European Food Safety Authority

ZOONOSES MONITORING

Finland

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 Finland 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.

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

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ANIMAL POPULATION TABLES

Table Susceptible animal population

		Population		
Animal species	**Category of animals**	**holding**	**animal**	**slaughter animal (heads)**
Cattle (bovine animals)	Cattle (bovine animals)	10,629	863,279	273,277
Deer	Deer - farmed			300
	Deer - wild			803
Ducks	Ducks			17,537
Gallus gallus (fowl)	Gallus gallus (fowl)			79,970,488
	Gallus gallus (fowl) - breeding flocks, unspecified			531,848
	Gallus gallus (fowl) - broilers	135	8,146,724	79,435,570
	Gallus gallus (fowl) - laying hens	975	3,663,349	3,070
Geese	Geese			4,764
Goats	Goats	975	8,201	351
Moose	Moose - wild			306
Mouflons	Mouflons			12
Pigs	Pigs	1,156	1,076,301	1,818,212
	Pigs - breeding animals			33,047
	Pigs - fattening pigs			1,785,165
Reindeers	Reindeers	4,394	184,958	55,148
Sheep	Sheep	3,958	135,480	64,067
Solipeds, domestic	Solipeds, domestic - horses	16,000	74,400	1,149
Turkeys	Turkeys	52	284,284	912,529
Wild boars	Wild boars - farmed			278

DISEASE STATUS TABLES

Table Bovine 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 suspended herds under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of animals positive to BST under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds	Number of animals or pools tested under surveillance by bulk milk	Number of notified abortions whatever cause under investigations of suspect cases	Number of isolations of Brucella abortus under investigations of suspect cases	Number of abortions due to Brucella infection under investigations of suspect cases	Number of animals tested by microbiology under investigations of suspect cases
FINLAND	129	0	0	0	10,629	0	863,279	0	0	10,629	1,255	88	0	0	88

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 suspended herds under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	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 animals	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
FINLAND	5	0	0	0	4,933	0	143,681	178	3,879	4,933	21

DISEASE STATUS TABLES

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	Interval between routine tuberculin tests	Number of animals tested with tuberculin routine testing	Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination	Total number of herds
FINLAND	10,629	0	863,279	0	0	0	8	0	10,629

Table Tuberculosis in farmed deer

Region	Number of infected herds	Number of herds with status free	Total number of animals	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination	Total number of herds
FINLAND	0	23	305	0	0	23

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 - Unspecified - Sweden - animal sample - blood - Monitoring - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	26	0	Brucella	0
	Dogs - pet animals - Unspecified - Unknown - animal sample - blood - Clinical investigations - Official sampling - Not specified	N_A	Not Available	animal	1	0	Brucella	0
	Dogs - pet animals - Unspecified - Unknown - animal sample - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	3	0	Brucella	0
	Moose - wild - Unspecified - Finland - animal sample - blood - Monitoring - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	2	0	Brucella	0
	Pigs - Unspecified - Finland - animal sample - blood - Surveillance - Official sampling - Selective sampling	N_A	Not Available	animal	1484	0	Brucella	0
	Pigs - Unspecified - Finland - animal sample - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	9	0	Brucella	0
	Reindeers - Unspecified - Finland - animal sample - blood - Monitoring - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	149	0	Brucella	0
	Wild boars - farmed - Unspecified - Finland - animal sample - blood - Surveillance - Official sampling - Selective sampling	N_A	Not Available	animal	38	0	Brucella	0
	Zoo animals, all - Unspecified - Not Available - animal sample - blood - Monitoring - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	6	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	Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Census	Sampling in June-October	Not Available	slaughter animal batch	1742	61	Campylobacter coli	5
							Campylobacter jejuni	56
	Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Objective sampling	Sampling in January-May and in November-December	Not Available	slaughter animal batch	336	0	Campylobacter jejuni	0

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 - Slaughterhouse - Finland - food sample - neck skin - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	26	Gram	N_A	Not Available	580	1	Campylobacter jejuni	1

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) - dairy cows - Farm - Finland - animal sample - milk - Surveillance - Official sampling - Objective sampling	herd/flock	N_A	Enzyme-linked immunosorbent assay (ELISA)	1255	10	10	Coxiella burnetii	10
	Cattle (bovine animals) - meat production animals - Slaughterhouse - Finland - animal sample - blood - Surveillance - Official sampling - Objective sampling	animal	N_A	Enzyme-linked immunosorbent assay (ELISA)	1775	5		Coxiella burnetii	5
		herd/flock	N_A	Enzyme-linked immunosorbent assay (ELISA)	360	5	4	Coxiella burnetii	5
	Cattle (bovine animals) - mixed herds - Farm - Finland - animal sample - blood - Clinical investigations - Private sampling - Selective sampling	animal	N_A	Enzyme-linked immunosorbent assay (ELISA)	93	0		Coxiella	0
	Goats - milk goats - Farm - Finland - animal sample - milk - Surveillance - Official sampling - Objective sampling	herd/flock	N_A	Enzyme-linked immunosorbent assay (ELISA)	7	0	0	Coxiella	0
	Sheep - Slaughterhouse - Finland - animal sample - blood - Surveillance - Official sampling - Objective sampling	animal	N_A	Enzyme-linked immunosorbent assay (ELISA)	871	1		Coxiella burnetii	1
		herd/flock	N_A	Enzyme-linked immunosorbent assay (ELISA)	96	1	1	Coxiella burnetii	1

Table Cysticercus:CYSTICERCUS 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) - unspecified - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Visual inspection	animal	273277	0	Cysticercus	0
	Pigs - breeding animals - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Visual inspection	animal	33047	0	Cysticercus	0
	Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Visual inspection	animal	1785165	0	Cysticercus	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Visual inspection	animal	278	0	Cysticercus	0

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
FINLAND	Cattle (bovine animals) - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	273277	0	Echinococcus	0
	Deer - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	300	0	Echinococcus	0
	Deer - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: only meat inspected animals, not all hunted animals	Not Available	animal	803	0	Echinococcus	0
	Foxes - wild - Natural habitat - Finland - animal sample - faeces - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	203	0	Echinococcus multilocularis	0
	Goats - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	351	0	Echinococcus	0
	Moose - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: only meat inspected animals, not all hunted animals	Not Available	animal	306	3	Echinococcus granulosus	3
	Moose - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	N_A	Not Available	animal	19	1	Echinococcus granulosus	1
	Mouflons - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	12	0	Echinococcus	0
	Pigs - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	1818212	0	Echinococcus	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - faeces - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	326	0	Echinococcus multilocularis	0
	Reindeers - semi-domesticated - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	N_A	Not Available	animal	21	0	Echinococcus	0
	Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	55148	2	Echinococcus granulosus	2
	Sheep - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	64067	0	Echinococcus	0
	Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	1149	0	Echinococcus	0
	Voles - wild - Natural habitat - Finland - animal sample - Survey - Official sampling - Objective sampling	N_A	Not Available	animal	478	0	Echinococcus	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	278	0	Echinococcus	0
	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	17	5	Echinococcus granulosus	5
Pohjanmaa	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	1	0	Echinococcus granulosus	0
Satakunta	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	1	0	Echinococcus granulosus	0
Helsinki-Uusimaa (NUTS level 3)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	2	0	Echinococcus granulosus	0
Kanta-Häme (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	1	1	Echinococcus granulosus	1
Pohjois- ja Itä-Suomi	Reindeers - semi-domesticated - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	N_A	Not Available	animal	21	0	Echinococcus	0
	Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Not Available	animal	55148	2	Echinococcus granulosus	2
Pohjois-Savo (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	1	0	Echinococcus granulosus	0

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
Pohjois-Karjala (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	1	0	Echinococcus granulosus	0
Kainuu (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	5	2	Echinococcus granulosus	2
Keski-Pohjanmaa (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	1	0	Echinococcus granulosus	0
Pohjois-Pohjanmaa (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	2	1	Echinococcus granulosus	1
Lappi (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	2	1	Echinococcus granulosus	1

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	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		Not Available	N_A	OIE method for E.coli O157 in animal faecal samples	3	3	VTEC O157	Not Available	Verotoxin production, VT2;Verotoxin production, VT1	eae positive	3
	Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Objective sampling	animal	10	Gram	N_A	OIE method for E.coli O157 in animal faecal samples	624	18	VTEC O157	Not Available	Verotoxin production, VT1	eae positive	2
											Verotoxin production, VT2;Verotoxin production, VT1	eae positive	16

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
FINLAND	Badgers - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	3	0	Lyssavirus	0
	Badgers - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	1	0	Lyssavirus	0
	Bats - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	58	0	Lyssavirus	0
	Bears - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	3	0	Lyssavirus	0
	Bears - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	4	0	Lyssavirus	0
	Cats - pet animals - Unspecified - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	22	0	Lyssavirus	0
	Cattle (bovine animals) - Farm - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	1	0	Lyssavirus	0
	Dogs - pet animals - Unspecified - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	19	0	Lyssavirus	0
	Ferrets - pet animals - Unspecified - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	2	0	Lyssavirus	0
	Foxes - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	61	0	Lyssavirus	0
	Foxes - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	6	0	Lyssavirus	0
	Lynx - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	10	0	Lyssavirus	0
	Lynx - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	25	0	Lyssavirus	0
	Marten - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	4	0	Lyssavirus	0
	Otter - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	3	0	Lyssavirus	0
	Otter - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	17	0	Lyssavirus	0
	Polecats - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	1	0	Lyssavirus	0
	Raccoon dogs - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	182	0	Lyssavirus	0
	Raccoon dogs - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	4	0	Lyssavirus	0
	Raccoon dogs - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	15	0	Lyssavirus	0
	Sheep - Unspecified - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	2	0	Lyssavirus	0

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
FINLAND	Wolverine - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	2	0	Lyssavirus	0
	Wolves - wild - Hunting - Not Available - animal sample - Surveillance - Official sampling - Not specified		Immunofluorescence assay tests (IFA)	animal	2	0	Lyssavirus	0
	Wolves - wild - Natural habitat - Not Available - animal sample - Surveillance - Official sampling - Suspect sampling		Immunofluorescence assay tests (IFA)	animal	5	0	Lyssavirus	0

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) - breeding bulls - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	Herds of origin of AI-bulls	Not Available	126	1	Salmonella Enteritidis PT 33	1
	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		N_A	Both faecal samples and environmental swab samples are taken	Not Available	126	7	Salmonella Enteritidis PT 33	1
									Salmonella Kentucky	1
									Salmonella Konstanz	1
									Salmonella Typhimurium DT 2	1
									Salmonella Typhimurium DT 41	2
									Salmonella Typhimurium DT RDNC	1
	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Industry sampling - Not specified	herd/flock		N_A	N_A	Not Available	3026	20	Salmonella Chester	1
									Salmonella Enteritidis PT 21	1
									Salmonella Enteritidis PT 33	2
									Salmonella Kentucky	3
									Salmonella Konstanz	1
									Salmonella Newport	1
									Salmonella Senftenberg	2
									Salmonella Tennessee	1
									Salmonella Typhimurium DT 1	1
									Salmonella Typhimurium DT 120	1
									Salmonella Typhimurium DT 2	1
									Salmonella Typhimurium DT 41	1
									Salmonella Typhimurium DT RDNC	4
									Salmonella Typhimurium U 277	2
	Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	N_A	Not Available	3136	1	Salmonella Typhimurium DT 41	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N	N_A	Not Available	3475	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	3975	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	N_A	Not Available	500	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for egg production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	1	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for egg production line - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	1	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for egg production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	1	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	765	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - day-old chicks - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	166	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	186	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	Small holdings outside the scope of Regulation 2160/2003, selling eggs only directly to final consumers	Not Available	260	2	Salmonella Hvittingfoss	1
									Salmonella Typhimurium DT 195	1
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	83	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	33	0	Salmonella	0

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) - parent breeding flocks for broiler production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	55	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	17	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	8	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	10	0	Salmonella	0
	Pigs - breeding animals - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	Nucleus and multipler herds	Not Available	37	1	Salmonella Enteritidis PT 33	1
	Pigs - breeding animals - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	N_A	Not Available	3072	2	Salmonella Montevideo	1
									Salmonella Typhimurium U 277	1
	Pigs - breeding animals - unspecified - boars - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	animal		N_A	Quarantine of boar	Not Available	321	0	Salmonella	0
	Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	N_A	Not Available	3249	0	Salmonella	0
	Pigs - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		N_A	Both faecal samples and environmental swab samples are taken	Not Available	21	4	Salmonella Derby	1
									Salmonella Typhimurium DT RDNC	1
									Salmonella Typhimurium U 277	2
	Pigs - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Industry sampling - Not specified	herd/flock		N_A	Breeding herds (other than nucleus and multiplier), mixed herds, fattening pig herds	Not Available	258	2	Salmonella Derby	1
									Salmonella Typhimurium DT 1	1
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	286	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	336	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N_A	N_A	Not Available	50	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N	N_A	Not Available	7	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	7	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	N_A	Not Available	7	0	Salmonella	0
	Turkeys - parent breeding flocks - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	5	0	Salmonella	0
	Turkeys - parent breeding flocks - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	7	0	Salmonella	0

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 - Slaughterhouse - Finland - food sample - carcase swabs - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	1400	Square centimetre	N_A	Not Available	3064	0	Salmonella	0
	Meat from bovine animals - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	1512	0	Salmonella	0
	Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	245	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	15	0	Salmonella	0
	Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	134	0	Salmonella	0
	Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	148	0	Salmonella	0
	Meat from pig - carcase - Slaughterhouse - Finland - food sample - carcase swabs - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	1400	Square centimetre	N_A	Not Available	6349	1	Salmonella Hessarek	1
	Meat from pig - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	1155	0	Salmonella	0
	Meat from turkey - carcase - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	87	0	Salmonella	0
	Meat from turkey - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	13	0	Salmonella	0
	Meat from turkey - meat preparation - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	53	0	Salmonella	0
	Meat from turkey - minced meat - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch (food/feed)	25	Gram	N_A	Not Available	19	0	Salmonella	0

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	Complementary feedingstuffs - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	13	0	Salmonella	0
	Compound feedingstuffs for cattle - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	74	0	Salmonella	0
	Compound feedingstuffs for cattle - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Compound feedingstuffs for fish - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Compound feedingstuffs for fur animal - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	6	0	Salmonella	0
	Compound feedingstuffs for horses - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Compound feedingstuffs for horses - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	3	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	34	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	40	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Compound feedingstuffs for sheep - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Compound feedingstuffs, not specified - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Border inspection activities - Ukraine - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	8	1	Salmonella Infantis	1
									Salmonella Typhimurium	1
	Feed material of cereal grain origin - oat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	3	0	Salmonella	0
	Feed material of cereal grain origin - oat derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	3	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of cereal grain origin - wheat derived - Border inspection activities - Kazakhstan - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0

