCP. A mandatory sampling is required at 4 weeks old and then 2 weeks before moving to the laying phase or laying unit as follows:

- A minimum of 2 pairs of boot swabs, or
- A composite faeces sample made up of individual 1g faeces samples selected at random from sites to represent the whole building/space available to the birds. The size of the sample required is determined by the number of birds in the building/ flock.

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

Breeding flocks in their production period are sampled according to the requirements of the Salmonella NCP. Mandatory sampling is required every 2 to 3 weeks during the laying/ production period as follows:

- A minimum of 5 pairs of boot swabs, or
- A composite faeces sample made up of individual 1g faeces samples selected at random from sites to represent the whole building/space available to the birds. The size of the sample required is determined by the number of birds in the building/flock.

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

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

Culture and isolation of Salmonella (field strain) from samples taken from the flock's environment. Reports of Salmonella isolates under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/ isolates obtained. 'Flock' is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace. Testing is done in accordance with ISO 6579-1: 2017 - Microbiology of the food chain -- Horizontal method for the detection, enumeration and serotyping of *Salmonella* -- Part 1: Detection of *Salmonella spp*. (MRSV method for primary production samples).

2. Measures in place

Regulation (EC) No. 2160/2003 lays down harmonised rules for the monitoring and control of Salmonella in breeding flocks of domestic fowl. The legislation sets out enhanced monitoring and controls for Salmonella which have been implemented in the UK Salmonella National Control Programme (NCP) for breeding chicken flocks. The requirements of the Programme are enforced through the Control of Salmonella in Poultry Order (England) 2007, the Control of Salmonella in Poultry (Scotland) Order 2008, the Control of Salmonella in Poultry (Wales) Order 2008 and the Control of Salmonella in Poultry Scheme Order (Northern Ireland) 2008 in order to meet the target for reduction in Salmonella prevalence set out in EU legislation. Regulation (EC) No. 200/2010 (which amends Regulation (EC) No. 1003/2005), sets a target for the breeding flock sector to ensure that no more than 1% of adult breeding flocks with more than 250 birds remain positive for the regulated Salmonella serovars annually. The EU target for breeding flocks is based on the 5 serovars considered of greatest public health significance at the time of drafting of the legislation (the 5 most frequent serovars in human cases): S. Enteritidis, S. Typhimurium, S. Virchow, S. Hadar and S. Infantis. Regulation (EU) No. 517/2011 amends Regulation (EC) No. 200/2010 to include the monophasic Salmonella Typhimurium variants S. 1,4,[5],12:i:- as regulated/ target Salmonella ssp. within the requirements of the Salmonella National Control Programmes. Any breeding flock found to be infected with a regulated Salmonella serovar according to the protocol outlined above is placed under official control and the requirements of Regulation (EC) No. 2160/2003 are implemented. Regulation (EC) No 200/2010 allows for an extension in the frequency of operator sampling at the holding from every two weeks to every three weeks, at the discretion of the Competent Authority. A reduction in the number of routine official samples required in each flock from three to two per year is also allowed. This revised testing protocol is applicable to Member States that have met the Salmonella reduction target as specified in the legislation for at least two consecutive calendar years. As the UK breeding chicken sector achieved the reduction target for 2017 and 2018, this extended testing interval (at the discretion of the Competent Authority) and the reduced official sampling frequency have been applied in the UK in 2018. However, some UK breeding chicken companies have chosen to still sample at a two weekly frequency.

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

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

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

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

3. Notification system in place to the national competent authority

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

The main provisions of the Zoonoses Orders are:

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

The main provisions of the Control of Salmonella in Poultry Orders relevant to the breeding chicken control programme are:

- Owners of poultry breeding flocks (of more than 250 birds in GB) must be registered unless officials have access to flock information from another source (e.g. the Great Britain Poultry

Register and the Poultry Register in Northern Ireland). Information supplied should include the name and address of the holding, the number (and species) of breeding flocks on the holding, the number of poultry in each breeding flock, their status in the breeding pyramid (e.g. Parent, Grandparent etc) and whether layer breeders or meat (broiler) breeders.

- Flock owners are required to record the movements of birds, chicks or eggs onto and off the premises, including dates of movements, numbers of poultry, chicks or eggs moved, their ages, building/ flock identity and the addresses of source or destination premises. This information must be made available for inspection on request by a government authorised official. Owners must also inform officials with two weeks' notice of the expected date of movements to the laying phase or laying unit and also the date on which the flock is expected to reach the end of the production cycle. This is done to facilitate the collection of official samples.
- The owner/ operator is required to maintain records of the dates of sampling, type of samples collected, the identity of building, flock or holding sampled and the age of each flock sampled. Owners should also keep a record of the test result and name of laboratory used.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella 13.23:i:- was the most frequently isolated salmonella from breeding chicken flocks in 2018. One regulated serovar (a monophasic *Salmonella* Typhimurium) was identified from UK breeding chicken flocks sampled under the Salmonella NCP during 2018. Therefore the UK continued to achieve the breeding chicken target as set in EU Regulation.

5. Additional information

The majority of *Salmonella* incidents reported in most animal and bird species in the UK are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

36. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ *Gallus gallus* – broilers

1. Monitoring/Surveillance/Control programmes system

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

National Control Programme, mandatory sampling is required within 3 weeks of the birds being sent to slaughter. Routine Official Control Samples are collected once annually from 10% of holdings with more than 5,000 birds.

The NCP sample must consist of a minimum of 2 pairs of boot swabs taken so as to be representative of the whole area in the house to which the birds have access. In flocks of less than 100 broilers, where it is not possible to take boot swabs, hand drag swabs may be used. Other operator voluntary monitoring can include additional boot swabs, litter samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc.

Case definition: Culture and isolation of Salmonella (field strain) from samples taken from the flock, or directly associated with its environment. Reports of Salmonella isolates under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/isolates obtained. A flock is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace.

The laboratory testing method is ISO 6579-1: 2017 - Microbiology of the food chain -- Horizontal method for the detection, enumeration and serotyping of *Salmonella* -- Part 1: Detection of *Salmonella spp*. (MRSV method for primary production samples).

2. Measures in place

There are no restrictions on the use of Salmonella vaccines which have a Marketing Authorisation. However, vaccination is not generally used in broiler flocks in the UK.

Regulation (EC) No. 2160/2003 and Regulation (EU) No. 200/2012 lay down harmonised rules for the monitoring and control of Salmonella in broiler flocks, which have been implemented in the UK *Salmonella* National Control Programme (NCP). The NCP is enforced by the Control of Salmonella in Broiler Flocks Order (England) 2009, the Control of Salmonella in Poultry (Breeding, Laying and Broiler Flocks) (Scotland) Order 2009, the Control of Salmonella in Broiler Flocks (Wales) Order 2009 and the Control of Salmonella in Broiler Flocks Scheme Order (Northern Ireland) 2009. This national legislation enforces the requirements of the NCP required to meet the target for reduction in Salmonella prevalence set out in EU legislation. The NCP applies to all operators, except where the operator produces small quantities of product provided direct to the consumer or via local retailers which only supply the final consumer or where all production is for private domestic use only. Regulation (EU) No. 200/2012 sets a target for the UK broiler sector to ensure that no more than 1% of broiler flocks are detected positive for Salmonella of greatest human health significance annually. The EU target is based on the two most common serovars in human cases which are S. Enteritidis and S. Typhimurium (including monophasic strains). According to Commission Regulation (EC) No. 1177/2006, the

administration of antimicrobials to any bird of the species *Gallus gallus* as a specific method to control Salmonella is prohibited. The same legislation also prohibits the administration of any live Salmonella vaccine to any bird of the species *Gallus gallus* where the manufacturer does not provide an appropriate method to distinguish bacteriologically wild-type strains of Salmonella from vaccine strains.

If S. Enteritidis or S. Typhimurium (including monophasic strains) is detected in an operator sample, official samples are collected by the Competent Authority from the next crop in the affected house as well as from all other flocks on the holding. If any of these samples are positive, a restriction notice is served on the holding under the Zoonoses Order, requiring supervised cleansing and disinfection and further sampling. If any of the post cleansing and disinfection samples return a positive result for S. Enteritidis or S. Typhimurium, subsequent flocks may only be moved off the site under licence to the slaughterhouse and further official sampling of all flocks in the next crop is carried out. It is the responsibility of the food business operator to notify the Official Veterinarian at the slaughterhouse of the Salmonella status of the flock prior to slaughter so that suitable precautions can be put in place to prevent the possibility of cross-contamination and to minimise the risk to public health. The Salmonella monitoring results for all eligible broiler flocks must be included as part of the Food Chain Information documentation, accompanying each batch to the slaughterhouse (Annex II of Regulation (EC) No. 853/2004). Public health authorities are advised of the isolation of Salmonella in broiler flocks. Visits are made to the farm by Government officials to carry out an epidemiological investigation and provide advice to the food business operator on the control of Salmonella if the Salmonella isolated is considered to be of public health significance.

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the *Salmonella* NCP are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella Mbandaka was the most frequently isolated salmonella from broiler chicken flocks in 2018. Twenty one regulated serovars (9 S. Enteritidis, 5 *Salmonella* Typhimurium and 7 monophasic *Salmonella* Typhimurium) were identified from UK broiler chicken flocks sampled under the Salmonella NCP during 2018. Therefore the UK continued to achieve the broiler chicken target as set in EU Regulation.

5. Additional information

The majority of *Salmonella* incidents reported in most animal and bird species in the UK are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

37. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ *Gallus gallus* – laying hens

1. Monitoring/Surveillance/Control programmes system

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

All consignments of day old chicks are sampled on arrival. This sample is taken in accord with the requirements of the Salmonella commercial laying hen NCP. Mandatory sampling is required on the day of arrival – samples must be taken from each flock within 72 hours of hatching, comprising of at least the following from each hatchery supplying the chicks:

- Hatcher tray liners or chick box liners: one liner for each 500 chicks delivered, up to a maximum of 10 liners.
- All chicks dead on arrival and culls at day old, up to a maximum of 60.

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

Rearing period samples are taken two weeks before moving to laying phase/ laying unit. This sample is taken in accord with the requirements of the Salmonella commercial laying hen NCP. Mandatory sampling is required 2 weeks before moving to the laying phase or laying unit as follows:

- A minimum of 2 pairs of boot swabs, or

- A composite faeces sample made up of at least 60 individual 1g faeces samples selected at random from sites to represent the whole building/space available to the birds.

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

Laying flocks are sampled between 22-26 weeks of age, and then every 15 weeks during the production period. This sample is taken in accordance with the requirements of the Salmonella commercial laying hen NCP. Mandatory sampling is required as follows:

- A minimum of 2 pairs of boot swabs, or
- 2 x 150g of pooled faeces from sites representative of the whole building/space available to the birds.

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

In addition to the sampling above, Official Control Samples are collected annually for one flock on all holdings with more than 1,000 birds.

Case definition: Culture and isolation of Salmonella (field strain) from samples taken from the flock, or directly associated with its environment. Reports of Salmonella isolates listed under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/ isolates obtained. 'Flock' is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace.

Bacteriological method: ISO 6579-1: 2017 - Microbiology of the food chain -- Horizontal method for the detection, enumeration and serotyping of *Salmonella* -- Part 1: Detection of *Salmonella spp*. (MRSV method for primary production samples).

2. Measures in place

Live vaccines are not authorised for use in birds during the laying period. Otherwise there are no restrictions on the use of Salmonella vaccines which have a marketing authorisation.