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 cereal grain origin - wheat derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of cereal grain origin - wheat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Feed material of land animal origin - dairy products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of land animal origin - meat and bone meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	1	Salmonella Kentucky	1
	Feed material of land animal origin - offal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of marine animal origin - fish meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Feed material of oil seed or fruit origin - groundnut derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	4	0	Salmonella	0
	Feed material of oil seed or fruit origin - linseed derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - France - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - Germany - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	10	3	Salmonella Liverpool	1
									Salmonella Tennessee	2
	Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - Poland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	31	4	Salmonella Infantis	1
									Salmonella Muenster	1
									Salmonella Tennessee	2
	Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - Ukraine - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	13	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Border inspection activities - Brazil - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	4	1	Salmonella Oranienburg	1
	Feed material of oil seed or fruit origin - soya (bean) derived - Border inspection activities - China - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	1	Salmonella Mbandaka	1
	Feed material of oil seed or fruit origin - soya (bean) derived - Border inspection activities - India - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	12	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Border inspection activities - Kazakhstan - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	14	0	Salmonella	0
	Feed material of oil seed or fruit origin - sunflower seed derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0

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 oil seed or fruit origin - sunflower seed derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	14	1	Salmonella Leeuwarden	1
	Other feed material - miscellaneous - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	50	1	Salmonella Enteritidis	1
	Other feed material - tubers, roots and similar products - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Other feed material - tubers, roots and similar products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Other feed material - tubers, roots and similar products - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - yeast - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Pet food - final product - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	48	0	Salmonella	0
	Pet food - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	61	2	Salmonella Senftenberg	1
									Salmonella Typhimurium	1
	Premixtures - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	6	0	Salmonella	0

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	Cats - Unspecified - Finland - animal sample - Clinical investigations - Official sampling - Convenient sampling	Animals submitted to necropsy at Finnish Food Safety Authority Evira to diagnose cause of death or cause of disease.	Histology	animal	236	1	Toxoplasma gondii	1
	Dogs - Unspecified - Finland - animal sample - Clinical investigations - Official sampling - Convenient sampling	Animals submitted to necropsy at Finnish Food Safety Authority Evira to diagnose cause of death or cause of disease.	Histology	animal	637	0	Toxoplasma	0
	Hares - wild - Natural habitat - Finland - animal sample - Monitoring - passive - Official sampling - Convenient sampling	Animals submitted to necropsy at Finnish Food Safety Authority Evira to diagnose cause of death or cause of disease.	Histology	animal	72	3	Toxoplasma gondii	3
	Sheep - Farm - Finland - animal sample - Clinical investigations - Official sampling - Convenient sampling	Animals submitted to necropsy at Finnish Food Safety Authority Evira to diagnose cause of death or cause of disease.	Histology	animal	125	0	Toxoplasma	0

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	Badgers - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	11	1	Trichinella nativa	1
	Bears - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	Testing is done for hunter's own interest, but if meat is sold directly to consumers testing is mandatory	Not Available	animal	218	8	Trichinella nativa	8
	Bears - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	10	1	Trichinella nativa	1
	Bears - wild - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Not specified	N_A	Not Available	animal	51	7	Trichinella nativa	7
	Bears - zoo animal - Zoo - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	2	0	Trichinella	0
	Beavers - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	8	0	Trichinella	0
	Eagle - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	21	1	Trichinella pseudospiralis	1
	Foxes - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	180	77	Trichinella nativa	8
							Trichinella, unspecified sp.	69
	Goshawk - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	18	1	Trichinella pseudospiralis	1
	Lynx - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	42	24	Trichinella pseudospiralis	1
							Trichinella, unspecified sp.	23
	Marten - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Martes martes	Not Available	animal	11	6	Trichinella nativa	2
							Trichinella, unspecified sp.	4
	Minks - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	1	0	Trichinella	0
	Otter - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	34	1	Trichinella, unspecified sp.	1
	Owls - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	4	0	Trichinella	0
	Pigs - breeding animals - not raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	32981	0	Trichinella	0
	Pigs - breeding animals - raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	21	0	Trichinella	0
	Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	1784161	0	Trichinella	0
	Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	471	0	Trichinella	0
	Polecats - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	1	0	Trichinella	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	229	91	Trichinella, unspecified sp.	91
	Seals - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	12	0	Trichinella	0
	Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	1149	0	Trichinella	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	278	0	Trichinella	0
	Wild boars - farmed - Unspecified - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	N_A	Not Available	animal	64	0	Trichinella	0
	Wild boars - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	Testing is done for hunter's own interest, but if meat is sold directly to consumers testing is mandatory	Not Available	animal	970	2	Trichinella nativa	2
	Wolverine - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	2	1	Trichinella nativa	1
	Wolves - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	9	4	Trichinella nativa	2
							Trichinella, unspecified sp.	2

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
Bacillus cereus	Sheep meat and products thereof	1	10	0	0				
	Mixed food	1	15	0	0				
Campylobacter jejuni	Mixed food	1	2	1	0				
Campylobacter, unspecified sp.	Other, mixed or unspecified poultry meat and products thereof	1	7	0	0				
	Buffet meals	1	12	4	0				
Clostridium perfringens	Pig meat and products thereof	1	36	0	0				
Cryptosporidium	Buffet meals	1	21	0	0				
Histamine	Fish and fish products	1	2	0	0				
Listeria monocytogenes	Vegetables and juices and other products thereof	1	30	30	3				
Norovirus	Crustaceans, shellfish, molluscs and products thereof	4	24	1	0				
	Tap water, including well water	2	472	4	0				
	Other foods	1	21	0	0				
	Mixed food	5	426	0	0	8	240	0	0
	Buffet meals	5	224	1	0	2	23	0	0
Salmonella	Buffet meals	1	4	1	0				
Salmonella Agama	Bovine meat and products thereof	1	14	3	0				
Salmonella Newport	Mixed food	1	15	0	1				
	Unknown					2	23	0	0
Unknown	Other or mixed red meat and products thereof					1	8	0	0
	Crustaceans, shellfish, molluscs and products thereof					1	5	0	0
	Bakery products					1	28	0	0
	Mixed food					8	47	0	0
	Buffet meals					11	113	0	0
	Unknown					9	94	0	0
Yersinia enterocolitica - serotype O:3	Unknown					2	22	6	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
Bacillus cereus	Clostridium perfringens	808	General	Sheep meat and products thereof	Mutton	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Transport	Unknown	Storage time/temperature abuse	N_A	1	10	0	0
	Not Available	762	General	Mixed food	B. cereus isolated from spices and cheese had an ability to produce toxins	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unprocessed contaminated ingredient;Storage time/temperature abuse	N_A	1	15	0	0
Campylobacter jejuni	Not Available	724	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Other contributory factor;Cross-contamination	N_A	1	2	1	0
Campylobacter, unspecified sp.	Not Available	757	General	Other, mixed or unspecified poultry meat and products thereof	Duck breast	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Household	Household	France	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	7	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
Campylobacter, unspecified sp.	Not Available	838	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Other contributory factor;Cross-contamination	N_A	1	12	4	0
Clostridium perfringens	Not Available	793	General	Pig meat and products thereof	pork fillet	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence;Analytical epidemiological evidence	Others	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Finland	Storage time/temperature abuse	N_A	1	36	0	0
Cryptosporidium	Not Available	770	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Multiple places of exposure in one country	Farm	Unknown	Unprocessed contaminated ingredient	N_A	1	21	0	0
Histamine	Not Available	760	General	Fish and fish products	fresh tunafish	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent;Descriptive epidemiological evidence	Household	Unknown	Maldives	Unknown	N_A	1	2	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
Listeria monocytogenes	Not Available	847	General	Vegetables and juices and other products thereof	Frozen corn	Product-tracing investigations;Descriptive environmental evidence;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	Processing plant	Hungary	Inadequate heat treatment	Multi-country outbreak of Listeria monocytogenes MLST6.	1	30	30	3
Norovirus	Not Available	718	General	Crustaceans, shellfish, molluscs and products thereof	oysters	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Farm	France	Unprocessed contaminated ingredient	N_A	1	4	0	0
		727	General	Crustaceans, shellfish, molluscs and products thereof	oysters	Descriptive environmental evidence;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	Farm	France	Unprocessed contaminated ingredient	N_A	1	10	0	0
		739	General	Crustaceans, shellfish, molluscs and products thereof	oyster	Descriptive environmental evidence;Descriptive epidemiological evidence	Household	Farm	France	Unprocessed contaminated ingredient	N_A	1	3	0	0
		744	General	Other foods	Raspberry and vanilla mousse dessert	Descriptive environmental evidence;Descriptive epidemiological evidence;Analytical epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Unknown	Infected food handler	N_A	1	21	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	745	General	Mixed food	Cocktail burger	Descriptive environmental evidence;Descriptive epidemiological evidence;Analytical epidemiological evidence	Household	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	12	0	0
		748	General	Crustaceans, shellfish, molluscs and products thereof	blue mussels	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Denmark	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	7	1	0
		754	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	46	0	0
		758	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	35	0	0
		764	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence;Analytical epidemiological evidence	Others	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	23	0	0
		768	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence;Analytical epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	80	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
Norovirus	Not Available	769	General	Mixed food	Berry quark dessert and/or iceberg lettuce	Descriptive environmental evidence;Descriptive epidemiological evidence;Analytical epidemiological evidence	Hospital or medical care facility	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	292	0	0
		772	General	Buffet meals	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	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Other contributory factor;Infected food handler	N_A	1	15	0	0
		777	General	Buffet meals	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;Analytical epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Unknown	Other contributory factor;Infected food handler	N_A	1	34	0	0
		807	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Temporary mass catering (fairs or festivals)	Household	Unknown	Infected food handler	N_A	1	60	0	0
		820	General	Tap water, including well water	household/bore well water	Descriptive epidemiological evidence	Household	Water source	Finland	Other contributory factor	N_A	1	9	0	0
		829	General	Mixed food	N_A	Descriptive epidemiological evidence;Analytical epidemiological evidence	School or kindergarten	Unknown	Unknown	Unknown	N_A	1	53	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	Sapporo virus	741	General	Tap water, including well water	N_A	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Household	Water distribution system	Finland	Other contributory factor	N_A	1	463	4	0
Salmonella	Not Available	774	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Cross-contamination	N_A	1	4	1	0
Salmonella Agama	Not Available	783	General	Bovine meat and products thereof	Beef casserole dish	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Household	Household	Unknown	Infected food handler	N_A	1	14	3	0
Salmonella Newport	Not Available	776	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Hospital or medical care facility	Farm	Unknown	Unprocessed contaminated ingredient	N_A	1	15	0	1

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
Norovirus	Not Available	720	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	4	0	0
		722	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	7	0	0
		746	General	Mixed food	N_A	Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	5	0	0
		749	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	59	0	0
		750	General	Mixed food	N_A	Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	35	0	0
		751	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school)	Others	Unknown	Infected food handler	N_A	1	110	0	0
		791	General	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	14	0	0
		803	General	Buffet meals	N_A	Descriptive epidemiological evidence	Household	Unknown	Unknown	Unknown	N_A	1	14	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	814	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Others	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	9	0	0
		837	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	6	0	0
Salmonella Newport	Not Available	784	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	19	0	0
		819	General	Unknown	N_A	Descriptive epidemiological evidence	Multiple places of exposure in one country	Unknown	Unknown	Unknown	N_A	1	4	0	0
Unknown	Not Available	726	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	4	0	0
		730	General	Crustaceans, shellfish, molluscs and products thereof	oysters	Descriptive epidemiological evidence	Others	Farm	France	Unprocessed contaminated ingredient	N_A	1	5	0	0
		737	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	7	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	742	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Storage time/temperature abuse	N_A	1	9	0	0
		743	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	24	0	0
		747	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	8	0	0
		755	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	5	0	0
		761	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Storage time/temperature abuse	N_A	1	21	0	0
		763	General	Other or mixed red meat and products thereof	Elk burger steak	Descriptive environmental evidence;Descriptive epidemiological evidence	Others	Household	Finland	Storage time/temperature abuse	N_A	1	8	0	0
		767	General	Unknown	N_A	Descriptive epidemiological evidence	School or kindergarten	Unknown	Unknown	Unknown	N_A	1	15	0	0
		779	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Storage time/temperature abuse	N_A	1	3	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	780	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	7	0	0
		786	General	Buffet meals	N_A	Descriptive epidemiological evidence	Canteen or workplace catering	Unknown	Unknown	Unknown	N_A	1	3	0	0
		790	General	Buffet meals	N_A	Descriptive epidemiological evidence	Temporary mass catering (fairs or festivals)	Unknown	Unknown	Unknown	N_A	1	3	0	0
		795	General	Bakery products	white chocolate-blueberry cake	Descriptive epidemiological evidence;Analytical epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	28	0	0
		797	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	15	0	0
		798	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	7	0	0
		799	General	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	4	0	0
		801	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Others	Transport	Unknown	Storage time/temperature abuse	N_A	1	10	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	806	General	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	9	0	0
		810	General	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	3	0	0
		813	General	Unknown	N_A	Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school)	Unknown	Unknown	Unknown	N_A	1	10	0	0
		815	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Storage time/temperature abuse;Inadequate chilling	N_A	1	8	0	0
		816	General	Unknown	N_A	Descriptive epidemiological evidence	Camp or picnic	Unknown	Unknown	Unknown	N_A	1	10	0	0
		817	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	10	0	0
		822	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	24	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	825	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	7	0	0
		826	General	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	7	0	0
		836	General	Buffet meals	N_A	Descriptive epidemiological evidence;Analytical epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	7	0	0
		840	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	12	0	0
		848	General	Mixed food	N_A	Descriptive epidemiological evidence	Temporary mass catering (fairs or festivals)	Unknown	Unknown	Unknown	N_A	1	2	0	0
Yersinia enterocolitica - serotype O:3	Not Available	733	General	Unknown	N_A	Descriptive epidemiological evidence	Multiple places of exposure in one country	Unknown	Unknown	Unknown	N_A	1	13	0	0
		734	General	Unknown	N_A	Descriptive epidemiological evidence	Multiple places of exposure in one country	Unknown	Unknown	Unknown	N_A	1	9	6	0

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

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

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

Sampler: Industry sampling | Sampling Strategy: Census | Programme Code: AMR MON

Analytical Method:

Country of Origin: Finland

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**	**32**	**64**
	N of tested isolates	**55**	**55**	**55**	**55**	**55**	**55**
MIC	**N of resistant isolates**	**14**	**0**	**0**	**14**	**0**	**0**
<=0.12		37					
<=0.25						1	
0.25		3		18			
<=0.5							55
0.5		1		36		7	
<=1			53				
1				1		31	
2			2		3	15	
4					33	1	
8		9			5		
16		5					
>64					14		

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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				
<=8						1									
8			1												
32												1			

Table Antimicrobial susceptibility testing of Salmonella Derby in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis PT 21 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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**	**1**	**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
<=2													1		
<=4											1				
4			1					1							
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis PT 33 in Pigs - breeding animals

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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 Enteritidis PT 33 in Cattle (bovine animals) - breeding bulls