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

Scheme Order (Northern Ireland) 2008 in order to meet the target for reduction in Salmonella prevalence set out in EU legislation. Regulation (EC) No. 517/2011 (which amends Regulation (EC) No. 1168/2006), sets a target for the laying flock sector to ensure that no more than 2% of adult breeding flocks with more than 350 birds remain positive for the regulated Salmonella serovars annually. The EU target for laying flocks is based on the serovars considered of greatest public health significance at the time of drafting of the legislation (the most frequent serovars in human cases): S. Enteritidis and S. Typhimurium including the monophasic variants (Regulation (EU) No. 517/2011 added the monophasic Salmonella Typhimurium variants S. 1,4,[5],12:i:- as regulated/target Salmonella ssp. within the requirements of the Salmonella National Control Programmes). The eggs from any laying flock found to be infected with a regulated Salmonella serovar according to the protocol outlined above are placed under official control and the requirements of Regulation (EC) No. 2160/2003 are implemented. Therefore if a laying flock is found to be infected with S. Enteritidis or S. Typhimurium including the monophasic variants S. 1,4,[5],12:i:- , the eggs from that flock are placed under restrictions and can only be sold for heat treatment. The operator can request additional testing of the flock at their own cost as per Regulation (EC) No.1237/2007. As well as collecting the operator's choice of sampling matrix as set out in this legislation officials will also collect five bird carcases for antimicrobial residues testing. If this test is negative the restrictions are lifted, but additional inspections may be scheduled on a risk basis. If the optional additional sampling permitted under Regulation (EC) No. 1237/2007 is positive, or is not undertaken, all other flocks on the premises are sampled, and any which are found to be positive will also have their eggs restricted. The operator may request additional testing of those flock(s) at their own cost as per Regulation (EC) No.1237/2007. The eggs from positive flocks remain under restrictions and can only be sold for heat treatment for the life of the flock. The flock following on after the infected flock has an official NCP sample taken at 22-26 weeks of age. In all cases visits are made to the farm by government officials to carry out an epidemiological investigation and provide advice to the food business operator on the control of Salmonella.

The main provisions of the Control of Salmonella in Poultry Orders relevant to the laying chicken control programme are:

- Owners of poultry flocks (in GB of more than 250 birds) must be registered unless officials have access to flock information from another source (e.g. the Great Britain Poultry Register and the Poultry Register in Northern Ireland). Information supplied should include the name and address of the holding, the number (and species) of laying flocks on the holding and the number of poultry in each laying flock.
- Flock owners are required to record the movements of birds, chicks or eggs onto and off the premises, including dates of movements, numbers of poultry, chicks or eggs moved, their ages, building/ flock identity and the addresses of source or destination premises. This information must be made available for inspection on request by a government authorised

official. Owners must also inform officials with two weeks' notice of the expected date of movements to the laying phase or laying unit and also the date on which the flock is expected to reach the end of the production cycle. This is done to facilitate the collection of the necessary official samples.

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella 13,23:i:- was the most frequently isolated salmonella from laying chicken flocks in 2018. Four regulated serovars (three S. Enteritidis and one *Salmonella* Typhimurium) were identified from UK laying chicken flocks sampled under the Salmonella NCP during 2018. Therefore the UK continued to achieve the laying chicken target as set in EU Regulation.

5. Additional information

The majority of *Salmonella* incidents reported in most animal and bird species in the UK are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

38. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/geese

1. Monitoring/Surveillance/Control programmes system

Monitoring for Salmonella in geese is carried out on a voluntary basis by the food business operator. Reports of Salmonella in geese usually arise from samples sent by a private veterinarian for diagnostic

purposes. There is no official National Control Programme for the control of Salmonella in the geese industry sectors. Government funded scanning surveillance programmes are delivered by the Animal and Plant Health Agency, Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.

The samples submitted are usually faeces or from organs collected at post mortem.

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

2. Measures in place

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

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

Restrictions may be placed on the premises under the domestic legislation.

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Private laboratories undertaking Salmonella testing are required under the Salmonella legislation to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Submission of samples from geese is most likely to be for diagnostic purposes. One isolation of monophasic 4,12:i- in geese was made in 2018 (compared to six from Great Britain in 2017). There were no isolations of Salmonella in samples from geese in Northern Ireland during 2017 or 2018.

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

39. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/partridges

1. Monitoring/Surveillance/Control programmes system

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

The samples submitted are usually whole birds or organs collected at post mortem.

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

2. Measures in place

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

All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the Salmonella isolated is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of Salmonella from partridges. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm. Restrictions may be placed on the premises under the domestic legislation.

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the

Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

There is no routine Salmonella monitoring of partridges in the UK, therefore isolates mostly come from clinically affected birds in rear. The number of reports is dependent on the total population and the number of diagnostic submissions to veterinary laboratories. *Salmonella* Typhimurium was the serovar most frequently isolated from partridges in the UK in 2018, and all isolations were made in Great Britain.

40. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/pheasants

1. Monitoring/Surveillance/Control programmes system

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

The samples submitted are usually whole birds or organs collected at post mortem.

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

2. Measures in place

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

All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the Salmonella isolated is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of Salmonella from pheasants. Assistance is given to the public health authorities with on-

farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm. Restrictions may be placed on the premises under the domestic legislation.

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

There is no routine Salmonella monitoring of pheasants in the UK, therefore isolates mostly come from clinically affected birds in rear. The number of reports is dependent on the total population and the number of diagnostic submissions to veterinary laboratories. *Salmonella* Senftenberg and *Salmonella* Typhimurium were the serovars most frequently isolated from pheasants in the UK in 2018, and all isolations were made in Great Britain.

41. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/pigeons

1. Monitoring/Surveillance/Control programmes system

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

The samples submitted are usually whole birds or organs collected at post mortem.

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

2. Measures in place

All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given to the individual submitting the positive sample(s) and visits to the site by Government officials may be made, particularly if the Salmonella isolated is considered to be of public health significance. The public health authorities are informed of isolations of Salmonella from pigeons. Assistance is given to the public health authorities with on-site investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the establishment or area. Restrictions may be placed on the specific premises affected under the domestic legislation.

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Only *Salmonella* Typhimurium (n=7) and *Salmonella* 4,12:i:- (n=2) serovars were isolated from pigeons in the UK in 2018, and all isolations were made in Great Britain.

42. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/pigs

1. Monitoring/Surveillance/Control programmes system

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

Samples usually consist of faeces, or organs collected at post mortem. These are voluntary samples usually sent by a private veterinarian for diagnostic purposes.

2. Measures in place

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

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

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

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

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

A series of prevalence surveys of poultry and pigs have been conducted within the European Union (EU) over the last decade with the aim of obtaining baseline and comparable data for all Member States concerning foodborne zoonoses of interest; two of these surveys, conducted in 2006/07 and 2008, respectively, focused on Salmonella in finisher pigs and breeding pigs. The results from finishing pigs showed that UK levels of Salmonella were above the EU average with a prevalence from lymph nodes of 21.8% and carcase contamination of 15.1% (versus 10.3% and 8.3%, respectively, across the EU). Levels of Salmonella carriage in 2013, as monitored by testing caecal contents were high at 30.5%; this is considerably higher than the 2007 average EU prevalence, based on lymph node testing (10.3%). Furthermore, Salmonella carriage, determined by caecal testing, was significantly higher in 2013 when 21.9% of pigs were found to be positive. These results indicate the carriage of Salmonella by 1 in 5 pigs and therefore efforts will continue to be required to prevent contamination of carcases, particularly in light of future EU plans for a reduction in Salmonella contamination of pig meat.

5. Additional information

A study to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum *β*-lactamase (ESBL) *E. coli* in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in *Campylobacter coli* was carried out in 2013. This was the first UK-wide study of Toxoplasma, HEV, PRRSv and ESBL *E. coli* in pigs. The study design was consistent, where possible, with the technical specifications for the EU baseline survey for Salmonella in slaughter pigs (Commission Decision 2006/668/EC), with a target sample size of 600 pigs. In anticipation of non-responses or inadequate samples, a further 10% of pigs were scheduled for sampling. The study was carried out at the 14 largest abattoirs of the 169 approved premises in the UK that between them process 80% of pigs slaughtered in the UK. Sampling was weighted so that the number of carcases to sample in each of the selected abattoirs was proportional to the throughput of the abattoir. Overall, 654 pigs were scheduled for sampling during the study period.

Salmonella carriage as determined by caecal sampling varied by abattoir from 11.3% to 46.8%, whereas carcase contamination ranged from 0% to 21%. The prevalence ratio of caecal carriage: carcase contamination by abattoir was examined which ranged from 0.0 to 1.17 with an average of 0.31. For all but two abattoirs the prevalence of caecal carriage was higher than the carcase

contamination. It should be noted however that some of the prevalence data are based on small sample sizes and the method of comparison is crude, however it highlights potential differences between abattoirs. Salmonella positivity in the caecal contents was examined by age: prevalence varied from 25.9% in pigs aged less than 6 months up to 40.7% in pigs aged over 12 months. Salmonella positivity in the carcase swab samples was also found to increase slightly with age from 7.3% in pigs aged less than 6 months up to 10.9% in pigs aged over 12 months although again this variation was not statistically significant (p=0.79). The proportion of pigs that tested positive for Salmonella in the caecal content sample was not found to vary significantly between the different months of sampling (p=0.43).

The most commonly isolated serovars were monophasic Typhimurium variants S. 4,12:i:- (found in 17.5% caecal contents positive samples and 26.7% carcass swab positive samples) and S. 4,5,12:i:- (16.9% caecal contents positive samples and 20.0% carcass swab positive samples). The other commonly isolated serovars were S. Typhimurium, S. Derby and S. Bovismorbificans. No pigs were found to be infected with S. Enteritidis, S. Hadar, S. Infantis or S. Virchow. For S. Typhimurium, S. 4,5,12:i:- and S. 4,12:i:-, DT193 was most commonly isolated. Phage type U288 was also relatively common among pigs infected with S. Typhimurium. The abattoirs participating in the survey processed 80% of the UK pig slaughter throughput; this coverage combined with the randomized sampling approach provides a robust and representative estimates of prevalence. *Salmonella* Typhimurium (n=70) and monophasic *Salmonella* Typhimurium (n=73) were the most commonly isolated serovars from pigs in the UK in 2018.

43. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/quail

1. Monitoring/Surveillance/Control programmes system

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

The samples submitted are usually whole birds or organs collected at post mortem.

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

2. Measures in place

All Salmonellae isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given to the individual submitting the positive sample(s) and visits to the site by Government officials may be made, particularly if the Salmonella isolated is considered to be of public health significance. The public health authorities are informed of isolations of Salmonella from pigeons. Assistance is given to the public health authorities with on-site investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the establishment or area. Restrictions may be placed on the specific premises affected under the domestic legislation.

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Only *Salmonella* Typhimurium (n=2) was isolated from quail in the UK in 2018, and both isolations were made in Great Britain.

44. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/sheep

1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Animal and Plant Health Agency (APHA), Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. Over 90% of the Salmonella isolates derived from sheep annually are from voluntary samples taken by private veterinary surgeons for

diagnostic purposes and submitted for testing under this programme. These samples are usually faeces, or from organs at post mortem.

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

2. Measures in place

Vaccination of sheep is rare but maybe used, on a voluntary basis. There is no restriction on using any authorised Salmonella vaccine.

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

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

45. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/solipeds (horses)

1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Animal and Plant Health Agency (APHA), Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. These diagnostic samples are usually faeces, or from organs collected at post mortem. Most samples are submitted by private veterinarians for diagnostic purposes.

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

2. Measures in place

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority. Units tested are not known because the laboratories do not report negative results (unless as part of an official control programme or survey).

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

There is no routine Salmonella monitoring of horses in the UK, therefore the majority of isolates come from horses with clinical disease. The number of reports is dependent on the total horse population and the number of diagnostic submissions to veterinary laboratories. As in previous years, the majority of Salmonella reports in horses were from samples taken for clinical diagnostic purposes and all isolations were made in Great Britain. *Salmonella* Typhimurium (n=7) and *Salmonella* Bovismorbificans (n=7) predominated.

46. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ turkeys (breeding)

1. Monitoring/Surveillance/Control programmes system

Sampling is carried out as specified in EU legislation (Regulation (EC) No. 2160/2003 and Regulation (EU) No. 1190/2012) and in the UK Salmonella National Control Programme (NCP) for breeding turkey flocks. Day old poults are sampled according to the requirements of the NCP, which requires mandatory sampling on the day of arrival, comprising at least the following from each hatchery delivery:- Ten poult box liners for every batch of poults delivered. All poults dead on arrival or culled on arrival from each hatchery delivery.

Rearing flocks are sampled according to the requirements of the NCP. Mandatory sampling is required at four weeks of age and two weeks before moving to the laying phase or laying unit as follows:

- A minimum of five pairs of boot swabs to be representative of the whole area in the house to which the birds have access; or
- one pair of boot swabs and one 900 square cm dust swab; or
- four hand-held 900 square cm dust swabs if less than 100 turkeys present.

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

Flocks which are in production are then sampled according to the requirements of the NCP, which requires mandatory sampling every three weeks during the laying/production period of the flock and within three weeks before the birds are moved to the slaughterhouse (or six weeks if moved to slaughter at more than 100 days of age). Sampling can be carried out at the holding or at the hatchery. If at the holding, and provided the holding has had no positive results in at least the previous two calendar years and the national target has been achieved, sampling in 2018 was at 4 week intervals. This was then changed to 3 weekly intervals following the disclosure of six turkey breeding flocks on two adjacent sites under one breeding company that were found to be positive for monophasic

Salmonella Typhimurium in later 2018. These were the first regulated serovar positives found in UK breeding turkey flocks since the inception of the breeding turkey NCP in 2010, but as 6 flocks were affected their identification meant that the UK breached the 1% prevalence target for regulated serovars.

Holding sampling:

- A minimum of five pairs of boot swabs to be representative of the whole area in the house to which the birds have access; or
- one pair of boot swabs and one 900 square cm dust swab; or
- four hand-held 900 square cm dust swabs if less than 100 turkeys present.

Hatchery sampling:

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

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

One routine Official Control Sample is collected annually from all flocks of adult breeding turkeys between 30 and 45 weeks of age.

2. Measures in place

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

Regulation (EC) No. 2160/2003 lays down harmonised rules for the monitoring and control of Salmonella in turkey flocks which have been implemented in the UK Salmonella National Control Programme (NCP). The Regulation is enforced in the UK through the Control of Salmonella in Turkey Flocks Order (England) 2009, the Control of Salmonella in Turkey Flocks (Scotland) Order 2009, the Control of Salmonella in Turkey Flocks (Wales) Order 2010 and the Control of Salmonella in Turkey Flocks Scheme Order (Northern Ireland) 2010. This national legislation enforces the requirements of the NCP required to meet the target for reduction in Salmonella prevalence set out in EU legislation. Regulation (EU) No. 1190/2012 sets a target for the UK turkey sector to ensure that no more than 1% of breeding turkey flocks (and no more than 1% of fattening turkey flocks) are detected positive for Salmonella of human health significance annually. The EU target is based on the two most common serovars in human cases which are S. Enteritidis and S. Typhimurium (including monophasic strains).

The Control of Salmonella in Turkey Flocks Orders state that no person may administer any antimicrobial to turkeys as a specific method to control Salmonella.

The NCP for breeding turkeys applies to all operators who keep 250 or more breeding turkeys over a calendar year.

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

During 2018 six turkey breeding flocks on two adjacent sites under one breeding company were found to be positive for monophasic *Salmonella* Typhimurium. These were the first regulated serovar positives found in UK breeding turkey flocks since the inception of the breeding turkey NCP in 2010, but as 6 flocks were affected their identification meant that the UK breached the 1% prevalence target for regulated serovars.

All turkey Salmonellas listed as group B were presumptive S. Derby. Presumptive *Salmonella* Derby are identified by slide agglutination rather than full serotyping. The testing approach used excludes the possibility of these isolates being ST or monophasic ST. S. Derby continues to be the most common serovar reported in turkeys in the UK, but this serovar is not commonly reported in human disease (laboratory confirmed) cases.

5. Additional information

The majority of *Salmonella* incidents reported in most animal and bird species in the UK are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

47. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ turkeys (fattening)

1. Monitoring/Surveillance/Control programmes system

Sampling is carried out as specified in EU legislation (Regulation (EC) No. 2160/2003 and Regulation (EU) No. 1190/2012) and in the UK Salmonella National Control Programme (NCP) for fattening turkey flocks producing meat for human consumption. According to the requirements of the Salmonella National Control Programme, mandatory sampling is required within 3 weeks of the birds being sent to slaughter, unless due to be slaughtered at more than 100 days of age or for organically reared birds produced according to Commission Regulation (EC) 889/2008 when sampling is required within 6 weeks of slaughter. The NCP sample must consist of a minimum of two pairs of boot swabs or one pair of boot swabs and one 900 square cm dust swab taken so as to be representative of the whole area in the house to which the birds have access. In flocks of less than 100 turkeys, where it is not possible to take boot swabs, four hand-held 900 square cm dust swabs may be used.

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

Routine Official Control Samples are collected once annually from 10% of holdings with more than 500 birds.

Bacteriological method: ISO 6579-1: 2017 - Microbiology of the food chain -- Horizontal method for the detection, enumeration and serotyping of *Salmonella* -- Part 1: Detection of *Salmonella spp*. (MRSV method for primary production samples). All turkey Salmonellas listed as group B were presumptive S. Derby. The testing approach used excludes the possibility of these isolates being ST or monophasic ST.

2. Measures in place

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

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

the NCP required to meet the target for reduction in Salmonella prevalence set out in EU legislation. Regulation (EU) No. 1190/2012 sets a target for the UK turkey sector to ensure that no more than 1% of fattening turkey flocks are detected positive for Salmonella of human health significance annually. The EU target is based on the two most common serovars in human cases which are S. Enteritidis and S. Typhimurium (including monophasic strains). The Control of Salmonella in Turkey Flocks Orders state that no person may administer any antimicrobial to turkeys as a specific method to control Salmonella.

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

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

3. Notification system in place to the national competent authority

All isolations of Salmonella in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff must be reported, and a culture must be made available to the National Reference Laboratory under the Zoonoses Order 1989 in Great Britain. In Northern Ireland, all isolations of Salmonella must be reported to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs under the Zoonoses Order (Northern Ireland) 1991. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Eight regulated serovars (0 S. Enteritidis, 4 *Salmonella* Typhimurium and 4 monophasic *Salmonella* Typhimurium, consisting of 3 *S*. 4,5,12:i:- DT193 and 1 *S*. Typhimurium *S*. 4,5,12:i:- DT193) were identified from UK fattening turkey flocks sampled under the Salmonella NCP during 2018. Therefore the UK continued to achieve the fattening turkey target as set in EU Regulation.

All turkey Salmonellas listed as group B were presumptive S. Derby. Presumptive *Salmonella* Derby are identified by slide agglutination rather than full serotyping. The testing approach used excludes the possibility of these isolates being ST or monophasic ST. S. Derby continues to be the most common serovar reported in turkeys in the UK, but this serovar is not commonly reported in human disease (laboratory confirmed) cases.

5. Additional information

The majority of *Salmonella* incidents reported in most animal and bird species in the UK are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

48. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* in food

1. Monitoring/Surveillance/Control programmes system

The UK government undertakes national microbiological food surveillance. The priorities of these surveys are closely linked to a strategy to reduce the level of foodborne disease. Surveys are carried out regularly on a variety of foods and processes to gather data on the possible effects of processing changes on pathogens and to monitor high-risk foods linked to human cases/ outbreaks and the emergence of new pathogens. In addition to English surveillance, Wales, Scotland and Northern Ireland also have separate microbiological food surveillance programmes within their own regions. The UK government also collates returns from all UK food authorities on official food enforcement activities in line with Regulation (EC) No 882/2004 on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules. In March 2017 the new official control Regulation (EU) 2017/625 came into force and will gradually supersede the provisions in Regulation (EC) 882/2004, however during the period of reporting the provisions of Regulation (EC) 882/2004 apply. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in this report.

3. Notification system in place to the national competent authority

Domestic legislation requires laboratories that isolate Salmonella species in a sample taken from an animal or bird, or from the carcase, products or surroundings of an animal or bird or from any feedingstuff report the isolation to the government, and provide a culture if requested.

49. Description of Monitoring/Surveillance/Control programmes system: *Salmonella in feed*

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Although Salmonellas are found in feed materials, the processes involved in animal feed production should normally eliminate them. Animal feed may become contaminated on farm if poorly stored and

not kept vermin free. There is the potential, if Salmonella serovars contaminate feed during the manufacturing process, for the serovar to infect a large number of animals. It is most important that the principles of HACCP are applied to manage this risk.

50. General evaluation: Toxoplasmosis

1. History of the disease and/or infection in the country

Although the clinical signs of Toxoplasma infection are usually mild, infection can be associated with serious sequelae including eye disease and disability. People who are immunocompromised and pregnant women newly infected with Toxoplasma are particularly vulnerable; in the latter, miscarriage, stillbirth and deformities of the child can occur. Toxoplasmosis is only notifiable in humans in Scotland. In the rest of UK, the human cases relate to voluntary laboratory reporting.

In animals in the UK, toxoplasmosis is not notifiable or reportable. In animals, surveillance relates to examination of samples received for diagnostic or monitoring reasons at government veterinary laboratories. Isolates from private laboratories are not reported. Toxoplasmosis is endemic in the UK sheep population and cases are regularly diagnosed in goats and on occasion in other species. Vaccination is carried out in some sheep flocks and goat herds.

2. Evaluation of status, trends and relevance as a source for humans

Toxoplasmosis is generally one of the more common causes of ovine abortion in the UK, but previous data suggests a cyclical aspect to annual case numbers, possibly associated to waning levels of flock immunity. Regular information campaigns are undertaken to highlight the potential risks to pregnant women and their unborn babies.

4. Additional information

A study to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum beta-lactamase (ESBL) E. coli in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter coli was carried out in 2013. This was the first UK-wide study of Toxoplasma in pigs. The seroprevalence of *Toxoplasma gondii* in this study was 7.4% (95% CI 5.3-9.5). this figure is comparable with those published several decades ago in which 4-12% of UK pigs tested positive using the Dye Test (Rawal, 1959; McColm et al., 1981; Jackson et al., 1987) and the estimate also falls within the range of recent seroprevalence estimates from other European countries such as the Netherlands, Ireland, Portugal, Italy and Spain. Seroprevalence had decreased in several European countries from the 1990s due to increasingly intensive management systems, however, as consumer

demand for outdoor-reared pork meat is increasing, the prevalence of Toxoplasma may show a parallel increasing trend again due to greater access of pigs to environmental sources of infection. Outdoor farming currently accounts for around 40% of commercial pig breeding herds in the UK. In this survey, only one of the Toxoplasma-positive pigs was recorded as being born outdoors but the information concerning the production system was relatively poorly completed so it was not possible to accurately assess any potential association with seroprevalence. More information on the 2013 slaughterhouse survey of pigs is available in 'Powell et al. (2014) Study of Salmonella, Toxoplasma, Hepatitis E virus, Yersinia, Porcine Reproductive and Respiratory Syndrome virus, antimicrobial resistance in Campylobacter and extended spectrum beta lactamase E. coli in UK pigs at slaughter: OZ0150 final report' (available on Defra website).

The Control of Substances Hazardous to Health (COSHH) Regulations 2002 require employers and the self-employed to assess risks to health from harmful substances, including micro-organisms, and to take steps to prevent or control those risks, and The Management of Health and Safety at Work Regulations 1999 require employers and the self-employed to further assess any risks which affect pregnant women. Updated information on zoonoses and appropriate control measures can be found in HSE Agriculture Information sheet 2 - Common Zoonoses in Agriculture (available at www.HSE.gov.uk/pubns/ais2.pdf). There is also the 1997 publication 'Infection risks to new and expectant mothers in the workplace - a guide for employers', by the Advisory Committee on Dangerous Pathogens (ref: ISBN 0-7176-1360-7)

51. Description of Monitoring/Surveillance/Control programmes system: *Toxoplasma gondii* in animals

1. Monitoring/Surveillance/Control programmes system

Some cases of toxoplasmosis are identified in the UK each year by Government laboratories as part of scanning surveillance of material submitted from clinically affected animals. No official control programme for toxoplasmosis in animals is pursued in the UK. Vaccination is permitted and pursued by some shepherds but is not pursued by most livestock keepers.