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	16	0.5	2	16	0.064	2	2	0.125	16	256	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									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis PT 33 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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							
<=2													1		
2		1													
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis PT 33 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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				1						
<=1		1						1							
1									1						
<=2													2		
2		1						1							
<=4											2				
4			2												
<=8						2									
16												2			

Table Antimicrobial susceptibility testing of Salmonella Hessarek in Meat from pig - carcase

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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	1
<=0.5					1				1						
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - dust

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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	1
<=0.5					1				1						
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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**	**1**	**0**	**1**	**0**	**1**	**1**	**1**	**0**	**0**
<=0.03										1					
<=0.25				1											1
0.5														1	
<=1								1							
1					1										
4			1												
<=8						1									
>8							1								
16									1						
>64		1											1		
>128											1				
>1024												1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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**	**3**	**0**	**3**	**0**	**3**	**3**	**3**	**0**	**0**
<=0.03										3					
<=0.25				3											3
0.5														3	
<=1								3							
1					3										
4			1												
<=8						3									
8			2				2								
>8							1								
16									2						
32									1						
>64		3											3		
>128											3				
>1024												3			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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													
<=2													1		
2								1							
<=4											1				
<=8						1									
16			1									1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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													
<=2													1		
2								1							
<=4											1				
<=8						1									
8			1												
16												1			

Table Antimicrobial susceptibility testing of Salmonella Montevideo in Pigs - breeding animals

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
16												1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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									
16												1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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										2	2
<=0.5					1				2						
<=1		1						2							
1					1										
<=2													2		
2		1													
<=4											2				
<=8						2									
8			2												
16												1			
32												1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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												
64												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 1 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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												
16												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 1 in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 1 in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 1 in Gallus gallus (fowl) - laying hens

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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	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 Typhimurium DT 120 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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												
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 2 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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	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 Typhimurium DT 2 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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	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 DT 41 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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	2
<=0.5					1				1						
0.5														1	
<=1		2						2							
1					1				1						
<=2													2		
<=4											2				
4			2												
<=8						2									
16												1			
64												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 41 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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		
2		1													
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 41 in Cattle (bovine animals) - unspecified

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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									1						
<=2													1		
<=4											1				
4			1												
<=8						1						1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT RDNC in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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	1
<=0.5					1										
<=1		1													
1									1						
<=2													1		
2								1							
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT RDNC in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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							3								
<=0.03										4					
0.03							1								
<=0.25				4										3	4
<=0.5					4				4						
0.5														1	
<=1		4						3							
<=2													4		
2								1							
<=4											4				
4			4												
<=8						4									
16												3			
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT RDNC in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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													
<=2													1		
2								1							
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium U 277 in Pigs - breeding animals

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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				
4			1												
<=8						1									
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium U 277 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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							1								
0.064										2					
<=0.25				2										1	
<=0.5					2				2						
0.5														1	2
<=1		1						2							
<=2													2		
2		1													
<=4											2				
4			2												
<=8						2									
32												2			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium U 277 in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**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							2								
<=0.03										1					
0.064										1					
<=0.25				2										2	1
<=0.5					2				2						
0.5															1
<=1		1						2							
<=2													2		
2		1													
<=4											1				
4			1												
<=8						2									
8			1								1				
16												1			
32												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 - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method:

Country of Origin: Finland

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**	**Not Available**	**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**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
N of tested isolates	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**
MIC **N of resistant isolates**	**36**	**46**	**37**	**37**	**46**	**37**	**0**	**0**	**0**	**0**
<=0.015							14			
<=0.03									46	
0.03							30			
<=0.064	1		8							
0.064							2			
<=0.12						3		20		
0.12	9		1							
0.25	23					6		26		
0.5	3									
1					1					
2	1	1	2	1	7	1				2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Not Available**	**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**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
	N of tested isolates	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**
MIC	**N of resistant isolates**	**36**	**46**	**37**	**37**	**46**	**37**	**0**	**0**	**0**	**0**
4		1	3	10	2	2	10				7
8		1	27	24	6	10	17				35
16		4	7	1	1	22	9				2
32		2			9	4					
>32		1									
64			2		27						
>64			6								

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 - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**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	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**
MIC	**N of resistant isolates**	**46**	**0**	**46**	**46**	**0**	**1**	**0**	**0**	**0**	**1**	**7**	**1**	**0**	**0**
<=0.015							36								
<=0.03										45					
0.03							9								
0.064										1					
<=0.25														44	22
<=0.5									30						
0.5							1							2	21
<=1								44							
1					2				15						3
<=2													44		
2					5			2	1						
<=4											45				
4			39	4	5								1		
>4				42											
<=8						46						27			
8			7		5										
>8					29										
16												7			
32												5			
>64		46											1		
128											1				

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**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	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**
MIC	**N of resistant isolates**	**46**	**0**	**46**	**46**	**0**	**1**	**0**	**0**	**0**	**1**	**7**	**1**	**0**	**0**
>1024												7			

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 - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON pnl2

Analytical Method:

Country of Origin: Finland

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**	**Not Available**	**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**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.06**	**0.25**	**0.06**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**
<=0.03										1	
0.03								1			
0.25		1							1		
8			1	1			1				1
16						1					
64					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 - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**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	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**
MIC	**N of resistant isolates**	**23**	**0**	**1**	**1**	**1**	**10**	**0**	**2**	**0**	**10**	**11**	**11**	**0**	**9**
<=0.015							141								
<=0.03										173					
0.03							22								
0.12							1								
<=0.25				172										161	97
0.25							6								
<=0.5					172				56						
0.5							1							12	63
<=1	1							173							
1									104						3
<=2			4										148		
2	53								11						1
<=4											161				
4	91	115											13		
>4				1											
<=8						168						130			
8	5	53					2				2		1		
>8					1										
16		1				4						31			
32									2			1	1		
>32															9

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**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	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**	**173**
MIC	**N of resistant isolates**	**23**	**0**	**1**	**1**	**1**	**10**	**0**	**2**	**0**	**10**	**11**	**11**	**0**	**9**
64											1		3		
>64		23											7		
128						1					4				
>128											5				
>1024												11			

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 - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method:

Country of Origin: Finland

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**	**Not Available**	**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**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
	N of tested isolates	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**
MIC	**N of resistant isolates**	**29**	**38**	**33**	**33**	**38**	**33**	**0**	**0**	**0**	**0**
<=0.015								20			
<=0.03										38	
0.03								15			
<=0.064		3		5							
0.064								3			
<=0.12							1		16		
0.12		6									
0.25		22					4		20		
0.5		2							2		
2				9		4	2				4
4			12	6	3	4	11				8
8		1	21	18	2	9	18				26
16		3			2	20	2				
32		1	1		9	1					

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Not Available**	**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**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
	N of tested isolates	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**
MIC	**N of resistant isolates**	**29**	**38**	**33**	**33**	**38**	**33**	**0**	**0**	**0**	**0**
64			2		22						
>64			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 - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**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	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**
MIC	**N of resistant isolates**	**38**	**0**	**38**	**38**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**
<=0.015							31								
<=0.03										38					
0.03							7								
<=0.25														38	17
<=0.5									26						
0.5															18
<=1								36							
1					1				11						3
<=2			3										38		
2				1	4			2	1						
<=4											38				
4			29	10	3										
>4				27											
<=8						38						14			
8			6		12										
>8					18										
16												19			
32		1										1			
64		6													
>64		31													
>1024												4			

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 - EFSA specifications	Official sampling	animal sample - caecum	slaughter animal batch	Finland	N_A	289	0
	Meat from broilers (Gallus gallus) - fresh - chilled	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Finland	N_A	300	0

European Food Safety Authority

Latest Transmission set

Table Name	Last submitted dataset transmission date
Antimicrobial Resistance	25-Jul-2019
Esbl	25-Jul-2019
Animal Population	25-Jul-2019
Disease Status	25-Jul-2019
Food Borne Outbreaks	25-Jul-2019
Prevalence	25-Jul-2019

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1. Institutions and Laboratories involved in zoonoses monitoring and reporting

Finnish Zoonosis Centre
Finnish Zoonosis Centre forms a cooperation body between Finnish Food Safety Authority Evira (Finnish Food Authority as of 1st January 2019) and the National Institute for Health and Welfare (THL). The Centre ensures a close cooperation between relevant experts in the field of animal health, human health, and food and feed safety. The Centre is responsible for the general coordination and officering of the report.

Finnish Food Safety Authority Evira (Finnish Food Authority as of 1st January 2019)
The operation of Evira focused on ensuring the safety of food, promoting the health and welfare of animals and providing the required preconditions for plant and animal production as well as plant health, until the end of 2018. Evira was the central competent authority for food and feed control as well as for animal health and welfare control. The duties of Evira also included surveillance activity, scientific research and risk assessment on food safety and animal diseases. Evira operated also as the national reference laboratory at its own field. Evira was responsible for the texts and tables of the report concerning animals, foodstuffs, feedstuffs, antimicrobial resistance, foodborne outbreaks and data on animal population and slaughtered animals.

The Finnish Food Authority
The Finnish Food Safety Authority Evira, the Agency for Rural Affairs and part of the IT services of the National Land Survey of Finland were merged into one single authority that began its operations on 1st January 2019. The Finnish Food Authority's activities cover all activities previously under the responsibility of Evira. Data from the year 2018 was collected by Evira and the report compiled at the Finnish Food Authority.

2. Animal population

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

Data on holdings and live animals:
Evira Animal register (sheep, goats, pigs), Evira Bovine register, Natural Resources Institute Finland: Statistics, Number of livestock. Situation as of 1.12.2018 (pigs, sheep, goat, bovine), situation as of 1.4.2018 (poultry).
Horses: Suomen Hippos, the Finnish Trotting and Breeding Association.
Reindeer: Statistics of the Reindeer Herders' Association. Final data, 2017/2018, reindeer herding year: 1 June-31 May.

Data on slaughtered animals: Meat inspection statistics of Finnish Food Safety Authority Evira from the year 2018.

2. Definitions used for different types of animals, herds, flocks and holdings as well as the production types covered

Bison are included in the Bovine population.
Poultry and pig keepers who keep animals for a hobby are excluded from the data.

3. National changes of the numbers of susceptible population and trends

The number of bovine animal holdings has still decreased. In 2009 there were in average 54 bovine animals in a holding, whereas eight years later the number was 77, so the number of animals in a typical bovine holding has increased notably.

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

Livestock production is concentrated in certain areas and, thus, there are large differences in livestock numbers between different parts of the country. Main areas for professional animal production especially for poultry and pigs are southern and western parts of the country. Dairy production is concentrated in Central Finland. Sheep farms are common also in northern Finland.

3. General evaluation: Brucellosis

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

The last case of *Brucella abortus* in cattle was recorded in 1960. Ovine and caprine brucellosis (*B. melitensis*) has never been detected in Finland. Porcine brucellosis (*B. suis*) has never been detected in domestic pigs in Finland.

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

Finland has been granted the officially brucellosis free status of bovine herds according to the Council Directive 64/432/EEC. The disease-free status was established by Commission Decision 94/960/EC of 28 December 1994, confirmed by Commission Decision 2003/467/EC.

Finland has also been granted the officially brucellosis (*B. melitensis*) free status of sheep and goat herds, established by Commission Decision 94/965/EC of 28 December 1994.

Porcine brucellosis (*B. suis*) has never been detected in domestic pigs in Finland, but in 2015 for the first time *B. suis* bv 2 was isolated from wild wild boars.

Brucellosis has no relevance to public health in Finland. The national situation remains favourable. This is illustrated by serological surveillance in sheep and goat (annually), in dairy cattle herds (every second year) as well as in the cattle and pig population (annually). In addition, the brucellosis status of aborted foetuses from cattle, sheep, goats and pigs is determined. Annually, there are a few clinical suspicions of Brucella infection in animals, which are due to abortions or genital infections. All of these have been negative on further serological and/or bacteriological investigation.

In 2018, no human brucellosis cases were reported in Finland[1].

3. Additional information

Vaccination against brucellosis is prohibited in Finland.

3.1. Description of Monitoring/Surveillance/Control programmes system: Brucella in bovine animals

1. Monitoring/Surveillance/Control programmes system

Testing strategy
The surveillance of *Brucella abortus* in Finland is based on active and passive monitoring.

Active surveillance, based on bulk milk sampling, is conducted every second year as part of a control program. The target population covers 10% of all dairy herds in which an increased number of abortions occurred during the previous year. The most recent survey of this type was performed during the year 2018. The survey was coordinated with other control programmes for Q fever, Bovine virus diarrhoea (BVD), Infectious Bovine Rhinotracheitis (IBR) and Schmallenberg Virus (SBV).

[1] The National Institute of Health and Welfare, 2019. Infectious disease register. Available at: https://thl.fi/ttr/gen/rpt/tilastot.html

Passive surveillance is targeted towards all dairy herds with increased number of abortions. All samples (aborted foetuses and/or blood) sent to the Finnish Food Safety Authority Evira for investigations due to abortions are tested also for brucellosis.
All herds selling bulls to semen collection centres are tested annually for brucellosis. Testing is based on bulk milk samples of herds of origin sending bulls to the semen collection centres.
Moreover, at the semen collection centres, all bulls intended for artificial insemination are tested within 28 days before entering the quarantine accommodation, and again before entering the semen collection centre. The bulls are also tested annually at the semen collection centre thereafter.

Methods of sampling
For active surveillance, bulk milk samples are taken by milk processing plants randomly and sent to the Finnish Food Safety Authority Evira for analysis.

For passive surveillance, bulk milk samples are taken at farms selling bulls to semen collection centres. Blood samples are taken from living bulls before entering the quarantine accommodation of the semen collection centre, and during the quarantine period by local veterinarian at the collection centre. In suspect cases, blood or aborted foetus, placental tissue and vaginal mucus are collected from the aborted cows. All the samples are analysed at the Finnish Food Safety Authority Evira.

Diagnostic methods used
For serological investigation, the rose Bengal test (RBT) and complement fixation test (CFT) on individual serum samples and the indirect ELISA test on bulk milk samples were used for the detection of antibodies against *Brucella*. In case of positive result for blood in the rose Bengal test, confirmation of the result by complement fixation test (CFT) was performed. If the indirect ELISA test of a bulk milk was positive, a new bulk milk sample was collected and tested by indirect ELISA test. If the new bulk milk sample was still positive, blood samples from 20 animals of the farm preferring animals with abortions or from animals in close contact were collected and tested by RBT test and the positive result obtained in RBT was confirmed by CFT test. If the CFT test was positive, the tissue samples from seropositive animals were cultured and investigated by bacteriological methods for the presence of *Brucella* bacteria.

For bacteriological investigation, tissue samples were cultured (and if Brucella bacteria would have been isolated the strain would be identified by PCR method).

Case definition
The animal/herd is considered as seropositive when the confirmation test is positive. And the animal/herd is considered as infected when *Brucella* bacteria are isolated from tissue (culture and confirmation by PCR method).

2. Measures in place

Control measures for *B. abortus*, *B. melitensis* and *B. suis* are defined in the Animal Disease Act No 441/2013 and the Decree No 19/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authority, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive herd in case of confirmed disease.