2. Measures in place

No specific control measures are in place in the UK with respect to *Toxoplasma gondii*. Some cases are identified in animals each year via scanning surveillance (mostly in sheep but a few incidents in

goats are generally identified too) but this is not a structured survey and so makes comparing annual diagnosis numbers challenging given the changes in submission numbers year on year and the potential consequences on annual submission levels as a result of strategic changes to veterinary surveillance in the UK in recent years. A structured UK survey was undertaken in 2013 at pig abattoirs and this remains the most up to date overview of UK prevalence in pigs (see additional information for the specific detail of this now historic survey).

3. Notification system in place to the national competent authority

No: there is no requirement to notify a suspicion of *Toxoplasma gondii* infection in animals in the UK, or for a private veterinary laboratory to notify the Government should *T. gondii* be identified in samples derived from animals.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Toxoplasmosis is generally one of the more common causes of ovine abortion in the UK, but previous data suggests a cyclical aspect to annual case numbers, possibly associated to waning levels of flock immunity. However human case numbers appear stable. No data on the number of cats contracting infection is available for the UK. The relative contribution of the foodborne route of transmission to the overall human disease burden in the UK, as well as the contribution of different food vehicles, is also unknown.

Animal Data: Great Britain (England, Scotland and Wales)
During 2018, there were 155 diagnoses of toxoplasmosis (including fetopathy) made by APHA and SRUC in Great Britain. One hundred and fifty-four of these diagnoses were in sheep and one diagnoses was in an alpaca. In 2017, there were 177 toxoplasmosis diagnoses in Great Britain, 234 diagnoses in 2016, 243 diagnoses in 2015, 212 diagnoses in 2014, 215 diagnoses in 2013, 248 in 2012, 146 in 2011 and 216 in 2010. These figures arise from clinical investigations and are the number of incidents recorded from 2010 - 2018. An incident is defined as the first diagnosis of a disease from a clinical diagnostic submission from an animal or group of animals on a single premises within a defined period of time.

Animal Data: Northern Ireland
During 2018, there were 461 diagnoses of toxoplasmosis (including fetopathy) made by AFBI in Northern Ireland. Four hundred and thirty of these diagnoses were in sheep, twenty eight were in cattle, two were in goats and one was in a reindeer. There were no diagnoses made in pigs. This was a decrease from 2017 when there were four hundred and eighty nine *T. gondii* incidents diagnosed. This compares to the

very low years 2015 (n=50) and 2014 (n=63). Prior to this there were 229 reports in 2013 and 100 in 2012.
Human 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.

52. General evaluation: Trichinella

1. History of the disease and/or infection in the country

Trichinosis is a food-borne parasitic disease that is spread primarily by the consumption of raw or undercooked meat products containing larvae of the nematode of the Trichinella spp. Symptoms are associated first with the gastrointestinal tract and later with the muscles as the worm penetrates and develops there. The main source of human infection is raw or undercooked meat products from pigs or wild boar, but meat products from other animals may also be a source (e.g. horse, bear and walrus). There is no evidence to indicate that Trichinella exists in pigs or wild boar in the UK, as shown by the negative results from carcasses and wildlife that are tested annually.

Humans: There have been no known cases of human trichinosis acquired from infected meat from animals reared in the United Kingdom either in the UK or in other countries that have received meat and meat products from the UK since 1975. Overall, there were no laboratory-confirmed cases of Trichinellosis between 1987 and 1999 in the UK. Eleven cases of trichinellosis were diagnosed in England and Wales between 2000 and 2014, which included an outbreak of eight cases in 2000 associated with the consumption of imported pork salami. The remaining 3 cases were travel-related: 1 in England and Wales in 2001, 1 in Scotland in 2010 in a person who had eaten partially cooked meat in France, and the other in Scotland in 2014 which had been acquired in the Czech Republic.

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

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

2. Evaluation of status, trends and relevance as a source for humans

There is no evidence to indicate that Trichinella exists in pigs, wild boar or horses in the UK, as shown by the negative results from carcasses that are tested annually. Pigs, horses and wild boar are routinely monitored for the presence of Trichinella. In the UK in 2018, 6,976,188 muscle samples from

domestic pigs were examined for Trichinella. In addition, 2,771 horses, 841 farmed wild boar and 581 feral wild boar muscle samples were examined. All samples yielded negative results. A survey of Trichinella in wildlife is carried out for the Food Standards Agency (FSA) in Northern Ireland. In total, 360 fox samples were examined during 2018 and all were negative for Trichinella spp.

53. Description of Monitoring/Surveillance/Control programmes system: *Trichinella spp.* in pigs

1. Monitoring/Surveillance/Control programmes system

From January 2006, enhanced testing for Trichinella, by the EU pepsin digest method, was extended to the domestic slaughter of all boars, sows and farmed wild boar that are processed in a slaughterhouse and feral wild boar processed in an Approved Game Handling Establishment. In 2008, a voluntary programme for testing feral wild boar hunted for own consumption or direct supply was also introduced. Testing of samples is undertaken by laboratories in the slaughterhouse, accredited contract laboratories or at the accredited contract laboratory appointed by government. All laboratories take part in a laboratory quality assurance programme organised by the National Reference Laboratory.

Surveillance system: Regulation (EC) No. 2015/1375 lays down specific rules on official controls for Trichinella in meat. It also lays down the methods of detection to be used and requires carcases of domestic swine to be sampled in slaughterhouses and tested for the presence of Trichinella as part of the post mortem inspection. Carcasses of horses, wild boar and other farmed and wild animal species susceptible to Trichinella infection are also required to be sampled in slaughterhouses or game handling establishments. Carcasses of domestic swine kept solely for fattening and slaughter can be exempt from testing if they come from a holding or category of holding that has been officially recognised by the Competent Authority as operating under controlled housing conditions in accordance with the criteria specified in Regulation (EU) No. 2015/1375. Systematic testing of pigs from a holding

or a compartment officially recognised as applying controlled housing conditions may also be reduced if the holding or compartment can demonstrate that no autochthonous Trichinella infestations in domestic swine have been detected in the Member State in the past three years and that prevalence of Trichinella does not exceed one per million in that population.

As per the legislation for the abattoir testing of sows, boars and wild boar together with a proportion of finishing pigs. Sample size 1 gram for domesticated pigs, 2 grams for breeding animals and 5 grams for farmed/ wild boar for the detection of Trichinella spp. larvae. From January 2006, testing for Trichinella spiralis, has been by the EU muscle digest method as per legislation. Other equivalent methods allowed in the legislation are not currently used in the UK.

In the UK in 2018, 6,976,188 muscle samples from domestic pigs were examined for Trichinella. All samples yielded negative results. For wild boar – farmed and feral: Farmed wild boars - UK: 841 tested, 0 positive. Feral wild boars - UK: 581 tested, 0 positive.

3. Notification system in place to the national competent authority

The UK has a notification system in place as per the legislation for the abattoir testing of domestic pigs. However, since 1979, no domestic pig has been found to have trichinella since 1978.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Since January 2006 all boars, sows, farmed wild boar processed in a slaughterhouse and feral wild boar processed through an Approved Game Handling Establishment together with a proportion of finishing pigs are routinely monitored for the presence of Trichinella. There was no evidence to indicate that trichinellosis existed in the UK domesticated pig population or the farmed/wild boar population in 2018. The last positive diagnosis in pigs in Great Britain was in 1978. In Northern Ireland, the last confirmed case of Trichinellosis in pig meat was in 1979. This case was linked to suspected illegally imported meat.

In humans, European outbreaks of trichinellosis are regularly reported and are mainly linked to the consumption of raw or undercooked meat from wild boar, back yard pigs or horses. In contrast, there have been no human cases acquired from meat produced in the UK for over 40 years.

Eleven cases of trichinellosis were diagnosed in the UK between 2000 and 2014, including an outbreak of eight cases in England and Wales in 2000 associated with the consumption of imported meat products. The remaining three cases were travel related: one in England and Wales in 2001, one in

Scotland in 2010 in a person who had eaten partially cooked meat in France, and the other in Scotland in 2014 which had been acquired in the Czech Republic.

54. Description of Monitoring/Surveillance/Control programmes system: *Trichinella spp.* in horses

1. Monitoring/Surveillance/Control programmes system

Surveillance system: Regulation (EC) No. 2015/1375 lays down specific rules on official controls for Trichinella in meat. It also lays down the methods of detection to be used and requires carcases of horses to be sampled in slaughterhouses and tested for the presence of Trichinella as part of the post mortem inspection. Carcasses of pigs, wild boar and other farmed and wild animal species susceptible to Trichinella infection are also required to be sampled in slaughterhouses or game handling establishments.

For domestic pig, wild boar, farmed wild boar and solipeds all testing in the UK is performed by the Reference Method of detection set out in Regulation (EU) 2015/1375.

3. Notification system in place to the national competent authority

Positive test results are notified to the Food Standards Agency (FSA) or Food Standards Scotland (FSS) and Department of Environment, Food and Rural Affairs (Defra) in Great Britain/ Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Horses are routinely monitored for the presence of Trichinella at the slaughterhouse. Muscle samples from 2,771 horses were examined. There was no evidence to indicate that trichinellosis existed in the UK horse population in 2018.

55. General evaluation: Yersiniosis

1. History of the disease and/or infection in the country

Yersiniosis is not notifiable in humans or animals in the UK.

Human data: A small number of human cases are reported each year on a voluntary basis. *Yersinia pestis* is not found in the UK.

Animal Data: During 2018, there were 110 cases of yersiniosis reported in the UK in animals (18 in Great Britain and 92 in Northern Ireland) from clinical diagnostic samples submitted by private veterinarians to the Animal and Plant Health Agency (APHA), the Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). The number of diagnoses is generally small and it is therefore difficult to comment on trends. In 2017, 153 cases (22 in GB and 131 in NI) of yersiniosis were diagnosed in animals in the UK, so the 2018 total represents a decrease year-on-year. In 2016 there were 166 cases (156 in NI and 10 in GB). The 2015 number of cases in the UK was 143 (22 in GB and 126 in NI). In 2014 there were 169 UK cases (22 in GB and 147 in NI). Prior to 2014 the UK figures are significantly lower as 2014 was the first full year that AFBI introduced the use of selective media, making Yersinia detection much easier. In 2013 there were 82 cases diagnosed, in 2012, 50 cases, in 2011, 44 cases and in 2010, 23 cases of yersiniosis (including fetopathy) were diagnosed in animals in the UK via scanning surveillance.

In addition a UK survey of pigs involving sampling at abattoirs in 2013 demonstrated, after accounting for within-farm clustering, the prevalence of *Y. enterocolitica* carriage on tonsils was 28.7% (95% CI 24.8-32.7) whilst the prevalence on carcases was 1.8% (95% CI 0.7-2.8). The prevalence of *Y. pseudotuberculosis* carriage was 3.4% (95% CI 2.0-4.8).

Transmission to people usually occurs by ingestion of contaminated food or water and less commonly by direct contact with infected animals, and rarely from person-to-person spread by the faecal oral route. *Y. enterocolitica* has been isolated from many domestic and wild mammals, birds and some cold-blooded animals. More than 50 serotypes have been identified, not all of which cause disease in animals and man. *Y. pseudotuberculosis* has been isolated from various species of wild and domestic mammals, birds and reptiles.

2. Evaluation of status, trends and relevance as a source for humans

A small number of human cases are reported each year on a voluntary basis. The number of cases in people in the UK per year are low compared to other European countries, probably due to the low

consumption of raw pork in the UK (Rosner et al., 2010). Pigs are considered to be the primary reservoir of human pathogenic *Y. enterocolitica* strains, mainly because of the high prevalence of such strains in pigs and the high genetic similarity between human and porcine isolates. The 2013 UK pig abattoir survey demonstrated that approximately one quarter of slaughter pigs were found to be infected with *Y. enterocolitica*, However very few carcases (2%) were contaminated with this organism. This indicates that the processes applied at abattoirs in the UK to reduce contamination of the carcases are having a positive effect, preventing widespread contamination of carcases.