The animal health requirements for semen of bulls are defined in the Decree No 1026/2013 of the Ministry of Agriculture and Forestry.

3. Notification system in place to the national competent authority

Yes. Brucellosis caused by *B. abortus, B. melitensis* and *B. suis* in cloven-hoofed animals is classified as an immediately notifiable and dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

In 2018, bulk milk samples from 1255 herds with increased number of abortions in the year 2017, 157 blood samples from AI bulls and bulk milk from 71 farms selling animals to semen collection centers were tested serologically against Brucella, all with negative results. In addition, 88 bacteriological examinations of animals from 70 farms and 129 blood samples of animals from 15 farms were tested by serological methods due to abortion or neonatal death; all also with negative results.

No brucellosis cases in bovine animal were recorded in 2018.

3.2. Description of Monitoring/Surveillance/Control programmes system: Brucella in Sheep and Goat

1. Monitoring/Surveillance/Control programmes system

Testing strategy and methods of sampling
The surveillance of *Brucella melitensis* in Finland is multi layered and based on active and passive monitoring.

For active surveillance, the blood samples are collected annually at farms from at least 5% of the sheep and goats over six months of age as a part of the voluntary Maedi Visna/CAE health program by municipal veterinary officer. Sampling is partly convenient.
In addition, blood samples are collected randomly at the slaughterhouses and include at least 20% of herds with at least 10 animals.

For passive surveillance, blood samples from all rams and goats used for artificial insemination are tested within 28 days before entering the quarantine accommodation of the semen collection centres and again before entering the semen collection centre. The rams and goats are also tested annually at the semen collection centre thereafter.

In suspect cases blood or aborted foetus, placental tissue and vaginal mucus are collected from the aborted animals at the farm. In suspect cases, individual blood samples are taken by an official veterinarian.

Diagnostic methods used
For serological investigation, the rose Bengal test (RBT) on individual serum sample is used for the detection of antibodies against *Brucella*. A positive RBT result is confirmed by a CFT test.
For bacteriological investigation, tissue samples were cultured (and if Brucella bacteria would have been isolated the strain would be identified by PCR method).

Case definition
An animal is regarded as seropositive when the confirmation test (CTF) is positive. The animal/herd is considered as infected when *Brucella* bacteria is isolated from tissue (culture and confirmation by PCR method).

2. Measures in place

Measures to control *B. abortus*, *B. melitensis* and *B. suis* are defined in the Animal Disease Act No 441/2013 and the Decree No 19/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authority, notification procedures and movement

restrictions of suspected animals, and culling or slaughtering of the positive herd in case of confirmed disease.
The animal health requirements for semen of sheep and goats are in the Decree No 1032/2013 of the Ministry of Agriculture and Forestry.

3. Notification system in place to the national competent authority

Yes. Brucellosis caused by *B. abortus, B. melitensis* and *B. suis* in cloven-hoofed animals is classified as an immediately notifiable and dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

In 2018 randomly collected blood samples from 3879 animals and 47 samples from animals in AI centre were tested against *Brucella* antibody, all with negative results. In addition, 21 bacteriological examinations of animals from 15 farms was performed due to abortion or neonatal death and 5 blood samples of animals from one farm with increasing number of abortions were tested serologically; all also with negative results.

No brucellosis cases in sheep and goat were recorded in 2018.

3.3. Description of Monitoring/Surveillance/Control programmes system: Brucella in pigs

1. Monitoring/Surveillance/Control programmes system

Testing strategy
Surveillance is passive and is based on animals sampled due to abortion. All these samples are tested also for brucellosis.

All boars intended for artificial insemination are tested individually within 30 days before entering the quarantine accommodation of the semen collection centres, and again 15 days before entering the semen collection centre. The boars are tested annually at the semen collection centre thereafter, and at the time of slaughter. The herds of origin sending boars to semen collection centres are tested annually. Blood samples are taken from farmed wild boars on voluntary bases, at the time of slaughter. All these samples are tested also for brucellosis.

Methods of sampling
Blood samples are taken from live animals at the quarantine accommodation of the semen collection centre, the semen collection centre, at farms and at slaughterhouses (that include animals leaving the semen collection centre and animals from farms which are aiming for official free status of diseases according to Animal Health Association ETT). In suspect cases, blood or aborted foetuses, placental tissue and vaginal mucus are collected from animals that have aborted. In suspect cases, individual blood samples are taken by an official veterinarian.

Diagnostic methods used
For serological investigation, rose Bengal test (RBT) or iELISA test of individual serum sample for detection of antibodies is used. Seropositive sample is always retested and confirmed by both serological tests. Seropositive live animals are resampled no earlier than seven days following the collection of the first seropositive sample.

For bacteriological investigation, tissue samples were cultured (and if Brucella bacteria would have been isolated the strain would be identified by PCR method).

Case definition
An animal is considered as seropositive, if one of the serological confirmation tests is positive, and the animal is considered as infected when *Brucella* bacteria is isolated from tissue (culture and confirmation by PCR method).

2. Measures in place

Control measures of *B. abortus*, *B. melitensis* and *B. suis* are defined in the Animal Disease Act No 441/2013 and in the Decree No 19/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authority, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive herd in case of confirmed disease.
The animal health requirements of semen of boars are in the Decree No 1029/2013 of the Ministry of Agriculture and Forestry.

3. Notification system in place to the national competent authority

Yes. Brucellosis caused by *B. abortus, B. melitensis* and *B. suis* in cloven-hoofed animals is classified as an immediately notifiable and dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

In 2018, altogether 1484 blood samples collected from live animals and from slaughterhouses were tested against *Brucella* antibody, all with negative results. In addition, bacteriological examinations on 9 organ samples from 5 farms and 16 serological examinations were performed, all with negative results.

No brucellosis cases in pigs were recorded in 2018.

4. General evaluation: Bovine Tuberculosis

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

Mycobacterium bovis was eradicated to a large extent during the 1960's. The last case of M. bovis infection in cattle in Finland was detected, in one herd, in 1982. Finland has been granted the officially tuberculosis free status of bovine herds according to Council Directive 64/432/EEC. The disease status was established by Commission Decision 94/959/EC of 28 December 1994, confirmed by Commission Decision 2003/467/EC in 2003.

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

Mycobacterium bovis in bovine animals:
Status as officially free of bovine tuberculosis during the reporting year. The entire country is free of the disease.

The national situation remains favourable. The risk of introducing infection from animals, feedingstuffs or foodstuffs to humans remains negligible.

4.1. Description of Monitoring/Surveillance/Control programmes system: Bovine tuberculosis in bovine animals and farmed deer

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Post mortem inspection is performed on all slaughtered animals and if there is a suspicion of tuberculosis, samples from organs with typical lesions are taken and sent for examination at the Finnish Food Safety Authority Evira by the competent authority (official veterinarian).

In case of a clinical suspicion, animals are tested by the intradermal tuberculin test or investigated by the pathological and bacteriological examination of suspect lymph nodes or lesions.

All AI-bulls are tested by intradermal tuberculin test within 28 days before entering the quarantine accommodation of the semen collection centre. The bulls are tested annually at the semen collection centre thereafter. In addition, samples are taken from all suspected cases.

Deer: In the voluntary control program the intradermal comparative testing is initially done three times (the minimum time between the first and the third testing is 12 months), then repeated at 24 to 30 months interval. An official veterinarian is responsible for performing the tests. At meat inspection, lymph nodes are collected from suspected animals. When tuberculosis is suspected at farm, a whole animal or its head and organs including lymph nodes from chest, abdomen and groin are sent for examination.

Type of specimen taken and diagnostical/analytical methods used
From a living animal biopsy of a lymph node or a whole lymph node can be taken.

From a dead animal one or more tuberculotic lesions are collected. These samples are divided into two parts, one of which is sent without preservatives and the other part in 10% buffered formalin solution.

Organ samples are investigated by histology, Ziehl-Neelsen staining and culture. If histology and Ziehl-Neelsen staining are negative, it is possible to omit to cultivate the sample.

Case definition
Bovine animals: Confirmation of an inconclusive or positive intradermal testing is done by comparative intradermal tuberculin testing. Comparative testing is considered positive, if bovine tuberculin injection site reaction is more than 4 mm thicker than avian tuberculin injection site when skin fold is measured or if there are clinical symptoms related to bovine tuberculin injection. An animal is considered positive if *M. bovis* (or *M. caprae* or *M. tuberculosis* complex) is isolated. The whole herd is investigated as defined above in case of a suspicion in one animal.

Deer: The intradermal test is considered positive if the bovine tuberculin injection site is more than 2,5 mm thicker than the first measure or at least the size of the avian tuberculin injection site or there are other clinical signs of positive reaction. Case is considered positive if *M. bovis* (or *M. caprae* or *M. tuberculosis complex*) is isolated.

2. Measures in place

The control program/strategies in place
The measures for control of Mycobacterium bovis are in the Animal Diseases Act No 441/2013 and, in the Decree, No 27/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authorities, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive animals in case of confirmed disease.

The animal health requirements of semen of bulls are in the Decree No 1026/2013 of the Ministry of Agriculture and Forestry.

Deer: The voluntary control programme with regular intradermal testing of deer herds is described in the Government Decree No 838/2013 and, in the Decree, No 843/2013 of the Ministry of Agriculture and Forestry.

Measures in case of the positive findings or single cases
Epidemiological investigation is started. The culling or slaughtering of the positive animals or herd in case of confirmed disease will be conducted.

Vaccination policy
Vaccination of animals against tuberculosis is prohibited in Finland.

3. Notification system in place to the national competent authority

Notification is mandatory. *Mycobacterium tuberculosis* complex -infections in cloven-hoofed animals are immediately notifiable and classified as dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

Results of the investigation
No *Mycobacterium bovis* (or *M. caprae* or *M. tuberculosis* complex) were detected in cattle or farmed deer in 2018.

Altogether 273277 bovine animals were slaughtered and subjected to a routine post mortem examination. Samples from eight suspicious animals were collected during meat inspection and sent to the Finnish Food Safety Authority Evira for examination. All results were negative.
In total, 57 intradermal tuberculin tests were performed on young bulls prior to their movement to a semen collection centre in another Member State, all with negative results.

No samples from farmed deer were sent to the Finnish Food Safety Authority Evira for bacteriological examination in 2018. Note that in the table the total number of herds and animals are for the year 2017.

National evaluation of the recent situation, the trends and sources of infection
The situation remains favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
The relevance seems to be negligible.

5. General evaluation: Campylobacteriosis

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

The annual number of human cases show a rising overall trend from 1995 to 2008. Since 2008 the annual number of reported human campylobacteriosis cases has varied between 3954 and 4924 and was 5095 in 2018[2]. Since 1998 campylobacters have been a more commonly reported cause of enteritis than salmonella. All Finnish broiler slaughterhouses have voluntarily monitored the prevalence of campylobacter in broilers at slaughter as a part of the own-check program since the 1990's. From 1999 to 2002 the flock prevalence was on average 7.9% between June and September and 1.1% during the other months. The national campylobacter monitoring program has been ongoing since 2004. The program consist of compulsory monitoring of broiler slaughter batches, interventions at slaughter and voluntary measures at the holdings.

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

National evaluation of the recent situation, the trends and sources of infection
Thermophilic campylobacters, especially Campylobacter jejuni, are the most common bacterial cause of human enteric infections in Finland.[2] A strong seasonal variation is typical for the incidence of campylobacteriosis, which is consistently highest in July. A high percentage of human campylobacter infections reported in Finland originate from travel abroad. However, the proportion of domestically acquired infections peaks in the summer season. The prevalence of campylobacters in broiler slaughter batches peaks in July-August. Since the implementation of the national campylobacter monitoring program for broilers, in 2004, the average prevalence of campylobacters in broiler slaughter batches has been around 5% during June-October and 1% during the rest of the year.[3] In the late summer thermophilic campylobacters are detected in 20 to 30% of retail poultry meat of domestic origin.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)
Poultry meat is considered as a source of campylobacters in a small proportion of the sporadic cases. Campylobacters are an occasional finding in broiler cecum samples. It is therefore important to maintain a high level of hygienic practices when handling poultry at slaughter, and other stages in production as well as informing consumers about hygienic handling of meat in the kitchen. Contaminated drinking water has caused six large outbreaks in the years 1999-2007.
Unpasteurized milk, imported turkey meat, chicken and strawberries have been suspected as sources of few small outbreaks. Consumption of raw milk caused a campylobacteriosis outbreak in 2012 and 2015, and in another farm outbreak in 2012 raw milk or contact with cattle was suspected as the origin of infection. In a wide raw-milk mediated outbreak in 2014, Campylobacter jejuni was one of the causative agents.

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

The process hygiene criterion (Regulation (EC) No 2073/2005, Regulation (EU) No 2017/1495) for campylobacter was implemented for the first time in 2018. Slaughterhouses took neck skin samples for campylobacter analysis as part of the own-check programs.

[2] National Institute of Health and Welfare, 2019. Kampylobakteerin esiintyvyys. Available at: https://thl.fi/fi/web/infektiotaudit/seuranta-ja-epidemiat/tartuntatautirekisteri/tartuntataudit-suomessa-vuosiraportit/tautien-esiintyvyys/kampylobakteerin-esiintyvyys. Accessed 10 May 2019.
[3] National Institute of Health and Welfare, Report: Infectious diseases in Finland 2017, http://urn.fi/URN:ISBN:978-952-343-243-7

5.1. Description of Monitoring/Surveillance/Control programmes system: Campylobacter in animals - Gallus gallus (fowl) - broilers – animal sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Compulsory active monitoring of broiler slaughter batches, since 2004. Census from June to October, when the prevalence is known to be highest, all broiler slaughter batches are sampled at slaughter. Random sampling from January to May and from November to December, when the prevalence has consistently been low. Random sampling of slaughter batches is performed according to a particular sampling scheme designed by the central authority, with taking into account that the total number of samples in a year is proportional to the number of slaughtered broilers. Each slaughterhouse allocates the samples to be taken evenly during the sampling months.

Frequency of the sampling
Census sampling of all broiler slaughter batches between June and October; random sampling (expected prevalence 1%, accuracy 1%, confidence level 95%, since 2008) of broiler slaughter batches between January and May, and between November and December.

Type of specimen taken
Caecum samples taken at slaughter by the slaughterhouse staff as a mandatory part of the own check program.

Methods of sampling (description of sampling techniques)
Intact caeca from ten birds are taken. Caecal contents are pooled into one sample in the laboratory.

Case definition
The samples are analysed by private approved laboratories and suspected campylobacter isolates are sent to the national reference laboratory for confirmation. A slaughter batch is defined as positive after confirmation of isolation of Campylobacter jejuni or C. coli at the NRL.

Diagnostic/analytical methods used
NMKL No 119 with modifications (direct culture without enrichment).

2. Measures in place

Vaccination policy
There is no vaccination against campylobacter in Finland.

Other preventive measures than vaccination in place
Strict biosecurity measures and production hygiene on holdings.