4. Additional information

Pigs are considered to be the primary reservoir of human pathogenic *Y. enterocolitica* strains, mainly because of the high prevalence of such strains in pigs and the high genetic similarity between human and porcine isolates. Yersinia was identified in the EFSA opinion on meat inspection in pigs as one of the four major public health hazards. A UK study to estimate the prevalence of Salmonella, Toxoplasma, Yersinia, Hepatitis E virus (HEV), Porcine Reproductive and Respiratory Syndrome virus (PRRSv) and extended spectrum beta-lactamase (ESBL) *E. coli* in UK pigs at slaughter and to investigate antimicrobial resistance (AMR) in Campylobacter was carried out in 2013. This survey demonstrated, after accounting for within-farm clustering, the prevalence of *Y. enterocolitica* carriage on tonsils was 28.7% (95% CI 24.8-32.7) whilst the prevalence on carcases was 1.8% (95% CI 0.7-2.8). The prevalence of *Y. pseudotuberculosis* carriage was 3.4% (95% CI 2.0-4.8). Additional iInformation on the 2013 slaughterhouse survey of pigs can be found in 'Powell et al. (2014) Study of Salmonella, Toxoplasma, Hepatitis E virus, Yersinia, Porcine Reproductive and Respiratory Syndrome virus, antimicrobial resistance in Campylobacter and extended spectrum beta lactamase *E. coli* in UK pigs at slaughter: OZ0150 final report' (available on Defra website).

56. Description of Monitoring/Surveillance/Control programmes system: *Yersinia spp.* in animals

1. Monitoring/Surveillance/Control programmes system

Some cases of Yersinia are identified in the UK each year by Government laboratories as part of scanning surveillance of material submitted from clinically affected animals. No official control programme of Yersinia spp. in animals is pursued in the UK.

2. Measures in place

No specific control measures are in place in the UK with respect to Yersinia spp. Some cases are identified in animals each year via scanning surveillance but this is not a structured survey and so

makes comparing annual diagnosis numbers challenging given the changes in submission numbers year on year, and the strategic changes to veterinary surveillance in the UK in recent years. A structured UK survey was undertaken in 2013 at pig abattoirs and this remains the most up to date overview of UK prevalence in pigs (see additional information for the specific detail of this now historic survey).

3. Notification system in place to the national competent authority

No: there is no requirement to notify a suspicion of Yersinia infection in animals in the UK, or for a private veterinary laboratory to notify the Government should Yersinia be identified in samples derived from animals.

4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, the number of animal cases found via clinical surveillance in the UK was 110 (18 in Great Britain and 92 in Northern Ireland) from clinical diagnostic samples submitted by private veterinarians to the Animal and Plant Health Agency (APHA), the Scotland's Rural Colleges (SRUC) and the Agri-food and Biosciences Institute (AFBI). The number of diagnoses is generally small and it is therefore difficult to comment on trends. In 2017, 153 cases (22 in GB and 131 in NI) of yersiniosis were diagnosed in animals in the UK, so the 2018 total represents a decrease year-on-year. The number of cases in the UK are low compared to other European countries, probably due to the low consumption of raw pork in the UK (Rosner et al., 2010).

Pigs are considered to be the primary reservoir of human pathogenic *Y. enterocolitica* strains, mainly because of the high prevalence of such strains in pigs and the high genetic similarity between human and porcine isolates. Yersinia was identified in the EFSA opinion on meat inspection in pigs as one of the four major public health hazards. In the 2013 UK pig abattoir survey approximately one quarter of slaughter pigs were found to be infected with *Y. enterocolitica*, However very few carcases (2%) were contaminated with this organism. It is encouraging that so few carcases were found to be contaminated with the organism indicating that the processes applied at the abattoir in the UK to reduce contamination of the carcases are having a positive effect and are effective in preventing widespread contamination of carcases. Most *Y. enterocolitica* types associated with human infections belong to bioserotypes 1B/O:8, 2/O:9, 3/O:3, 4/O:3, and 2/O:5,27. In a study of English pigs at slaughter, the most common biotypes of *Y. enterocolitica* were 2/O:9 (33%) and 2/O:5 (26%) (Ortiz Martinez et al., 2010). (Biotyping of the isolates was not undertaken in the 2013 study because of the low prevalence and therefore hazard on the carcasses, so the predominant type and range of biotypes cannot be reported).

57. Food-borne Outbreaks

1. System in place for identification, epidemiological investigations and reporting of food-borne outbreaks

Public Health England (PHE), Health Protection Scotland (HPS), Public Health Wales and Public Health Agency Northern Ireland (PHANI) receive preliminary reports of general outbreaks of Infectious Intestinal Disease (IID) from laboratories, health authorities or boards and local authority environmental health departments. The appropriate health protection unit/ health authority/ board collects a minimum dataset on each outbreak. The following data are collected:

- Health protection team/ health authority/ board
- Date of outbreak
- Place of outbreak (hospital, restaurant, school, community etc.)
- Pathogen
- Mode of transmission (Foodborne, person to person, mixed, other)
- Number of cases, admissions to hospital and deaths

Specifically for foodborne outbreaks:

- Food vehicle suspected/ implicated
- Evidence (microbiological, epidemiological)
- Additional data as required by the EFSA technical specifications for food-borne outbreak reporting

Data for foodborne outbreak investigations in England and Wales is reported into a stand-alone, web-based surveillance system: eFOSS (PHE electronic Foodborne and non-foodborne Gastrointestinal Outbreak Surveillance System), which commenced in England and Wales in 2009. Data for Scotland is reported into a similar system: ObSurv, the surveillance system for all general outbreaks of IID in Scotland. In Northern Ireland data for foodborne outbreaks is reported to both HPZone (case management system) and a local database for monitoring outbreaks of infectious disease in general. Comparable datasets based on the EFSA definitions and criteria are collated by the health authorities and submitted to PHE for inclusion in a UK return for the annual report to EFSA under the requirements of Directive 2003/99/EC.

Additional data are occasionally collected or specific surveillance studies set up, either nationally or locally, to provide information on certain aspects of a disease outbreak or specific pathogen.

2. Description of the types of outbreaks covered by the reporting

The definitions used in this report are those given in the EFSA Manual for reporting of foodborne outbreaks in accordance with Directive 2003/99/EC.

The UK only reports data for general outbreaks of foodborne infections. A general outbreak is an incident in which two or more people, from more than one household, or residents of an institution, are thought to have a common exposure, experience a similar illness or proven infection (at least one of them having been ill). Data on household outbreaks are not included in the 2018 UK dataset**.**

3. National evaluation of the reported outbreaks in the country

In 2018, 49 foodborne outbreaks were reported in the UK compared to 40 reported in 2017. There were 1,706 affected individuals, 888 of which were laboratory confirmed, and 83 reported hospitalisations. There were nine reported deaths, one associated with a *Salmonella* outbreak, two associated with a *Clostridium perfringens* outbreak and six with two *Listeria monocytogenes* outbreaks. Norovirus was the most commonly reported causative pathogen (11/49 reported outbreaks, 22%) followed by *Salmonella* (10/49, 20%). The majority of foodborne outbreaks occurred in the food service sector (37/49, 75%), followed by community (10/49, 20%).

5. Control measures or other actions taken to improve the situation

Evidence from reported foodborne outbreaks occurring in the UK during 2018 has again shown that the majority of reported outbreaks were linked to food service premises, and that these were related to inadequate cooking of the food, storage time/ temperature abuse and/ or cross contamination in the kitchen. Where food safety breaches are detected, action is taken by the relevant food standards authorities and/or local authorities. Specific control action at production, processing and further down the food chain is taken depending on the outbreak, under national legislation. In the event of food vehicles from non-UK sources, the communication channels via the relevant communication platforms and EU institutions responsible for food safety in the EU and internationally are utilised.

7. Additional information

PHE and HPS now routinely perform whole genome sequencing (WGS) for several gastrointestinal pathogens, including *Salmonella* spp., *Shigella* spp., *Listeria monocytogenes* and pathogenic strains of *Escherichia coli*. The high resolution WGS typing of isolates provides at a national level for routine surveillance has facilitated the improved detection of smaller or geographically widespread clusters, detection of outbreaks and is helping to refine case definitions and focus outbreak investigations. The use of WGS has resulted in an enhanced ability to detect re-emergence of outbreaks identified and

investigated in previous years and trace them back to the same source of contamination as previously identified when control measures have not been fully effective in eliminating contamination. Using WGS has also enabled the consolidation of multiple regional outbreaks into national level outbreaks based on the WGS and epidemiological information obtained during the investigations. Both the re-emergence of cases associated with outbreak clusters and the consolidation of multiple outbreaks into large national outbreaks of long duration are complicating the approach to reporting in compliance with current EFSA guidelines.

58. Institutions and laboratories involved in antimicrobial resistance monitoring and reporting

The Veterinary Medicines Directorate is the competent authority in relation to AMR in animals. VMD was responsible for the programme of abattoir sampling of animals.

The Animal and Plant Health Agency (APHA) is the UK National Reference Laboratory for AMR in animals. APHA performed the statutory testing required under Decision 2013/652/EU of caecal and meat samples from the UK, with the exception of the isolation of ESBL/ ampC/ carbapenemase-producing *E. coli* from caecal samples from broilers and turkeys in Northern Ireland which was performed by the Agri-Food and Biosciences Institute (AFBI), Northern Ireland. APHA was responsible for the epidemiological aspects of the monitoring in animals, performed all of the susceptibility testing and collated and reported the AMR data from the UK to EFSA.

The Food Standards Agency (FSA), an independent government department set up by an Act of Parliament in 2000 to protect the public health and consumer interest in relation to food, is the competent authority in relation to AMR in food. FSA was responsible for the programme of sampling meat in the UK.

59. General Antimicrobial Resistance Evaluation

1. Situation and epidemiological evolution (trends and sources) regarding AMR to critically important antimicrobials (CIAs) over time until recent situation

3rd/4th generation cephalosporins

No resistance to cefotaxime or ceftazidime was detected in indicator *E. coli* isolates from broilers and turkeys (2014 and 2016) and pigs (2015 and 2017) at slaughter, except for one *E. coli* isolate from a

turkey in 2016, which was resistant to both cefotaxime and ceftazidime. In 2018, no resistance was observed to cefotaxime or ceftazidime in indicator *E. coli* isolates from turkeys, but in 2% of indicator *E. coli* isolates from broilers resistance was observed to these antibiotics.

No resistance to cefotaxime or ceftazidime was detected in *Salmonella* spp. isolates from laying hen, broiler or turkey flocks in 2014, 2016 and 2018, or in *Salmonella* spp. from broiler neck skin samples in 2016 and 2018, from turkey neck skin samples in 2018, or pig carcase swabs in 2015 and 2017.

C. jejuni isolates from broilers and turkeys are not tested for susceptibility to 3rd/4th generation cephalosporins.

Ciprofloxacin

Observed resistance to ciprofloxacin was higher than resistance to 3rd/4th generation cephalosporins. Resistance was observed in 25% and 19% of indicator *E. coli* isolates from broilers and turkeys in 2014, respectively, which decreased to 22% and 16% in 2016, respectively, and to 16% and 11% in 2018, respectively. Resistance in indicator *E. coli* isolates from pigs in 2015 and 2017 was observed to be low, at 2 and 3%, respectively.

In 2014, resistance to ciprofloxacin was also detected in 4%, 20% and 2% of *Salmonella* spp. isolates from boot swabs and dust samples from flocks of broilers, turkeys and laying hens, respectively, in 2016 in 9%, 2% and 9% of isolates and in 2018 in 6%, 5% and 4% of *Salmonella* spp. isolates. However, no resistance to ciprofloxacin was detected in *Salmonella* spp. isolated from broiler neck skin samples in 2016 or in 2018. Resistance to ciprofloxacin was observed in one *Salmonella* spp. isolate from carcase swabs from pigs in 2015, but in none of the isolates from pigs in 2017.

In 2014, resistance to ciprofloxacin was observed in 44% and 35% of *C. jejuni* isolates from broilers and turkeys, respectively, with similar results in 2016: 41% and 35%, respectively. In 2018, observed resistance to ciprofloxacin in *C. jejuni* isolates from broilers was higher (48%), but lower in turkey isolates (31%).

Colistin

No resistance to colistin was detected in indicator *E. coli* isolates obtained from broilers or turkeys in 2014, 2016 and 2018. In 2015, one indicator *E. coli* isolate from pig caeca showed resistance to colistin; in 2017 no resistance to colistin was observed in *E. coli* isolates from pigs.

In 2014, colistin resistance was observed in five *Salmonella* spp. isolates from laying hen flocks, but this finding was not repeated in 2016 or 2018 when resistance to colistin was not observed in isolates from

this poultry population. No resistance to colistin was detected in *Salmonella* spp. isolates from turkey flocks, broiler flocks and broiler neck skin samples in 2014 or 2016 or from pig carcase swabs in 2015 or 2017. In 2018, colistin resistance was observed in two *Salmonella* Enteritidis isolates from broiler flocks, but not in other *Salmonella* spp. isolates from turkey flocks or broiler or turkey neck skin samples. *S*. Enteritidis is a Group D *Salmonella* and *Salmonella* belonging to this serogroup can show a degree of intrinsic colistin resistance.

Erythromycin

Resistance to erythromycin in *C. jejuni* isolates from broilers and turkeys at slaughter was below 1% in 2014, 2016 and 2018.

Overall, resistance to HP-CIAs was either not detected, very low or low, except for resistance to ciprofloxacin in poultry, where resistance was moderate to high.

2. Public health relevance of the findings on food-borne AMR in animals and foodstuffs

The EU harmonised AMR monitoring (based on CID 2013/652/EU) in the UK shows that there is a low or very low level of resistance in food-borne pathogens to most of the HP-CIAs, except for resistance to fluoroquinolones in *Campylobacter* and *E. coli* isolated from poultry. These levels of resistance were shown to be relatively stable or decreasing. Several animal sectors have explicitly committed to reducing the use of HP-CIAs to a minimum.

3. Recent actions taken to control AMR in food producing animals and food

The UK commitment to reduce antimicrobial use in livestock and fish farmed for food to a multi-species average of 50 mg/kg was achieved in 2016, two years ahead of the deadline. UK sales of veterinary antibiotics were the lowest in 2017, since the start of recording in 1993. The recently published UK 20-year Vision on containing and controlling AMR and UK 5-year National Action Plan (NAP) on AMR contain a commitment to a further reduction of 25% between 2016 and 2020, through the livestock sectors' implementation of actions to achieve the targets they have set; the livestock sector targets will be under continued review. The NAP focuses on three key ways of tackling AMR: i) reducing need for, and unintentional exposure to, antimicrobials, ii) optimising use of antimicrobials, and iii) investing in innovation, supply and access. These three ways are underpinned by actions across 15 content areas, for example 'lower burden of animal infection', 'optimal use in animals and agriculture' and 'development of and access to diagnostics'. The Vision and NAP can be found here.

Furthermore, in addition to the EU harmonised AMR monitoring, the UK has a passive surveillance system in place under which veterinary pathogens from diagnostic samples associated with clinical cases

are tested for antimicrobial resistance. The UK also has contingency planning in place which enables a rapid response ('ResAlert') to the identification of AMR from animals that is considered to be a potentially high risk for human and/or animal health.

4. Any specific action decided in the Member State or suggestions to the European Union for actions to be taken against food-borne AMR threat

In the UK, the animal production sectors voluntarily share usage data for inclusion in the VARSS report (see below), demonstrating their commitment to transparency and reduction of antibiotic usage and resistance. This transparency also provides insight into the different challenges faced by each of the animal production sectors, which is important to consider for every potential measure to be taken.

However, there is a need to fill knowledge gaps on risk pathways related to the food-borne AMR threat. This would enable focusing resource and effort on the antibiotic usages that are of highest risk.

5. Additional information

The VMD produces the annual UK-VARSS report, collating UK-wide data on overall antibiotic sales for veterinary use, antibiotic usage by livestock species and antibiotic resistance in livestock, which can be found here:
https://www.gov.uk/government/collections/veterinary-antimicrobial-resistance-and-sales-surveillance.

The UK's 20-year Vision and five-year National Action Plan for antimicrobial resistance can be found here:
https://www.gov.uk/government/collections/antimicrobial-resistance-amr-information-and-resources.

60. General Description of Antimicrobial Resistance Monitoring; Carcases of Broilers / *Salmonella* spp.

1. General description of sampling design and strategy

Carcases of broilers sampled by food business operators in accordance with point 2.1.4 of Chapter 2 of Annex I to Regulation (EC) No 2073/2005 and Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Salmonella isolates recovered by food business operators from broilers were eligible for inclusion in the monitoring.

3. Randomisation procedure per animal population and food category

Randomisation was not performed as the number of available *Salmonella* isolates was lower than the target figure of 170.

4. Analytical method used for detection and confirmation

Salmonella isolates were examined biochemically and serologically to confirm identification to genus level. Isolates were serotyped using micro, tube and/ or slide agglutination tests, to investigate the presence of the recognised somatic and flagellar antigens, using specific antisera. Additional biochemical tests were performed where required for certain serovars. Serovars were determined according to the Kauffman-White-Le Minor scheme.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (Table 4 in Decision 2013/652/EU) was not performed since there were no isolates detected which were microbiologically resistant to cefotaxime, ceftazidime or meropenem.

6. Results of investigation

The number of *Salmonella* isolates investigated was 100, including *S.* Indiana (35 isolates), Derby (19 isolates) and *S.* Montevideo (14 isolates). The other serovars recovered included *S.* Tennessee, *S.* Stanley, *S.* Mbandaka and *S.* Kedougou and five incomplete serovars (rough strains). *S.* Enteritidis, *S.* Typhimurium and monophasic Typhimurium were not detected. The majority of isolates (99/100) were susceptible to the panel of antimicrobials tested. Resistance was not detected to ampicillin, azithromycin, cefotaxime, ceftazidime, chloramphenicol, ciprofloxacin, colistin, gentamicin, meropenem, nalidixic acid, tetracyclines or tigecycline. A single isolate of *S.* Kedougou was resistant to sulphonamides and trimethoprim.

7. Additional information

Resistance to trimethoprim/ sulphonamides in *S.* Kedougou from broilers was also detected in national monitoring performed in 2018.

61. General Description of Antimicrobial Resistance Monitoring; Carcases of Fattening Turkeys / *Salmonella* spp.

1. General description of sampling design and strategy

Carcases of fattening turkeys sampled by food business operators in accordance with point 2.1.4 of Chapter 2 of Annex I to Regulation (EC) No 2073/2005 and Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Salmonella isolates recovered by food business operators from fattening turkeys were eligible for inclusion in the monitoring.

3. Randomisation procedure per animal population and food category

Randomisation was not performed as the number of available *Salmonella* isolates was lower than the target figure of 170.

4. Analytical method used for detection and confirmation

Salmonella isolates were examined biochemically and serologically to confirm identification to genus level. Isolates were serotyped using micro, tube and/ or slide agglutination tests, to investigate the presence of the recognised somatic and flagellar antigens, using specific antisera. Additional biochemical tests were performed where required for certain serovars. Serovars were determined according to the Kauffman-White-Le Minor scheme.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (Table 4 in Decision 2013/652/EU) was not performed since there were no isolates detected which were microbiologically resistant to cefotaxime, ceftazidime or meropenem.

6. Results of investigation

Three *Salmonella* isolates were investigated; two *S.* Derby and an incomplete serovar (rough strain) with the antigenic formula O rough:f,g:-. One of the *S.* Derby and the rough strain were resistant to

sulphonamides and tetracyclines; these isolates were susceptible to the remaining antimicrobials which were tested. The remaining *S.* Derby isolate was susceptible to the panel of antimicrobials tested.

7. Additional information

Resistance to tetracyclines, sulphonamides or streptomycin was also detected in *S.* Derby from turkeys in national monitoring performed in GB in 2018.

62. General Description of Antimicrobial Resistance Monitoring; National Control Programme (NCP) Sampling of Broilers / *Salmonella* spp.

1. General description of sampling design and strategy

Salmonella spp. isolates from broilers sampled in the framework of the national control programme, established in accordance with Article 5(1) of Regulation (EC) No 2160/2003, were included in the monitoring in accordance with Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Salmonella isolates recovered under the framework of the national control plan from broilers were eligible for inclusion in the monitoring.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with EFSA's recommendations, as the number of available *Salmonella* isolates exceeded the target figure of 170.

4. Analytical method used for detection and confirmation

Salmonella isolates were examined biochemically and serologically to confirm identification to genus level. Isolates were serotyped using micro, tube and/ or slide agglutination tests, to investigate the presence of the recognised somatic and flagellar antigens, using specific antisera. Additional biochemical tests were performed where required for certain serovars. Serovars were determined according to the Kauffman-White-Le Minor scheme.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines

(>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (Table 4 in Decision 2013/652/EU) was not performed since there were no isolates detected which were microbiologically resistant to cefotaxime, ceftazidime or meropenem.

6. Results of investigation

The number of *Salmonella* isolates investigated was 171, including the incomplete serovar 13,23:i:- (61 isolates), *S*. Mbandaka (54 isolates), *S*. Kedougou (18 isolates), *S.* Montevideo (8 isolates) and *S.* Ohio (7 isolates). There were no isolates of *S.* Typhimurium or monophasic Typhimurium included in the random sample of isolates from broilers. Three *S.* Enteritidis isolates were included in the sample of 171 isolates.

Resistance was not detected to azithromycin, cefotaxime, ceftazidime, chloramphenicol, gentamicin, meropenem or tigecycline.

Two of three *S.* Enteritidis isolates showed microbiological resistance to colistin; *S.* Enteritidis is a group D *Salmonella* and this serogroup typically show a degree of intrinsic resistance to colistin. The remaining *Salmonella* isolates were susceptible to colistin.

Microbiological resistance to ciprofloxacin was detected in 11/171 *Salmonella* isolates, most of which (9/11) were the incomplete serovar 13,23:i:-. Microbiological resistance to ciprofloxacin without resistance to nalidixic acid was present in 6/11 isolates; this phenotype can indicate the presence of transferable fluoroquinolone resistance genes. The remaining isolates showed microbiological resistance to both ciprofloxacin and nalidixic acid, a phenotype typically seen with DNA gyrase mutations conferring quinolone/ fluoroquinolone resistance.

Ampicillin resistance was detected in single isolates of *S.* Derby, *S.* Kottbus and 13,23:i:- and in two isolates of *S.* Mbandaka. Sulphonamide resistance was detected in 10/171 (6%) of isolates; five of these Salmonella isolates (*S.* Kedougou (3) and *S.* Ohio (2)) were also resistant to trimethoprim. 7/171 (4%) of isolates were microbiologically resistant to tetracyclines including *S.* Ohio (5 isolates) and single isolates of *S.* Derby and *S.* Kottbus.

Susceptibility to the panel of antimicrobials tested was shown by 143/171 (84%) *Salmonella* isolates from broilers.

63. General Description of Antimicrobial Resistance Monitoring; National Control Programme (NCP) Sampling of Turkeys / *Salmonella* spp.

1. General description of sampling design and strategy

Salmonella spp. isolates from turkeys sampled in the framework of the national control programme, established in accordance with Article 5(1) of Regulation (EC) No 2160/2003, were included in the monitoring in accordance with Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Salmonella isolates recovered under the framework of the national control plan from turkeys were eligible for inclusion in the monitoring.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with EFSA's recommendations as the number of available *Salmonella* isolates exceeded the target figure of 170.

4. Analytical method used for detection and confirmation

Salmonella isolates were examined biochemically and serologically to confirm identification to genus level. Isolates were serotyped using micro, tube and/ or slide agglutination tests, to investigate the presence of the recognised somatic and flagellar antigens, using specific antisera. Additional biochemical tests were performed where required for certain serovars. Serovars were determined according to the Kauffman-White-Le Minor scheme.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (Table 4 in Decision 2013/652/EU) was not performed since there were no isolates detected which were microbiologically resistant to cefotaxime, ceftazidime or meropenem.