The control program/strategies in place
The Finnish campylobacter program was introduced in June 2004. It is compulsory for all broiler slaughterhouses.

Measures in case of the positive findings
If campylobacters are detected in two consecutive growing batches from the same holding, all the following flocks from the holding will be slaughtered at the end of the day until slaughter batches from two consecutive growing batches are negative. Special attention to production hygiene at the holding will be paid in cooperation with the local municipal veterinarian.

3. Notification system in place to the national competent authority

All positive flocks in the programme must be reported to the authorities according to MAF (Ministry of Agriculture and Forestry) Decree on Campylobacter Control of Broilers (10/EEO/2007).

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

Results of the investigation
In 2018, a total of 1742 slaughter batches were sampled between June and October, thermophilic campylobacters were detected in 61 (3,5 %) of these slaughter batches. Campylobacter jejuni was detected in 56 batches and C. coli in 5 of the slaughter batches. Between January-May and November-December, in total, 336 slaughter batches were sampled, thermophilic campylobacters were detected in none of these slaughter batches. These values are comparable to those in previous years.

National evaluation of the recent situation, the trends and sources of infection
The prevalence of campylobacter in Finnish broiler slaughter batches has been consistently low. Since the implementation of a national campylobacter monitoring programme for broilers in 2004, the average prevalence of campylobacters in broiler slaughter batches has been on average 5% during June-October and 1% during the rest of the year.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Consumption of poultry meat is considered as a source of campylobacter in part of the sporadic domestic human cases during the seasonal peak in summer.

5.2. Description of Monitoring/Surveillance/Control programmes system: Campylobacter in food- Gallus gallus (fowl) - broilers – food sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Slaughterhouses take neck skin samples according to Regulation (EC) No 2073/2005 (Regulation (EU) No 2017/1495) process hygiene criterion for campylobacter.

Frequency of the sampling
Sampling is included in the own-check program of the establishment and is done monthly in January to May and November to December and once a week in June to October.

Type of specimen taken
Neck skin samples taken by the slaughterhouse staff as a mandatory part of their own check program after slaughter.

Methods of sampling (description of sampling techniques)
Sampling is done according to Regulation (EC) No 2073/2005.

Case definition
A case is defined as a slaughter batch, from which Campylobacter jejuni or C. coli is found over the limit of 1000 cfu/g. Samples are analysed by private approved laboratories and suspected

campylobacter isolates are sent to the national laboratory for confirmation. A batch is defined as positive after confirmation at the NRL.

Diagnostic/analytical methods used
EN ISO 10272-2

2. Measures in place

Vaccination policy
There is no vaccination against campylobacter in Finland.

Other preventive measures than vaccination in place
Strict biosecurity measures and production hygiene at holdings. Hygienic slaughter practices.

Control program/mechanisms
The Finnish campylobacter programme was introduced in June 2004. It is compulsory for all broiler slaughterhouses. High level of production hygiene at all stages of production and advice to consumers about hygienic practices in the kitchen.

Measures in case of the positive findings or single cases
Review of the slaughter process and improvements in slaughter hygiene.

3. Notification system in place to the national competent authority

All positive flocks in the monitoring programme are reported to the authorities.

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

Results of the investigation
In 2018 a total of 580 neck skin samples were analysed. Only one sample was found to have campylobacters over the process hygiene criterion of 1000 cfu/g.

National evaluation of the recent situation, the trends and sources of infection
The prevalence of campylobacter in Finnish broiler slaughter batches has been consistently low. Since the implementation of a national campylobacter monitoring programme for broilers in 2004, the average prevalence of campylobacters in cecum samples of broiler slaughter batches has been on average 5% during June-October and 1% during the rest of the year. For neck skin samples data has been collected for only one year so a trend cannot be evaluated. In the EU-baseline study in 2008, only one sample of broiler neck skin samples out of 369 was found to have campylobacter over 1000 cfu/g.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Consumption of poultry meat is considered as a source of campylobacter in part of the sporadic domestic human cases during the seasonal peak in summer.

6. General evaluation: *Coxiella burnetii* (Q fever)

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

The first evidence of *Coxiella burnetii* (Q fever) in bovine animals, in Finland, is from 2008, as antibodies were detected in an animal that was tested for export purposes. Further investigations revealed other seropositive animals at the same holding. None of the seropositive animals had any clinical symptoms.

Since 2009, two national surveys have been conducted, in which the prevalence of *C. burnetii* antibodies in the milk of dairy cattle (in 2009), and in Finnish goat and sheep (in 2010) populations have been determined. The prevalence of antibodies against *C. burnetii* in cattle population, in 2009, was 0.2% whereas in the goat and sheep populations, in 2010, no antibodies against *C. burnetii* were detected. There has never been a reported suspicion of Q fever in animals based on disease symptoms.

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

In 2018, two human Q fever cases were reported in Finland[4]. No information whether these infections are of foreign or domestic is available. According to the results of serological surveillance study in the year 2018, the prevalence of Q fever in the Finnish bovine, sheep and goat populations is very low. The national situation remains favourable.

6.1. Description of Monitoring/Surveillance/Control programmes system: *Coxiella burnetii* (Q fever)

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Active serological surveillance is conducted every ten years on dairy herds and was latest performed in 2018. The survey was coordinated with the control programmes for brucellosis, Bovine virus diarrhoea (BVD), Infectious Bovine Rhinotracheitis (IBR) and Schmallenberg virus (SBV).

In 2018, the prevalence of antibodies against *C. burnetii* in dairy and meat cattle, and in sheep and goat populations were determined. Sampling for dairy cattle was based on bulk milk samples that were collected from 10% of dairy farms with increased number of abortions in previous year. Sampling for meat cattle was based on blood samples that were collected from 10% of all meat cattle herds, selected by random sampling, covering the whole country. Sampling for sheep population was based on blood samples that were collected from 20% of sheep herds with more than 10 animals per herd, selected by random sampling. Only seven goat bulk milk samples were received during the study.

Continuous annual surveillance for Q fever in animals is based on investigation of about 100 samples taken on farms with increased number of abortions and for from animals investigated for export purposes.

Type of specimen taken and diagnostical/analytical methods used

[4] The National Institute of Health and Welfare, 2019. Infectious disease register. Available at: https://thl.fi/ttr/gen/rpt/tilastot.html

The samples were taken from live animals on farm (bulk milk or blood). Blood samples from bovine and sheep were taken by official veterinarians at the slaughterhouses, and milk samples from bovine and goats were taken by dairy processing plant as part of an official sampling and sent to the Finnish Food Authority Evira.

For serological investigations ELISA test on bulk milk or individual blood samples is used.

Case definition
An animal/ a herd is considered seropositive when the ELISA test is positive.

2. Measures in place

No measures in place.

3. Notification system in place to the national competent authority

Q fever is a notifiable disease. Notification of a primary case of Q fever in animals is based on detection of antibodies against *C. burnetii*.

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

The survey revealed that 0.8% of the tested herds had seropositive bulk milk. In comparison to the results from survey in 2010, a slight increase of seropositive herds was detected. Furthermore, 0.3% of meat cattle blood samples from 1.1% (4 out of 360) of herds were seropositive. The survey of sheep herds showed a very low prevalence of antibodies; in one out of 96 herds only one animal was seropositive. All samples from dairy goats were seronegative.

7. General evaluation: Cysticercus

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

Taenia solium cysts (Cysticercus cellulosae) have never been found in Finland. Bovine cysticercosis caused by ***Taenia saginata*** (Cysticercus bovis) is very rare. Single cases have been reported in cattle in 1996 and 2002 (case was not confirmed). *Taenia solium* and *Taenia saginata* infections in humans are rare. Single cases may be travel related. These infections in humans are not notifiable to the National Institute for Health and Welfare.

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

All slaughtered pigs and cattle are inspected at meat inspection for cysticerci. Domestic bovine and pig meat are not considered a source of infection for humans.

7.1. Description of Monitoring/Surveillance/Control programmes system: Cysticercus in bovine animals, pigs and wild boar

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
All slaughtered pigs and cattle are inspected at meat inspection for cysticercus.

2. Measures in place

Control measures in place
Compulsory meat inspection for bovines, pigs and wild boar.

3. Notification system in place to the national competent authority

Taenia solium (Cysticercus cellulosae) in pigs is a notifiable disease according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. A suspicious finding in bovines or pigs at meat inspection must be confirmed at the National Reference Laboratory.

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

Cysticerci were not found in 2018 in either pigs or bovines.

8. General evaluation: Echinococcosis

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

Echinococcus granulosus sensu lato was endemic in reindeer husbandry (reindeer - reindeer herding dog -cycle), but disappeared after the 1970's mainly because of the changes in reindeer husbandry rendering herding dogs redundant. In the early 1990's, echinococcosis started to re-emerge, then in the southeastern part of the Finnish reindeer husbandry area. The cycle now involves reindeer, elk (moose) and wolves and the parasite has been recognised as *E. canadensis* G10 (syn. *E. granulosus* G10). Hitherto, no other definitive hosts have been identified. *E. granulosus* does not occur in domestic production animals.

Echinococcus multilocularis has never been diagnosed in Finland. Finland is regarded as officially free from. *E. multilocularis* according to Commission Implementing Regulation (EU) 2018/878.

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

National evaluation of the recent situation, the trends and sources of infection
The low endemic *E. granulosus* strain in Finland has been described as G10 (Fennoscandian cervid strain) which is nowadays considered to belong to the species *E. canadensis*. Known intermediate hosts in Finland are moose *Alces alces*, semi-domesticated reindeer *Rangifer tarandus* and wild forest reindeer *Rangifer tarandus fennicus*, while the wolf *Canis lupus* is the only definitive host in the wild. The wolf has steadily expanded its range to the west during the last five years. The total number of wolves, however, has not increased markedly due to decrease of wolves in the east. It seems that *E. canadensis* is beginning to follow its hosts. Positive moose from western Finland have been found in 2017 and 2018 and one positive wolf in southwestern Finland in 2018. New possible intermediate hosts, mainly the white-tailed deer *Odocoileus virginianus*, are abundant in Southwest Finland. So far, the zoonotic infection risk is characterized as very low, but in 2015 an autochthonous case of cystic echinococcosis caused by *E. canadensis* G10 was diagnosed in a child living in the endemic area. This was the first case of its kind in more than 50 years. The infection was most probably transmitted from a dog. Active surveillance is needed as well as information and education of the public. Surveillance is also needed for *E. multilocularis*, which is known to occur in neighbouring Estonia and was diagnosed in southern Sweden in 2010.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)
Human infection risk from wildlife (wolf faeces) is regarded as very low due to low density of the wolf population. Infected domestic dogs would pose a more serious risk to human. Therefore, it is recommended to treat hunting dogs with anticestodal drugs both prior to and after moose hunting season. Moreover, it is recommended that cervid offal (especially lungs) are not given to dogs or that offal are only fed to dogs after thorough cooking.

8.1. Description of Monitoring/Surveillance/Control programmes system: Echinococcus in animals

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Mandatory meat inspection covers all known potential intermediate hosts of *E. granulosus* sensu lato slaughtered. In post mortem inspection, lungs are palpated and incised to discover hydatid cysts. The cysts are sent to the Finnish Food Authority (FFA) for confirmation. In addition to samples from meat

inspection, samples of the intermediate hosts of *E. canadensis* (moose, reindeer) are submitted by hunters or reindeer herders to examine the cause of death or disease.

The rodent scientists at Natural Resources Institute Finland (LUKE) perform long-term surveys twice a year at least on 50 locations to detect fluctuations of small mammal populations. All animals are dissected, and their gross parasitological condition, including the presence of *E. multilocularis* cysts in liver, is checked. In addition, other researchers send liver samples from small mammals if they find something suspicious (usually Taeniid cysts) to the LUKE rodent scientists. In the LUKE survey in 2018, 478 small mammals (voles) were studied. Generally, small mammals are sampled from high-density habitat patches, preferred by foxes as hunting grounds. Species include bank vole *Myodes glareolus* (whole Finland), red and grey-sided voles *M. rutilus* and *M. rufocanus* (Lapland), field vole *Microtus agrestis* (whole Finland), sibling vole *M. rossiaemeridionalis* (*M. levis*) (south-central Finland), root vole *M. oeconomus* (Lapland), Norway lemming *Lemmus lemmus* (Lapland) and water vole *Arvicola amphibius*.

FFA performs surveillance of possible definitive wild hosts (foxes and raccoon dogs for *E. multilocularis*, wolves for *E. canadensis*) as part of targeted and general wildlife disease surveillance. These animals are either hunted or found dead or diseased in the nature.

Frequency of the sampling
Continuous sampling.

Type of specimen taken
Definitive hosts: Faeces/ rectal content and intestine. Intermediate hosts: lungs, liver.

Methods of sampling (description of sampling techniques)
Definitive hosts: In connection of post mortem examination, a piece of rectum containing faeces is taken for sample. Intestine is saved in freezer for possible confirmation of infection. Samples are frozen at -80 ˚C for a week to inactivate possible *Echinococcus* eggs.
Intermediate hosts: organs are inspected during meat inspection or pathological examination, voles are dissected and livers inspected.

Case definition
Definitive host: Faeces/rectal contents positive by specific PCR or adult worms found in intestine.
Intermediate host: positive protoscolex finding in microscopic examination of cyst fluid or typical histology of cysts.

Diagnostic/analytical methods used
Definitive hosts: Species-specific PCR for the detection of *Echinococcus multilocularis* (fox and raccoon dog) or *E. canadensis* G10 (wolf) egg DNA in faeces or sedimentation and counting method.
Intermediate hosts: microscopy of cyst fluid and histology; PCR if deemed necessary.

2. Measures in place

The control strategies in place
Mandatory official meat inspection to for surveillance of the disease and to remove infected tissues from the food chain. Survey of wild mammals for the surveillance of *E. multilocularis* and *E. canadensis*.

Other preventive measures than vaccination in place
In accordance with the Commission Delegated Regulation (EU) 2018/772 imported dogs must be treated against echinococcosis 1-5 days before entering Finland. Alternatively, dogs can be treated regularly every 28 days. Dogs must have a microchip for identification and a pet passport in which treatments are marked. It is recommended to treat hunting dogs with anticestodal drugs both prior to

and after hunting season. Moreover, it is recommended that cervid offal (especially lungs) are not given to dogs or that offal are only fed to dogs after thorough cooking.

Measures in case of the positive findings or single cases
Organs with cystic echinococcosis are condemned at meat inspection and are so excluded from the food chain.

3. Notification system in place to the national competent authority

Echinococcosis is a notifiable disease in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. *Echinococcus multilocularis* is classified as an animal disease to be controlled according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

Results of the investigation including the origin of the positive animals
In 2018, hydatid cysts of *E. canadensis* were found in two reindeer and three moose at meat inspection and in one moose examined as part of wildlife disease surveillance. Five wolves out of 17 examined in wildlife disease surveillance were found positive for *E. canadensis*. The wolves were found dead or put down by special permissions, No *E. multilocularis* infections were found in hunted foxes or raccoon dogs.