6. Results of investigation

The number of Salmonella isolates investigated was 170, including *S.* Derby/ presumptive *S.* Derby (143 isolates) [Presumptive *Salmonella* Derby are identified by slide agglutination rather than full

serotyping. The testing approach used excludes the possibility of these isolates being ST or monophasic ST}], *S*. Senftenberg (6 isolates), *S*. Typhimuirium (5 isolates), *S*. Agona (5 isolates) with lower numbers of other serovars. There were no isolates of monophasic *S.* Typhimurium or *S.* Enteritidis included in the random sample of isolates from turkeys.

Resistance was not detected to azithromycin, cefotaxime, ceftazidime, chloramphenicol, colistin, meropenem or tigecycline.

The *S.* Typhimurium isolates (n=5) were resistant to sulphonamides and tetracyclines, with 2/5 isolates also microbiologically resistant to both ciprofloxacin and ampicillin. Nalidixic acid resistance was not shown by the ciprofloxacin resistant isolates, a phenotype suggestive of transferable fluoroquinolone resistance.

Microbiological resistance to ciprofloxacin was detected in 9/170 Salmonella isolates, most of which (6/9) were *S.* Senftenberg. All isolates except the two *S.* Typhimurium isolates referred to above showed microbiological resistance to both ciprofloxacin and nalidixic acid, a phenotype typically seen with DNA gyrase mutations conferring quinolone/ fluoroquinolone resistance.

Ampicillin resistance was detected in 8/170 (5%) of isolates. Sulphonamide resistance was observed in 128/170 (75%) of isolates; 128/170 (75%) of isolates were microbiologically resistant to tetracyclines and 127/170 isolates (75%) were resistant to both sulphonamides and tetracyclines. Trimethoprim resistance was observed in 3/170 isolates (2%), which were *S.* Derby or presumptive *S.* Derby. A single isolate of *S.* Derby was microbiologically resistant to gentamicin.

Susceptibility to the panel of antimicrobials tested was shown by 34/170 (20%) Salmonella isolates from turkeys.

64. General Description of Antimicrobial Resistance Monitoring; National Control Programme (NCP) Sampling of Laying Hens / *Salmonella* spp.

1. General description of sampling design and strategy

Salmonella spp. isolates from laying hens sampled in the framework of the national control programme, established in accordance with Article 5(1) of Regulation (EC) No 2160/2003, were included in the monitoring in accordance with Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Salmonella isolates recovered under the framework of the national control plan from laying hens were eligible for inclusion in the monitoring.

3. Randomisation procedure per animal population and food category

Randomisation was not performed as the total number of available *Salmonella* isolates which were eligible for inclusion was lower than the target figure of 170.

4. Analytical method used for detection and confirmation

Salmonella isolates were examined biochemically and serologically to confirm identification to genus level. Isolates were serotyped using micro, tube and/ or slide agglutination tests, to investigate the presence of the recognised somatic and flagellar antigens, using specific antisera. Additional biochemical tests were performed where required for certain serovars. Serovars were determined according to the Kauffman-White-Le Minor scheme.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (Table 4 in Decision 2013/652/EU) was not performed since there were no isolates detected which were microbiologically resistant to cefotaxime, ceftazidime or meropenem.

6. Results of investigation

The number of Salmonella isolates investigated from laying hens was 52, including *S*. Senftenberg (7 isolates) and the incomplete serovar 13,23:i:- (5 isolates).There were three isolates of S. Typhimurium, four of monophasic S. Typhimurium and four of *S.* Enteritidis included.

Resistance was not detected to azithromycin, cefotaxime, ceftazidime, colistin, meropenem or tigecycline.

The four *S*. Enteritidis and three *S.* Typhimurium isolates from laying hens were susceptible to the panel of antimicrobials tested. The four monophasic *S*. Typhimurium isolates were resistant to ampicillin, sulphonamides and tetracyclines (3/4 isolates tetracycline resistant), with most isolates therefore showing the typical resistance pattern associated with monophasic *S.* Typhimurium. Two isolates of *S*. Rissen were resistant to ampicillin, sulphonamides, tetracyclines and trimethoprim.

Microbiological resistance to ciprofloxacin was detected in 2/52 Salmonella isolates, both of which were the incomplete serovar 13,23:i:-. Microbiological resistance to ciprofloxacin without resistance to nalidixic acid was present in one of the isolates; this phenotype can indicate the presence of transferable fluoroquinolone resistance genes. The remaining isolates showed microbiological resistance to both ciprofloxacin and nalidixic acid, a phenotype typically seen with DNA gyrase mutations conferring quinolone/ fluoroquinolone resistance.

Susceptibility to the panel of antimicrobials tested was shown by 42/52 (81%) Salmonella isolates from laying hens.

65. General Description of Antimicrobial Resistance Monitoring; Caecal contents from broilers / Indicator *Escherichia coli*

1. General description of sampling design and strategy

Caecal contents from broilers were sampled for indicator *Escherichia coli* in accordance with Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2013/652/EU and EFSA guidelines. All countries within the UK were included.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2013/652/EU and EFSA guidelines. 183 isolates were recovered. In accordance with EFSA's guidelines, each eligible broiler flock (the "epidemiological unit") was eligible to contribute one randomly selected *E. coli* isolate and thereby avoid clustering.

4. Analytical method used for detection and confirmation

Indicator *E. coli* were isolated from caecal contents using MacConkey agar. An isolate was randomly selected and sub-cultured for further testing. Standard biochemical tests were used to identify *E. coli*.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) was performed in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (Table 4 in Decision 2013/652/EU) was not performed since there were no isolates detected which were microbiologically resistant to cefotaxime, ceftazidime or meropenem.

6. Results of investigation

Resistance was not detected to azithromycin, colistin, meropenem or tigecycline in indicator *E. coli* from broilers in 2018. This was the position also observed in 2016.

Resistance to cefotaxime and ceftazidime was detected in 4/183 (2%) of indicator *E. coli* from broilers, including 2/183 with an ESBL phenotype and 2/183 with an AmpC phenotype. Resistance to cefotaxime and ceftazidime was not detected in 2016 in indicator *E. coli* from broilers.

Resistance to ciprofloxacin was observed in 29/183 (16%) of indicator *E. coli*, a decline from the figure of 21.6% resistance observed in 2016. 27/29 (93%) of indicator *E. coli* resistant to ciprofloxacin were also resistant to nalidixic acid.

A decline in resistance was noted to several antimicrobials. Thus, ampicillin resistance at 46% showed a decline on the figure of 67% observed in 2016, chloramphenicol resistance was 4% in 2016, 3% in 2018, sulphamethoxazole resistance was 53% in 2016, 40% in 2018, tetracycline resistance was 44% in 2016, 27% in 2018 and trimethoprim resistance was 43% in 2016, 27% in 2018.

The decline in resistance coincides with decreasing antimicrobial usage in broilers.

66. General Description of Antimicrobial Resistance Monitoring; Caecal contents from turkeys / Indicator *Escherichia coli*

1. General description of sampling design and strategy

Caecal contents from fattening turkeys were sampled for indicator *Escherichia coli* in accordance with Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2013/652/EU and EFSA guidelines. All countries within the UK were included.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2013/652/EU and EFSA guidelines. 176 isolates were recovered. In accordance with EFSA's guidelines, each eligible turkey flock (the "epidemiological unit") was eligible to contribute one randomly selected *E. coli* isolate and thereby avoid clustering.

4. Analytical method used for detection and confirmation

Indicator *E. coli* were isolated from caecal contents using MacConkey agar. An isolate was randomly selected and sub-cultured for further testing. Standard biochemical tests were used to identify *E. coli*.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) was performed in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (Table 4 in Decision 2013/652/EU) was not performed since there were no isolates detected which were microbiologically resistant to cefotaxime, ceftazidime or meropenem.

6. Results of investigation

Resistance was not detected to azithromycin, cefotaxime, ceftazidime, colistin, meropenem or tigecycline in indicator *E. coli* from fattening turkeys in 2018. This was similar to the position observed in 2016, when no resistance was detected to colistin, meropenem or tigecycline although in 2016 low levels of azithromycin (0.9%), cefotaxime (0.4%) and ceftazidime (0.4%) resistance were detected.
Resistance to ciprofloxacin was observed in 19/176 (11%) of indicator *E. coli*, a decline from the figure of 16% resistance observed in 2016. 11/19 (58%) of indicator *E. coli* resistant to ciprofloxacin were also resistant to nalidixic acid; resistance to ciprofloxacin without resistance to nalidixic acid is a phenotype suggesting transferable fluoroquinolone resistance.

A decline in resistance was noted to several antimicrobials. Thus, ampicillin resistance at 57% showed a decline on the figure of 61% observed in 2016, chloramphenicol resistance was 8% in 2016, 4% in 2018, gentamicin resistance was 2% in 2016, 0.6% in 2018, sulphamethoxazole resistance was 25% in 2016, 18% in 2018, tetracycline resistance was 67% in 2016, 47% in 2018 and trimethoprim resistance was 23% in 2016, 14% in 2018.

67. General Description of Antimicrobial Resistance Monitoring; Caecal contents from broilers / specific monitoring for ESBL/AmpC/Carbapenemase –producing *Escherichia coli*

1. General description of sampling design and strategy

Caecal contents from broilers were sampled for ESBL/ AmpC/ carbapenemase-producing *Escherichia coli* in accordance with the specific monitoring described in Decision 2013/652/EU and the guidance and protocols produced by the EU Reference Laboratory for AMR in Denmark. Voluntary monitoring using selective agars for carbapenemase-producing *E. coli* and OXA-carbapenemase producing *E. coli* was also performed.

2. Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2013/652/EU and EFSA guidelines. All countries within the UK were included.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2013/652/EU and EFSA guidelines. 31 isolates were recovered from 302 caecal samples. In accordance with EFSA's guidelines, each eligible broiler flock (the "epidemiological unit") was eligible to contribute one randomly selected *E. coli* isolate and thereby avoid clustering.

4. Analytical method used for detection and confirmation

The protocol issued by the EU Reference Laboratory in Denmark was used for the specific monitoring of ESBL/ AmpC/ carbapenemase-producing *E. coli*. In addition, two selective agars for the detection of carbapenemase producing *E. coli* were used, chromID® CARBA and chromID® OXA-48. These agars for selective culture of carbapenemase-producing *E. coli* were used according to the protocol issued by the EU Reference Laboratory.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) was performed in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (in accordance with Table 4 in Decision 2013/652/EU) was then performed using cefepime (>0.125), cefotaxime (>0.25), cefotaxime + clavulanate (NA), cefoxitin (>8), ceftazidime (>0.5), ceftazidime plus clavulanate (NA), ertapenem (>0.06), imipenem (>0.5), meropenem (>0.125) and temocillin (>32).

6. Results of investigation

The total number of caecal samples examined from different broiler flocks in 2018 was 302, of which 31/302 (10.3%) yielded growth of *E. coli* on selective MacConkey plates containing cefotaxime.

Microbiological resistance was not detected to azithromycin, chloramphenicol, colistin, ertapenem, meropenem, imipenem, temocillin or tigecycline.

19/302 (6.3%) caecal samples yielded *E. coli* with an AmpC phenotype, showing resistance to cefoxitin, cefotaxime and ceftazidime.

12/302 (3.9%) caecal samples yielded *E. coli* with an ESBL phenotype, showing synergy with cefotaxime and clavulanate and / or ceftazidime and clavulanate.

There were no caecal samples which yielded *E. coli* with both an AmpC and an ESBL phenotype.

Considering the 31 *E. coli* recovered from caecal contents of 302 broilers, which had an AmpC (n=19) or an ESBL (n=12) phenotype, all of the isolates were resistant to ampicillin, as expected. Of five isolates which were microbiologically or clinically resistant to ciprofloxacin, 2/5 had an ESBL phenotype and 3/5 had an AmpC phenotype. Nalidixic acid resistance was observed in all isolates showing microbiological resistance to ciprofloxacin. The 31 *E. coli* recovered from caecal contents of broilers using selective medium showed 45% tetracycline resistance, 52% sulphonamide resistance and 10% trimethoprim resistance and these are higher than the levels of resistance to these antimicrobials reported for randomly selected *E. coli* recovered from broiler caecal samples.