National evaluation of the recent situation, the trends and sources of infection
Echinococcus canadensis persists in the wolves and cervids of eastern Finland and is now spreading westward. In 2018, three positive moose and one positive wolf originated from an area situated west of the traditional distribution area. *E. multilocularis* has not been found in regular, national monitoring of definitive and intermediate hosts.
Human infection risk from wildlife (wolf faeces) is regarded as very low. Proper disposal of hunting offal from wild cervids is the key measure to reduce the transmission of *E. canadensis*.

9. General evaluation: Verotoxigenic E. coli (VTEC)

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

In 1996, an enhanced microbiological surveillance of VTEC infections was initialized in Finland and since then the reporting has been mandatory. The first Finnish outbreak caused by VTEC serotype O157 occurred in 1997. The outbreak was associated with swimming in a shallow lake. The annual incidence of VTEC infections in humans rose from 0.06 (1990) to 1.0 (1997). Since then the incidence has been 0.4/100.000 inhabitants or lower in the 2000's. About 70-80% of VTEC infections are considered domestically acquired and most of them are caused by VTEC O157. Most human cases are sporadic or family-related infection and some of them have been associated with consumption of unpasteurized milk or with a cattle farm contact. The prevalence of VTEC O157 in cattle faeces was 1.3% in 1997, and in a latter study, in 2003, 0.4%. In 2003, VTEC O157 and non-O157 serotypes were found on 0.07% and 11% of bovine carcass surfaces, respectively. The prevalence of VTEC non-O157 serotypes in cattle faeces was 30%, in 2003. A compulsory control programme for all bovine slaughterhouses started in 2004 for VTEC O157. Since 2004, VTEC O157 has been found on average in about 0,5-1.2% of cattle examined. From 2011 onwards, the prevalence has risen to around 2 - 3 %. The program consists of compulsory monitoring of slaughter bovines, interventions at the holding of origin of the animals and voluntary measures at the slaughterhouse. In addition, a new control programme for bovine holdings delivering raw milk over 2500 kg/year directly to final consumers, started in 2014. Regular analysis of STEC serotypes O26, O103, O104, O111, O145 and O157 in food started in 2011 in Finland in the national reference laboratory. Before that, monitoring was mostly based on serotype O157 (excluding specific research projects where STEC group was monitored). Own control by business operators with analyses of STEC serotypes O26, O103, O104, O111, O145 and O157 in food (in sprouted seeds, later also in raw milk) started in 2013 in Finland.

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

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

The number of human infections caused by VTEC was stable during the first decade of the 21st century (yearly incidence 0.2-0,6 / 100 000). In 2013, the incidence increased to 1.8/ 100000. In 2018 the incidence in humans was 3.9/100000 and highest in young children (0-4 years, 9.4/100000). The increase was partly due to changes in VTEC diagnostics and due to the development of laboratory methods (PCR). [5] 46 % of cases were classified as being of domestic origin. Visiting farms and cattle contact are major risk factors for infection, especially of young children. Most human infections are sporadic and their source remains unknown. Farm-associated small outbreaks have occurred in Finland. The first Finnish outbreak in 1997 was associated with swimming in a lake. In 2001, imported minced meat used in kebab was verified as the source of a small outbreak. In 2012, unpasteurized milk and animal contact was associated with an outbreak caused by sorbitol-fermenting VTEC O157:H7. In 2013, a nationwide outbreak caused by sorbitol-positive, non-motile variant of VTEC O157 (with 10 microbiologically confirmed cases) was detected but the source remained unknown. In 2014, a contaminated well was the source of an outbreak caused by VTEC O103. In 2016, nine human cases led to investigation at cattle, sheep or goat farms. In two of these cases, an identical VTEC strain was isolated from the farm (one cattle and one sheep farm) and the patient. In both cases, the infected children were living at the farm and had contact with the animals. A foodborne outbreak with STEC as a demonstrated causative agent was detected in 2016 (rucola used as garnishing for food servings, serotype ONT:H11 and O166:H28).

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

[5]National Institute of Health and Welfare, 2019. Enterohemorraginen Escherichia Colin (EHEC) esiintyvyys. Available at: https://thl.fi/fi/web/infektiotaudit/seuranta-ja-epidemiat/tartuntatautirekisteri/tartuntataudit-suomessa-vuosiraportit/tautien-esiintyvyys/enterohemorraginen-escherichia-colin-ehec-esiintyvyys. Accessed 10 May 2019.

of infection)
The number of VTEC human cases is relatively low but the disease caused can be severe and lead to death. Cattle seem to be the major reservoir of VTEC. Same PFGE and cgMLST subtypes are detected among strains isolated from human infections and cattle indicating that cattle might be a common source of human infections in Finland.

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

Since the beginning of 2014, bovine holdings which deliver over 2500 kg/year raw milk directly to the final consumer were obligated to sample the herd and the raw milk for VTEC, at least once a year. Sampling is carried out by the food business operator. However, data is not available for reporting of the results. Discussions have been started on how to renew the VTEC program for bovine slaughterhouses. More information is needed on potential control options especially on farms.

9.1. Description of Monitoring/Surveillance/Control programmes system: Verotoxigenic E. coli (VTEC) in animal - Cattle (bovine animals) - animal sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Compulsory active monitoring of slaughter bovines, since 2004. A compulsory control programme for all bovine slaughterhouses started in January 2004 for serotype O157. Starting from 2015, at least 600 bovines are sampled in a year. Samples are taken from slaughtered bovines by the industry. The total number is divided between the different slaughterhouses depending on their slaughter capacity. The sampling is evenly distributed throughout the year. Note! Sampling at slaughter has an animal based approach, not herd based. Cattle herds are tested as part of the epidemiological investigations related to human infections in case of suspected contact to the farm. In these cases, sampling at the farm is carried out by the official municipal veterinarian.

Frequency of the sampling
Animals at farm: Case based
Animals at slaughter: Sampling distributed evenly throughout the year, the individual animals are selected randomly for testing.

Type of specimen taken
Animals at farm: Faeces
Animals at slaughter: Faeces

Methods of sampling (description of sampling techniques)
Animals at farm: If possible, 50 g of faeces is taken from the rectum and placed in a plastic container and cooled to a temperature of 4 (+/-2)°C. The sample is sent to Evira laboratory for analysis.
Animals at slaughter: 50 g of faeces is taken from the rectum and placed in a plastic container and cooled to a temperature of 4 (+/-2)°C. The sample is sent to an approved local laboratory for analysis. If VTEC is isolated at the local laboratory, the isolate is sent for confirmation and further typing to Evira.

Case definition
Animals at farm: An animal or herd is considered to be positive when VTEC O157 strain with the shigatoxin (stx1 and/or stx2) and adhesion genes (eae) or another VTEC-strain which has been connected to human cases is isolated from a sample.
Animals at slaughter: An animal is considered to be positive when VTEC O157 strain with the shigatoxin (stx1 and/or stx2) and adhesion genes (eae) is isolated from a sample.

Diagnostic/analytical methods used
Animals at farm: VTEC O157 was isolated according to ISO 16654:2001. Other VTEC were analysed using PCR based method detecting O serogroup specific genes, or the stx1, stx2 and eae genes.
Animals at slaughter: NMKL 164:2005 (ISO 16654:2001)

2. Measures in place

The control program/strategies in place
Compulsory monitoring of slaughter bovines, interventions at holdings of origin of positive slaughter animals, and voluntary measures at the farms and slaughterhouses. Interventions at farms are related to slaughter animal findings; the farm of origin of the positive slaughter bovine is traced and sampled. In addition, all bovine holdings which are suspected to be connected to human VTEC cases are sampled. In 2003, common guidelines were established by the authorities and by the industry. The guidelines were updated in 2006 and partly in 2014. They give recommendations of how to prevent spreading of VTEC at bovine holdings and slaughterhouses. According to the recommendations, a special risk management plan is designed by the official municipal veterinarian and the animal health care veterinarian for holdings that VTEC was confirmed on. The purpose of the plan is to minimize spread of infection to other animals, to neighbouring holdings and to people.

Recent actions taken to control the zoonoses
Discussion is currently going on, on how to renew the current VTEC control program.

Measures in case of the positive findings or single cases
In case of a positive finding at slaughter, the herd of origin of the animal is sampled by the official municipal veterinarian. In case of positive findings at the holding, a voluntary risk management plan is launched. If the farm does not follow the plan, the animals from the holding are slaughtered at the end of the working day with special attention to slaughter hygiene. Milk can be delivered only to establishments for pasteurization. The access of visitors to the farm is restricted (especially children).

3. Notification system in place to the national competent authority

According to MAF (Ministry of Agriculture and Forestry) Decree on EHEC-sampling from bovines in slaughterhouses and on farms (24/EEO/2006) the national reference laboratory notifies all positive results to the competent authorities.

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

Results of the investigation
In 2018, 18 out of 624 samples (2.88%) from slaughtered cattle were detected to be positive for VTECO157. Three out of seven herds tested due to a human case revealed positive.

National evaluation of the recent situation, the trends and sources of infection
In general (exception of 2016 and 2017), the number of positive findings in slaughtered animals has been increasing during the last few years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Cattle seems to be the major reservoir of VTEC. Same PFGE and cgMLST subtypes are detected among strains isolated from human infections and cattle which could indicate that cattle might be a common source of human infections in Finland.

10. General evaluation: Listeriosis (L. monocytogenes)

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

Since 1995 a total of 18-91 human listeriosis cases have been recorded annually. The annual incidence in humans has been 0,2 -1,65 per 100 000[6].

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

The actual source of infection is usually not identified but most cases are believed to be food-borne. Cold-smoked and gravad fishery products are considered to be risk foodstuffs. Food business operators monitor L. monocytogenes according to the Regulation 2073/2005, supplemented by sampling done by the municipal food control authorities. Additionally, national surveys on L. monocytogenes in food are carried out, but not annually.

[6] The National Institute of Health and Welfare, 2019. Infectious disease register. Available at: https://thl.fi/ttr/gen/rpt/tilastot.html

11. General evaluation: Lyssavirus (Rabies)

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

Rabies was common in the Finnish dog population at the beginning of the 20th century but the disease was eradicated from the country by vaccinating local dog populations during the 1950's. In April 1988, a local spot of essentially sylvatic rabies was discovered in south-eastern Finland. Between April 1988 and February 1989, a total of 66 virologically verified cases were recorded within a geographical area of 1 700 km^2. As a first measure the local dog population in the area, some 8 000 animals, were vaccinated against rabies at the expense of the state. At the same time, it was also highly recommended to vaccinate all other dogs. In co-operation with the WHO surveillance centre in Tübingen, Germany, a field campaign of oral vaccination of raccoon dogs and foxes was started in September 1988. During four distribution operations, the last one in the autumn 1990, a total of 200 000 Tübingen baits were distributed. In accordance with the WHO standards, Finland was declared rabies free in March 1991 after two years with no cases of rabies. Oral rabies vaccination is carried out annually in South East part of Finland. A rabid animal has twice been imported to Finland (a horse from Estonia in 2003, and a dog from India in 2007).
Rabies in bats was suspected for the first time in 1985 when a bat researcher died. He had handled bats in several countries during the previous years and it could not be concluded where the researcher had become infected. Despite an epidemiological study in bats in 1986, and subsequent rabies surveillance, bat rabies was not detected until 2009. The European Bat Lyssavirus-2 (EBLV-2) was isolated from the Daubenton's bat. Second case of EBLV-2 in a bat was detected in 2016. In 2017, a novel lyssavirus was detected in Brandt's bat and was designated as Kotalahti bat lyssavirus (KBLV).

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

Finland has been free from rabies since 1991 in accordance with the OIE Terrestrial Animal Health Code. The present control of wildlife rabies appears successful and important. Rabies in bats and the import of animals from endemic areas, however, remains a risk, which can be reduced by increasing public awareness of the disease. As no sylvatic rabies cases were detected, the risk for humans is very low at this moment. Even though lyssaviruses in bats are present in Finland, the health risk to the public, which has little contact with bats, is very low.

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

Oral vaccination campaigns and control program should be continued annually. Dogs imported from rabies endemic countries should be tested for rabies antibodies.

11.1. Description of Monitoring/Surveillance/Control programmes system: Rabies

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The surveillance of rabies in pets is based on the detection of clinical signs, background information, and laboratory testing. Sampling of wildlife is a part of a permanent monitoring scheme to control the success of vaccination. Wild animals that are found dead in the nature or have shown signs that could be related to rabies are part of passive surveillance.
Indicator animals are animals that have been found dead or have exhibited symptoms that could be related to rabies. The hunting bag consist of animals hunted as healthy animals. Farm animals include animals kept for production. Natural habitat is wildlife.

Samples (whole animals) are sent by local veterinarians, hunters etc and are sent to the Finnish Food Authority. Sample animals for the monitoring of the success of the vaccination campaign are collected in cooperation with the Finnish Wildlife Agency and local hunters and hunters' associations.

Type of specimen taken and diagnostical/analytical methods used
The tests carried out include an examination for rabies from the brains sample of the animals. The efficacy of rabies oral vaccination campaigns is evaluated by measuring the antibody response from a blood sample and bait uptake by detection of tetracycline from the teeth/jaw after vaccination in small carnivores (foxes and raccoon dogs), which are sent from the vaccination area.

Animal brain samples are analysed using the fluorescent antibody test (FAT). In cases of inconclusive results from FAT, or in all cases of human exposure, further tests (cell culture or polymerase chain reaction (PCR) tests) are performed.

Case definition
An animal is considered to be rabies positive when FAT and virus isolation / RT-PCR are positive. The identification of the agent will be supplemented by identifying any variant virus strains through sequencing of genomic areas.

The control program is approved by the European Commission and co-financed under the Regulation (EU) No 652/2014:
https://ec.europa.eu/food/sites/food/files/safety/docs/cff_animal_vet-progs_2018-9_rabies_fin.pdf

2. Measures in place

The control program/strategies in place
The competent authority for implementing the programme in Finland is the Finnish Food Authority. Tests included are performed at the national reference laboratory for rabies within the Finnish Food Authority. Implementation of the programme is controlled by information exchange, e.g. via e-mails and meetings with Ministry of Agriculture and Forestry. Locally the control/monitoring of rabies is carried out by regional veterinary officers and municipal veterinary officers in Finland.
The measures for control of rabies are in the Animal Diseases Act No 441/2013 and in the Decree No 724/2014 of the Ministry of Agriculture and Forestry (16.9.2014) including investigation of all suspected cases by the veterinary authorities, notification procedures and vaccination. In case of suspicion the animal must be isolated for two weeks or euthanized and sent to the Food Authority for laboratory analysis.