None of the caecal samples (0/302) yielded growth of *E. coli* on the two agars selective for carbapenemase-producing organisms.

7. Additional information

In monitoring performed in 2016, 19.1% of broiler caecal samples yielded *E. coli* with an ESBL phenotype and 10.5% of broiler caecal samples yielded *E. coli* with an AmpC phenotype. These figures include 0.5% of broiler caecal samples which yielded *E. coli* with both an AmpC and an ESBL phenotype. The figures obtained in 2018 demonstrate a decline in the proportion of broiler caecal samples yielding AmpC or ESBL *E. coli.*

68. General Description of Antimicrobial Resistance Monitoring; Caecal contents from turkeys / specific monitoring for ESBL/AmpC/Carbapenemase –producing *Escherichia coli*

1. General description of sampling design and strategy

Caecal contents from turkeys were sampled for ESBL/ AmpC/ carbapenemase-producing *Escherichia coli* in accordance with the specific monitoring described in Decision 2013/652/EU and the guidance and protocols produced by the EU Reference Laboratory for AMR in Denmark. Voluntary monitoring using selective agars for carbapenemase-producing *E. coli* and OXA-carbapenemase producing *E. coli* was also performed.

2. Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2013/652/EU and EFSA guidelines. All countries within the UK were included.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2013/652/EU and EFSA guidelines. 14 isolates were recovered from 373 caecal samples. In accordance with EFSA's guidelines, each eligible turkey flock (the "epidemiological unit") was eligible to contribute one randomly selected *E. coli* isolate and thereby avoid clustering.

4. Analytical method used for detection and confirmation

The protocol issued by the EU Reference Laboratory in Denmark was used for the specific monitoring of ESBL/ AmpC/ carbapenemase-producing *E. coli*. In addition, two selective agars for the detection of carbapenemase producing *E. coli* were used, chromID® CARBA and chromID® OXA-48. These agars for selective culture of carbapenemase-producing *E. coli* were used according to the protocol issued by the EU Reference Laboratory.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) was performed in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (in accordance with Table 4 in Decision 2013/652/EU) was then performed using cefepime (>0.125), cefotaxime (>0.25), cefotaxime + clavulanate (NA), cefoxitin (>8), ceftazidime (>0.5), ceftazidime plus clavulanate (NA), ertapenem (>0.06), imipenem (>0.5), meropenem (>0.125) and temocillin (>32).

6. Results of investigation

The total number of caecal samples examined from different turkey flocks in 2018 was 373, of which 14/373 (3.8%) yielded growth of *E. coli* on selective MacConkey plates containing cefotaxime.

Microbiological resistance was not detected to azithromycin, chloramphenicol, colistin, ertapenem, meropenem, imipenem, gentamicin, temocillin or tigecycline.

4/373 (1.1%) caecal samples yielded *E. coli* with an AmpC phenotype, showing resistance to cefoxitin, cefotaxime and ceftazidime.

9/373 (2.4%) caecal samples yielded *E. coli* with an ESBL phenotype, showing synergy with cefotaxime and clavulanate and / or ceftazidime and clavulanate.

There were no caecal samples which yielded *E. coli* with both an AmpC and an ESBL phenotype. One caecal sample yielded *E. coli* which were resistant to cefotaxime, did not show synergy with clavulanate and which had cefoxitin MIC at the microbiological breakpoint.

Considering the 14 *E. coli* recovered from caecal contents of 373 turkeys, which had an AmpC (n=4) or an ESBL (n=9) phenotype, all of the isolates were resistant to ampicillin, as expected. Four isolates which were microbiologically or clinically resistant to ciprofloxacin had an ESBL phenotype. Nalidixic acid resistance was observed in three of the four isolates showing microbiological or higher levels of resistance to ciprofloxacin. The 14 *E. coli* recovered from caecal contents of turkeys using selective medium showed 29% tetracycline resistance, 64% sulphonamide resistance and 43% trimethoprim resistance.

None of the caecal samples (0/373) yielded growth of *E. coli* on the two agars selective for carbapenemase-producing organisms.

7. Additional information

In monitoring performed in 2016, 3.3% of turkey caecal samples yielded *E. coli* with an ESBL phenotype and 1.4% of turkey caecal samples yielded *E. coli* with an AmpC phenotype. The figures obtained in 2018 demonstrate a reduction in the proportion of turkey caecal samples yielding AmpC or ESBL *E. coli.*

69. General Description of Antimicrobial Resistance Monitoring; chicken meat from broilers / specific monitoring for ESBL/AmpC/Carbapenemase –producing *Escherichia coli*

1. General description of sampling design and strategy

Chicken (meat from broilers) was sampled for ESBL/ AmpC/ carbapenemase-producing *Escherichia coli* in accordance with the specific monitoring described in Decision 2013/652/EU and the guidance and protocols produced by the EU Reference Laboratory for AMR in Denmark. Voluntary monitoring using selective agars for carbapenemase-producing *E. coli* and OXA-carbapenemase producing *E. coli* was also performed.

2. Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2013/652/EU and EFSA guidelines. All countries within the UK were included.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2013/652/EU and EFSA guidelines. 42 isolates were recovered from 309 meat samples.

4. Analytical method used for detection and confirmation

The protocol issued by the EU Reference Laboratory in Denmark was used for the specific monitoring of ESBL/ AmpC/ carbapenemase-producing *E. coli*. In addition, two selective agars for the detection of carbapenemase producing *E. coli* were used, chromID® CARBA and chromID® OXA-48. These agars for selective culture of carbapenemase-producing *E. coli* were used according to the protocol issued by the EU Reference Laboratory.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) was performed in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): ampicillin (>8), azithromycin (>16), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.064), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>16), sulfamethoxazole (>256), tetracyclines (>8), tigecycline (>1), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (in accordance with Table 4 in Decision 2013/652/EU) was then performed using cefepime (>0.125), cefotaxime (>0.25), cefotaxime + clavulanate (NA), cefoxitin (>8), ceftazidime (>0.5), ceftazidime plus clavulanate (NA), ertapenem (>0.06), imipenem (>0.5), meropenem (>0.125) and temocillin (>32).

6. Results of investigation

The total number of chicken retail meat samples examined in 2018 was 309, of which 42/309 (13.6%) yielded growth of *E. coli* on selective MacConkey plates containing cefotaxime.

Microbiological resistance was not detected to azithromycin, colistin, ertapenem, meropenem, imipenem, temocillin or tigecycline.

19/309 (6.1%) retail chicken meat samples yielded *E. coli* with an AmpC phenotype, showing resistance to cefoxitin, cefotaxime and ceftazidime.

26/309 (8.4%) retail chicken meat samples yielded *E. coli* with an ESBL phenotype, showing synergy with cefotaxime and clavulanate and / or ceftazidime and clavulanate.

These figures include 3/309 (1.0%) retail chicken meat samples which yielded *E. coli* with both an AmpC and an ESBL phenotype.

Considering the 42 *E. coli* recovered from 309 retail chicken meat samples, which had an AmpC (n=19) or an ESBL (n=26) phenotype, all of the isolates were resistant to ampicillin, as expected. Of 17 isolates which were microbiologically or clinically resistant to ciprofloxacin, 13/17 had an ESBL phenotype and 6/17 had an AmpC phenotype; these figures include two isolates which had a combined ESBL and AmpC phenotype. Nalidixic acid resistance was observed in most (16/17) isolates showing microbiological or higher levels of resistance to ciprofloxacin. The 42 *E. coli* recovered from retail chicken meat samples using selective medium showed 64% tetracycline resistance, 71% sulphonamide resistance and 19% trimethoprim resistance.

None of the caecal samples (0/309) yielded growth of *E. coli* on the two agars selective for carbapenemase-producing organisms.

7. Additional information

In monitoring performed in 2016, 29.7% of retail chicken meat samples yielded *E. coli* with an ESBL phenotype and 16.3% of retail chicken meat samples yielded *E. coli* with an AmpC phenotype. These figures include 0.9% of samples which yielded *E. coli* with both an AmpC and an ESBL phenotype. The figures obtained in 2018 demonstrate a decline in the percentage of retail chicken meat samples yielding AmpC or ESBL *E. coli.*

70. General Description of Antimicrobial Resistance Monitoring; Caecal contents from broilers / *Campylobacter jejuni*

1. General description of sampling design and strategy

Caecal contents from broilers were sampled for *Campylobacter jejuni* in accordance with Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2013/652/EU and EFSA guidelines. All countries within the UK were included.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2013/652/EU and EFSA guidelines. 171 *C.jejuni* isolates were recovered. In accordance with EFSA's guidelines, each eligible broiler flock (the "epidemiological unit") was eligible to contribute one randomly selected *C. jejuni* isolate and thereby avoid clustering.

4. Analytical method used for detection and confirmation

MCCDA agar was used for isolation of *C. jejuni,* without pre-enrichment. Maldi-tof was used to confirm identification.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) was performed in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): erythromycin (>4), ciprofloxacin (>0.5), gentamicin (>2), nalidixic acid (>16), streptomycin (>4), tetracycline (>1).

6. Results of investigation

In 2018, 82/171 (47.9%) of *C. jejuni* isolates from broilers were resistant to ciprofloxacin applying the ECOFF. All isolates resistant to ciprofloxacin were also resistant to nalidixic acid; a single isolate was resistant to nalidixic acid but susceptible to ciprofloxacin. Most (79/82) *C. jejuni* isolates from broilers resistant to ciprofloxacin were also resistant to tetracyclines.

1/171 (0.6%) *C. jejuni* isolates was microbiologically resistant to erythromycin; this isolate was susceptible to ciprofloxacin. The isolate did not show high-level erythromycin resistance and had an MIC of 8mg/l.

1/171 (0.6%) *C. jejuni* isolates was microbiologically resistant to gentamicin, whilst 5/171 (2.9%) were resistant to streptomycin. Tetracycline resistance was observed in 111/171 (64.9%) isolates.

7. Additional information

In 2016, the UK reported microbiological resistance to ciprofloxacin in 40.6% and to erythromycin in 0.6% of *C. jejuni* from broilers.

71. General Description of Antimicrobial Resistance Monitoring; Caecal contents from turkeys / *Campylobacter jejuni*

1. General description of sampling design and strategy

Caecal contents from turkeys were sampled for *Campylobacter jejuni* in accordance with Decision 2013/652/EU.

2. Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2013/652/EU and EFSA guidelines. All countries within the UK were included.

3. Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2013/652/EU and EFSA guidelines. 174 *C.jejuni* isolates were recovered. In accordance with EFSA's guidelines, each eligible turkey flock (the "epidemiological unit") was eligible to contribute one randomly selected *C. jejuni* isolate and thereby avoid clustering.

4. Analytical method used for detection and confirmation

MCCDA agar was used for isolation of *C. jejuni,* without pre-enrichment. Maldi-tof was used to confirm identification.

5. Laboratory methodology used for detection of antimicrobial resistance

Broth microdilution (MIC determination) was performed in accordance with Decision 2013/652/EU. The following antimicrobials were tested (the ECOFF applied is stated in brackets): erythromycin (>4), ciprofloxacin (>0.5), gentamicin (>2), nalidixic acid (>16), streptomycin (>4), tetracycline (>1).

6. Results of investigation

In 2018, 54/174 (31.0%) of *C. jejuni* isolates from turkeys were resistant to ciprofloxacin applying the ECOFF. Almost all (53/54) isolates resistant to ciprofloxacin were also resistant to nalidixic acid; 2/174 isolates were resistant to nalidixic acid but susceptible to ciprofloxacin. Most (49/54) *C. jejuni* isolates from turkeys which were resistant to ciprofloxacin were also resistant to tetracyclines.

1/174 (0.6%) *C. jejuni* isolates was microbiologically resistant to erythromycin with an MIC of 128mg/l; this isolate was susceptible to ciprofloxacin.

C. jejuni isolates were all susceptible to gentamicin, whilst 3/174 (1.7%) were resistant to streptomycin. Tetracycline resistance was observed in 78/174 (44.8%) isolates.

7. Additional information

In 2016, the UK reported microbiological resistance to ciprofloxacin in 34.7% and to erythromycin in 1.1% of *C. jejuni* from turkeys.