Vaccination policy
Vaccination against rabies is recommended for all dogs and cats. Dogs that are used in hunting, guide dogs, sniffer dogs, and dogs that are used by the police, the frontier guard and the army must be vaccinated against rabies (Decree No 724/2014, 16.9.2014). Dogs, cats and ferrets entering Finland shall be vaccinated against rabies in accordance with the Regulation (EC) No 576/2013 of the European Parliament and of the Council.
An annual programme for the immunisation of wild carnivores is carried out since 1989 in the South East border area. Since 2014 the vaccination campaign is carried out once in a year, in the autumn. 180 000 bait vaccines are distributed aerially in September-October over a 20-40 km wide and 350 km long zone along the south eastern border against Russia. The oral rabies vaccination programme is co-financed by the EU, based on Regulation (EU) No 652/2014 of the European Parliament and of the Council:
https://ec.europa.eu/food/sites/food/files/safety/docs/cff_animal_vet-progs_2018-9_rabies_fin.pdf

Measures in case of the positive findings or single cases
Public health authorities are notified in all cases where a human exposure is possible. If a positive case of rabies is found, the competent authority will take the necessary measures to destroy the carcass

and carry out an epidemiological investigation to find other animals and people who might have come in contact with the infected animal. The measures taken in regard of those animals depend on the nature of the contact and on whether the animal had been vaccinated against rabies or not. The Finnish Food Authority, who is responsible for carrying out the oral vaccination campaign in wild animals, will decide on whether there is a need to enlarge the area or increase the frequency of the vaccination campaign.

3. Notification system in place to the national competent authority

According to the Finnish legislation rabies has been notifiable and controlled since 1922 (Act 338/22, 29 Dec 1922). Rabies is a notifiable disease in all animals and classified as a dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry (2.12.2013).

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

Results of the investigation
46 domestic animals and one zoo animal were tested for rabies with negative results. 348 wild animals were tested, out of which 75 were indicator animals and 273 hunted animals. Also, 58 bats were analysed. Rabies was not detected.

From the oral rabies vaccination area, 266 foxes and raccoon dogs were analysed for biomarker, 168 were positive. Rabies vaccination antibodies were analysed from 240 foxes and raccoon dogs, 116 were positive.

National evaluation of the recent situation, the trends and sources of infection
Indigenous rabies has not been detected since 1989.
As no sylvatic rabies cases were detected, the risk for humans is very low at this moment. Illegal import of pet animals could pose a risk for the introduction of rabies. Currently the infection pressure in wild carnivores species in Russia is, however, relevant and poses a continuous risk for the reintroduction of the disease. The health risk to the general public, which has little contact with bats, is low.

12. General evaluation: Salmonellosis

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

The Finnish situation regarding Salmonella in feedingstuffs, animals and food of animal origin has been very favourable for years. When Finland joined the EU, the salmonella situation in Finland was markedly different from that of the rest of the EU (with the exception of the other Nordic countries). It was important to uphold the favourable Salmonella situation upon entering the EU. The program describes the ways in which the salmonella situation in animals and foodstuffs is monitored and the measures to be taken when Salmonella is isolated. It was approved by the commission in 1994.

The number of Salmonella cases in humans has decreased in the last 10 years. During the year 2018, there were 1448 human cases (1550 in 2017). The incidence in Finland was 26/100000. Of these cases 289 were of domestic and 928 foreign origin. In 227 cases, data on the country in which the salmonella infection had been acquired was not obtained.[7]

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

Domestic foodstuffs of animal origin are not considered a significant source of salmonellosis in humans.

12.1. Description of Monitoring/Surveillance/Control programmes system: Salmonella in animals - Cattle (bovine animals) - animal sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme: Cattle

Slaughterhouse: At least 3000 animals are sampled each year randomly from the cattle population at the slaughterhouses. Sampling is carried out by the food business operator under supervision of the official veterinarian. All sampling at slaughterhouses has an animal based approach, not herd based.

Farm: All AI-bulls and heifers are sampled not more than one month before entering the quarantine accommodation of a semen collection centre and in the quarantine accommodation before entering the semen collection centre. The herds of origin of AI -bulls and heifers are sampled annually by the food business operator. Bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumers, are sampled annually, sampling is carried out by the food business operator. Suspected herds (clinical symptoms or positive finding at slaughterhouse or other suspicion) are sampled at the farm by the official veterinarian. After a Salmonella finding herds are sampled several times by the operator during the sanitation and eradication process and at least twice by the official veterinarian before the restrictions are lifted. Note! All sampling at slaughterhouses has an animal based approach, not herd based.

Frequency of the sampling
Animals at farm:
The herds of origin of AI -bulls are sampled annually. Bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumers, are sampled annually (between July and November).
Animals at slaughter:

[7] The National Institute of Health and Welfare, 2019. Infectious disease register. Available at: https://thl.fi/ttr/gen/rpt/tilastot.html

Sampling is distributed evenly throughout the year

Type of specimen taken
Animals at farm:
Routine sampling: faeces
Suspect sampling and sampling before restrictions are lifted: faeces and environmental swab samples
Animals at slaughter:
Lymph nodes

Methods of sampling
Animals at farm:
Sampling of herds of origin of AI bulls and holdings, which deliver raw milk: The number of faecal samples is dependent on the number of animals in the herd. In the herds with less than 40 animals all the animals are sampled. In the herds with 40-200 animals all the youngest 40 animals are sampled and from the rest of the animals every second is sampled. In herds with over 200 animals all the youngest 40 animals are sampled, from the next youngest 160 animals, every second is sampled and from the rest of the animals every fifth. A maximum of 20 samples may be pooled together.
Sampling of suspected herds: Faecal sampling is carried out as described above. In addition, 5-50 environmental swab samples are taken from different areas of the premises. If there is a suspicion that feedstuffs are contaminated with Salmonella, swab samples are also taken from the feed systems.
Sampling of salmonella positive herds for lifting the restrictions: a faecal sample is collected from each animal. A maximum of 20 samples may be pooled together. In addition, 10-100 environmental swab samples are taken from different areas of the premises.

Animals at slaughter:
From each carcass five ileo-caecal lymphnodes are taken. Lymph nodes are divided into two equal parts. Lymph node parts from five animals are pooled together for analyse. If the sample is positive, each of the five individual samples are analysed separately.

Case definition
Animals at farm:
A herd is positive if Salmonella spp. has been isolated from one or more faecal or environmental samples.

Animals at slaughter:
Animal is positive if Salmonella spp. has been isolated from a sample.

Diagnostic/analytical methods used
Animals at farm:
Bacteriological method: ISO 6579:2002/Amd 1:2007

Animals at slaughter (herd based approach)
ISO 6579:2002 or NMKL No 71:1999 or ISO 6579:2002 / Amendment 1:2007

2. Measures in place

Vaccination policy
Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place
Biosecurity and production hygiene measures at holdings. Salmonella control of feedstuffs.

The control program/strategies in place
The Finnish Salmonella Control Programme approved by Commission Decision 94/968/EC of 28 December 1994.

Recent actions taken to control the zoonoses
National Decree on Salmonella control of cattle was amended in 2011 and in 2014. A compulsory control programme for all bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumers, started in the beginning of 2014 (National Decree on Salmonella control of cattle 1030/2013). The herds are sampled annually, sampling is carried out by the business operator.

Measures in case of the positive findings or single cases
At slaughterhouse: If a positive lymph node sample is detected in the slaughterhouse, the herd of origin is sampled by the official veterinarian.

At farm: Official restrictions: no trade of live animals except to a slaughterhouse (the meat is heat treated), milk can be delivered only to an approved establishment for pasteurization. Sanitation and eradication is carried out according to the holding specific plan. Restrictions are lifted after the herd has been negative in two consecutive sampling sessions with an interval of 3-4 weeks. Epidemiological investigation is carried out by the official veterinarian. Contact herds are sampled. Feedingstuffs are analysed for Salmonella.

3. Notification system in place to the national competent authority

In accordance with the Animal Diseases Act (441/2013) laboratory must notify the positive result to the competent authority and to the food business operator. Salmonella is notifiable in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. Salmonella in cattle is classified as an animal disease to be controlled according to Decree No 843/2013 of the Ministry of Agriculture and Forestry. The laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Salmonella Control in Meat Establishments (134/2012).

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

Results of the investigation
Lymph node sampling at slaughterhouses: one animal was positive (0,03 %) and the serovar was S. Typhimurium.
Herds: Salmonella was detected in 28 herds (14 x S. Typhimurium, 5 x S. Enteritidis, 4 x S. Kentucky, 2 x S. Konstanz, 1 x S. Chester, 1 x S. Newport and 1 x S. Senftenberg. In two herds were found both S. Typhimurium and S. Tennessee or S. Senftenberg.

National evaluation of the recent situation, the trends and sources of infection
Salmonella situation in cattle has been favourable for years. In 2018 there was an unusually high number of cases. Usually Salmonella is detected in around 6-15 herds per year. Out of the 28 positive herds, 5 were contact herds to other positive cases, one was sampled due to clinical symptoms, and one because of a positive lymph node finding at the slaughterhouse. One was found in the sampling of a herd of origin of AI-bulls, one in selling of animals and the rest in other samplings done by the food business operator.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Despite the increase in cases of Salmonella in 2018, the prevalence remains low, and cattle are not considered to be an important source of human salmonellosis cases in Finland.

12.2. Description of Monitoring/Surveillance/Control programmes system: Salmonella in animals - Gallus gallus (fowl) - broilers - animal sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme: Broiler flocks

All broiler flocks are sampled at the holdings within three weeks before slaughter.
Sampling is carried out by the official veterinarian once a year at each holding otherwise the sampling is carried out by the food business operator. In addition, the flock is sampled by the official veterinarian every time when there is a reason to suspect that the flock is positive for Salmonella spp. There are also specific national rules for farms which deliver only small amount of broiler meat to the final consumer or to local retail establishments directly supplying the final consumer. At these farms, the flocks are sampled 1-4 times a year by the operator and every second or third year by the official veterinarian.

Frequency of the sampling
Broiler flocks: Before slaughter at farm
Within three weeks before slaughter

Type of specimen taken
Broiler flocks: Before slaughter at farm
Samples taken by the food business operator; two pairs of socks/boot swabs. Samples taken by the official veterinarian; one pair of socks/boot swabs and one dust sample

Methods of sampling (description of sampling techniques)
Broiler flocks: Before slaughter at farm
Sampling by the food business operator: two pairs of socks/boot swabs samples are taken. Both pairs are analysed separately.
Sampling by the official veterinarian: one pair of socks/boot swabs and one dust sample collected by swab are taken. Both samples are analysed separately. The sampling is in accordance with the Annex of Commission Regulation (EU) No 200/2012.

Case definition
Broiler flocks: Before slaughter at farm
A flock is considered to be positive when Salmonella spp. is isolated from any sample.

Diagnostic/analytical methods used
Broiler flocks: Before slaughter at farm
Bacteriological method: ISO 6579:2002/Amd 1:2007

2. Measures in place

Vaccination policy
Broiler flocks: Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place
Broiler flocks: Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs. 90% of flocks are treated with a competitive exclusion product as day-old chicks.

The control program/strategies in place
Broiler flocks: The Finnish Salmonella Control Programme, approved by Commission Decision 2008/815/EC

Measures in case of the positive findings or single cases
Broiler flocks: Before slaughter at farm
In the case of a positive finding the flock is destructed or slaughtered and the meat heat treated. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out.
Feedingstuffs are analysed for Salmonella. The measures are the same for all salmonella serovars.

3. Notification system in place to the national competent authority

In accordance with the Animal Diseases Act (441/2013) the laboratory must notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995. Salmonella is notifiable in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. Salmonella in *Gallus gallus* and in turkeys is classified as an animal disease to be controlled according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

Results of the investigation
Salmonella spp. was not detected in broiler flocks in 2018.

National evaluation of the recent situation, the trends and sources of infection
The Salmonella situation has been very favourable in broiler flocks for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Domestic broiler meat is not considered to be an important source of human salmonellosis cases in Finland.

12.3. Description of Monitoring/Surveillance/Control programmes system: Salmonella in animals - Pigs - animal sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme: Pigs

Breeding herds:
All nucleus and multiplier herds are sampled at the holding once a year by the operators.
At least 3000 sows are sampled each year randomly from the sow population at the slaughterhouses. Sampling is carried out by the food business operator under supervision of the official veterinarian.
Note! All sampling at slaughterhouses has an animal based approach, not herd based.
Suspected herds (clinical symptoms or a positive finding at the slaughterhouse or other suspicion) are sampled at the holding by the official veterinarian. After a Salmonella finding herds are sampled several times by the operator during the sanitation and eradication process and at least twice by the official veterinarian before restrictions are lifted.

Fattening herds:
Together 3000 fattening pigs are sampled each year randomly from the population at the slaughterhouses. Sampling is carried out by the food business operator under supervision of the official

veterinarian. Note! All sampling at slaughterhouses has an animal based approach, not herd based. Suspected herds (clinical symptoms or a positive finding at the slaughterhouse or other suspicion) are sampled at the holding by the official veterinarian. After a Salmonella finding herds are sampled several times by the operator during the sanitation and eradication process and at least twice by the official veterinarian before restrictions are lifted.

Frequency of the sampling
Breeding herds
At slaughterhouses: sampling distributed evenly throughout the year.
At holdings: nucleus and multiplier herds once a year

Fattening herds at slaughterhouse:
Sampling distributed evenly throughout the year

Type of specimen taken
Breeding herds
At holding:
Routine sampling: faeces
Suspect sampling and sampling before restrictions are lifted: faeces and environmental swab samples
At slaughterhouse: lymph nodes

Fattening herds at farm: Faeces and environmental swab samples
Fattening herds at slaughterhouse: Lymph nodes

M**ethods of sampling**
Breeding herds:
At holding: Routine sampling of nucleus and multiplier herds: Sows: One composite sample is taken from every 100 sows or part of 100 sows. However, the maximum number of composite samples is ten. Samples are preferably taken from sows with piglets.
Faecal samples of maximum of 20 animals may be pooled to one composite sample. Growers, young breeding animals or weaned piglets (if present): Two faecal samples are taken from a group of 10-15 animals. Maximum of 20 samples may be pooled to one composite sample. The number of composite samples is dependent on the number of sows at the holding. Maximum number of composite samples is 15. Suspected herds: Adult animals: Faecal sample is taken from every second sow with piglets. From other adult animals one composite sample is taken from every 100 animals or part of 100 animals. Faecal samples of maximum of 20 animals may be pooled to one composite sample. Young animals: Two faecal samples are taken from each group of 10-15 animals. Maximum of 20 samples may be pooled. In addition, 5-50 environmental swab samples are taken from different areas of the premises. If there is a suspicion that feedstuffs are contaminated with Salmonella swab samples are also taken from the feed systems. Sampling of salmonella positive herds for lifting the restrictions: Adult animals: Faecal sample is collected from every animal. Maximum of 20 samples may be pooled. Young animals: Two faecal samples are collected from each group of 10-15 animals. Maximum of 20 samples may be pooled. In addition, 10-100 environmental swab samples are taken from different areas of the premises.
Slaughterhouse: From each carcass five ileo-caecal lymphnodes are taken. Lymph nodes are divided into two equal parts. Lymph node parts from five animals are pooled together for analysis. If the sample is positive each of the five individual samples are analysed separately.

Fattening herds at farm:
Suspected herds: One faecal sample is collected from each group of 10-15 animals. Maximum of 20 samples may be pooled. In addition, 5-50 environmental swab samples are taken from different areas of the premises. If there is a suspicion that feedstuffs are contaminated with Salmonella swab samples are also taken from the feed systems. Sampling of salmonella positive herds for releasing the restrictions: Two faecal samples are collected from each group of 10-15 animals. Maximum of 20 samples may be pooled. In addition, 10-100 environmental swab samples are taken from different

areas of the premises.

Fattening herds at slaughterhouse
From each carcass five ileo-caecal lymphnodes are taken. Lymph nodes are divided into two equal parts. Lymph node parts from five animals are pooled together for analysis. If the sample is positive each of the five individual samples are analysed separately.

Case definition
Breeding herds
A herd is positive if Salmonella spp. has been isolated from one or more faecal or environmental samples.

Fattening herds at farm
A herd is positive if Salmonella spp. has been isolated from one or more faecal or environmental samples.

Fattening herds at slaughterhouse
An animal is positive if Salmonella spp. has been isolated from a sample.

Diagnostic/analytical methods used
Breeding herds
Bacteriological method: ISO 6579:2002/Amd 1:2007

Fattening herds at farm
Bacteriological method: ISO 6579:2002/Amd 1:2007

Fattening herds at slaughterhouse ISO 6579:2002 or NMKL No 71:1999 or ISO 6579:2002 / Amendment 1:2007

2. Measures in place

Vaccination policy
Breeding herds: Vaccination against salmonella is not allowed in Finland.
Fattening herds: Vaccination against salmonella is not allowed in Finland.

Other preventive measures than vaccination in place
Breeding herds: Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.
Fattening herds: Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

The control program/strategies in place
Breeding herds: The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.
Fattening herds: The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of positive findings or single cases
At slaughterhouse: If a positive lymph node sample is detected in the slaughterhouse, the herd of origin is sampled by the official veterinarian. At farm: Official restrictions: no trade of live animals except to slaughterhouse (meat is heat treated). Sanitation and eradication is carried out according to the holding specific plan. Restrictions are released after herd has been negative in two consecutive sampling sessions with 3-4 weeks intervals. Epidemiological investigation is carried out by the official veterinarian. Contact herds are sampled. Feedingstuffs are analysed for Salmonella.

3. Notification system in place to the national competent authority

In accordance with the Animal Diseases Act (441/2013) laboratory must notify the positive result to the competent authority and to the food business operator. Salmonella in swine is classified as an animal disease to be controlled according to Decree No 843/2013 of the Ministry of Agriculture and Forestry. Salmonella is notifiable in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. The laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Salmonella Control in Meat Establishments (134/2012)

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

Results of the investigation
Lymph node sampling at slaughterhouses: Two breeding pigs (0.07 %) were positive. The serovars were S. Typhimurium and S. Montevideo.
Herds: Salmonella was detected in 7 herds. The serovars were 4 x S. Typhimurium, 2 x S. Derby, and 1 x S. Enteritidis. (1 x S. Derby was detected from the same holding in 2017.)

National evaluation of the recent situation, the trends and sources of infection
The Salmonella situation in pigs has been very favourable for years and findings are rare.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Pigs are not considered to be an important source of human salmonellosis cases in Finland.

12.4. Description of Monitoring/Surveillance/Control programmes system: Salmonella in animals - Gallus gallus (fowl) - flocks of laying hens

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Laying hens flocks:
Day-old chicks are sampled at the holding after arriving by the food business operator. Rearing flocks are sampled at the holding two weeks before the laying period by the food business operator. Production flocks are sampled at the holdings every 15 weeks by the food business operator. Sampling is carried out by the official veterinarian once a year at each rearing and laying holding. In addition, the flock is sampled by the official veterinarian every time when there is a reason to suspect that the flock is positive for Salmonella spp. There are specific national rules also for farms which deliver only small amount of eggs directly to the final consumers. At these farms, the flocks are sampled once or twice a year by the operator and every second or third year by the official veterinarian.

Frequency of the sampling
Laying hens: Day-old chicks
Every flock is sampled

Laying hens: Rearing period
Every flock is sampled two weeks before laying period

Laying hens: Production period
Every 15 weeks

Type of specimen taken

Laying hens: Day-old chicks
linings of delivery boxes

Laying hens: Rearing period
faeces or sock samples / boot swabs

Laying hens: Production period
faeces or sock samples / boot swabs, dust

Methods of sampling (description of sampling techniques)
Laying hens: Day-old chicks
Five internal lining papers are collected from delivery baskets and pooled together. If papers are not used five swab samples are taken.

Laying hens: Rearing period
Two pairs of boot swabs/sock samples are taken and pooled to one. In cage flocks: two samples of 150 g of naturally mixed faeces are collected and pooled to one.

Laying hens: Production period
Two pairs of boot swabs/sock samples are taken and pooled to one. In cage flocks: two samples of 150 g of naturally mixed faeces are collected and pooled to one. In official sampling also a dust sample (250 ml, 100 g) or a dust swab sample is taken. The sampling is in accordance with the Annex of Commission Regulation (EU) No 517/2011.

Case definition
Laying hens: Day-old chicks
Flock is considered to be positive if Salmonella spp. is isolated from any sample.

Laying hens: Rearing period
Flock is considered to be positive if Salmonella spp. is isolated from any sample.

Laying hens: Production period
Flock is considered to be positive if Salmonella spp. is isolated from any sample.

Diagnostic/analytical methods used
Laying hens: Day-old chicks
Bacteriological method: ISO 6579:2002/Amd 1:2007

Laying hens: Rearing period
Bacteriological method: ISO 6579:2002/Amd 1:2007

Laying hens: Production period
Bacteriological method: ISO 6579:2002/Amd 1:2007

2. Measures in place

Vaccination policy
Laying hens flocks:
Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place
Laying hens flocks:
Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

Control program/mechanisms

Laying hens flocks:
The Finnish Salmonella Control Programme approved by Commission Decision 2007/849/EC

Measures in case of the positive findings or single cases
Laying hens flocks:
In the case of a positive finding the flock is destructed or slaughtered and the meat heat treated. Eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. The measures are the same for all Salmonella serovars.

3. Notification system in place to the national competent authority

In accordance with the Animal Diseases Act (441/2013) the laboratory must notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995. Salmonella is notifiable in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. Salmonella in *Gallus gallus* and in turkeys is classified as an animal disease to be controlled according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

Results of the investigation
Salmonella spp. was not detected in commercial flocks of adult laying hens in 2018. Salmonella was detected in two holdings delivering eggs only directly to the final consumers. The serovars were S. Typhimurium and S. Hvittingfoss.

National evaluation of the recent situation, the trends and sources of infection
The Salmonella situation has been very favourable in flocks of laying hens for years. Usually 0-3 positive flocks have been detected yearly. S. Typhimurium has been the most common serovar.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Flocks of laying hens or eggs are not considered to be an important source of human salmonellosis cases in Finland.

12.5. Description of Monitoring/Surveillance/Control programmes system: Salmonella in animals - Gallus gallus (fowl) - breeding flocks, animal sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme: Breeding flocks

Day-old chicks are sampled by the food business operator after arriving to the holding. Rearing flocks are sampled at the holding by the food business operator at four weeks old and two weeks before moving to laying unit or phase. Once a year samples are taken by the official veterinarian at each holding.
Adult breeding flocks – egg production line: Flocks are sampled every third week at the holdings by the food business operator and twice during the production cycle by the official veterinarians.

Adult breeding flocks - broiler production line: Flocks are sampled every second week at the holdings by the food business operator and twice during the production cycle by the official veterinarian.
In addition, a rearing and adult flock is always sampled by the official veterinarian if there is any reason to suspect that the flock is positive for Salmonella spp.

Frequency of the sampling
Breeding flocks: Day-old chicks: Every flock is sampled

Breeding flocks: Rearing period: Every flock is sampled at age of four weeks and two weeks before moving to laying unit

Breeding flocks: Production period:
Egg production line: Every flock is sampled at the holding every third week
Broiler production line: Every flock is sampled at the holding every second week

Type of specimen taken
Breeding flocks: Day-old chicks
Internal linings of delivery boxes

Breeding flocks: Rearing period
Socks/ boot swabs, in cage flocks: faeces

Breeding flocks: Production period
Socks/boot swabs and dust sample, in cage flocks: faeces

Methods of sampling (description of sampling techniques)
Breeding flocks: Day-old chicks
Internal linings are collected from ten delivery boxes. Five papers are pooled together. If papers are not used swab samples from ten delivery boxes are taken. Five swab samples are pooled together.

Breeding flocks: Rearing period
Two pairs of socks/ boot swabs samples are taken. Both pairs are analysed separately. In cage flocks; 2 x 150 g faeces. Both samples are analysed separately.

Breeding flocks: Production period
One pair of socks/boot swabs samples and one dust sample collected by swab are taken. Both samples are analysed separately. In cage flocks: two samples of 150 g faeces. Both samples are analysed separately. The sampling is in accordance with the Annex of Commission Regulation (EU) No 200/2010.

Case definition
Breeding flocks: Day-old chicks
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Breeding flocks: Rearing period
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Breeding flocks: Production period
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Diagnostic/analytical methods used
Breeding flocks: Day-old chicks
Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks: Rearing period
Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks: Production period
Bacteriological method: ISO 6579:2002/Amd 1:2007

2. Measures in place

Vaccination policy
Breeding flocks:
Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place
Breeding flocks:
Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

The control program/strategies in place
Breeding flocks:
The Finnish Salmonella Control Programme approved by Commission Decision 2007/849/EC.

Measures in case of positive findings or single cases
Breeding flocks:
A positive flock is destructed or slaughtered and the meat heat treated. Hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. The measures are the same for all Salmonella serovars.

3. Notification system in place to the national competent authority

In accordance with the Animal Diseases Act (441/2013) the laboratory must notify positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995. Salmonella is notifiable in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. Salmonella in *Gallus gallus* and in turkeys is classified as an animal disease to be controlled according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

Results of the investigation
Salmonella spp. was not detected in breeding flocks of *Gallus gallus* in 2018.

National evaluation of the recent situation, the trends and sources of infection
Salmonella situation has been very favourable in *Gallus gallus* breeding flocks for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Breeding flocks are not considered to be an important source of human salmonellosis cases in Finland

12.6. Description of Monitoring/Surveillance/Control programmes system: Salmonella in animals - Turkeys - breeding flocks and meat production flocks

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme: Breeding flocks and meat production flocks

Breedings flocks:
Day-old chicks are sampled by the food business operator after arrival to the holding. Rearing flocks are sampled at the holding by the food business operator at four weeks old and two weeks before moving to the laying unit or phase. Once a year samples are taken by the official veterinarian at each holding. Adult breeding flocks are sampled at the holding every second week by the food business operator and once during the production cycle by the official veterinarian. In addition, the rearing and adult breeding flock are always sampled by the official veterinarian if there is any reason to suspect that the flock is positive for Salmonella spp.

Meat production flocks:
The Finnish Salmonella Control Programme: All meat production flocks are sampled at the holding within three weeks before slaughter. The sampling result is valid for three weeks except for small producers the result is valid for six weeks. At each holding sampling is carried out by the official veterinarian once a year, otherwise sampling is carried out by the food business operator. In addition, the flock is always sampled by the official veterinarian if there is any reason to suspect that the flock is positive for Salmonella spp. There are also specific national rules for farms which deliver only small amount of turkey meat to the final consumer or to local retail establishments directly supplying the final consumer. At these farms, the flocks are sampled 1-4 times a year by the operator and every second or third year by the official veterinarian.

Frequency of the sampling
Breeding flocks: Day-old chicks: Every flock is sampled

Breeding flocks: Rearing period**:** Every flock is sampled at age of 4 weeks and 2 weeks before moving to the laying unit

Breeding flocks: Production period: Every flock is sampled at the holding every second week.

Meat production flocks:
Before slaughter at farm. Every flock is sampled within three weeks before slaughter.

Type of specimen taken
Breeding flocks: Day-old chicks: Internal linings of delivery boxes

Breeding flocks: Rearing period: Socks/ boot swabs

Breeding flocks: Production period: One pair of socks/boot swabs and one dust sample

Meat production flocks:
Before slaughter at farm. Samples taken by the food business operator; two pairs of socks/boot swabs Samples taken by the official veterinarian; one pair of socks/boot swabs and one dust sample

Methods of sampling
Breeding flocks: Day-old chicks:
Internal linings are collected from ten delivery boxes. Five papers are pooled together. If papers are not

used swab samples from ten delivery boxes are taken. Five swab samples are pooled together.

Breeding flocks: Rearing period:
Two pairs of socks/ boot swabs samples are taken. Both pairs are analysed separately.

Breeding flocks: Production period:
One pair of socks/boot swabs samples and one dust sample collected by swab are taken. Both samples are analysed separately. The sampling is in accordance with the Annex of Commission Regulation (EU) No 1190/2012.

Meat production flocks:
Before slaughter at farm. Sampling by the food business operator: two pairs of socks/boot swabs samples are taken. Both pairs
are analysed separately. Sampling by the official veterinarian: one pair of socks/boot swabs and one dust sample collected by swab are taken. Both samples are analysed separately. The sampling is in accordance with the Annex of Commission Regulation (EU) No 1190/2012.

Case definition
Breeding flocks: Day-old chicks
A flock is considered to be positive when Salmonella spp. is isolated from any sample.

Breeding flocks: Rearing period
A flock is considered to be positive when Salmonella spp. is isolated from any sample.

Breeding flocks: Production period
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Meat production flocks: Before slaughter at farm
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Diagnostic/analytical methods used
Breeding flocks: Day-old chicks
Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks: Rearing period
Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks: Production period
Bacteriological method: ISO 6579:2002/Amd 1:2007

Meat production flocks: Before slaughter at farm
Bacteriological method: ISO 6579:2002/Amd 1:2007

2. Measures in place

Vaccination policy
Breeding flocks:
Vaccination against salmonella is not allowed in Finland.

Meat production flocks:
Vaccination against salmonella is not allowed in Finland.

Other preventive measures than vaccination in place
Breeding flocks:
Strict biosecurity and production hygiene in holdings. Competitive exclusion. Feedstuff control.

Meat production flocks:
Strict biosecurity and production hygiene in holdings. Competitive exclusion. Feedstuff control.

Control program/mechanisms
Breeding flocks:
The Finnish Salmonella Control Programme approved by Commission Decision 2009/771/EC.

Meat production flocks:
The Finnish Salmonella Control Programme approved by Commission Decision 2009/771/EC.

Measures in case of positive findings or single cases
Breeding flocks:
In case of a positive finding the flock is destructed or slaughtered and the meat heat treated. Hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. The measures are the same for all Salmonella serovars.

Meat Production flocks:
In case of positive finding the flock is destructed or slaughtered and meat heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. The measures are the same for all Salmonella serovars.

3. Notification system in place to the national competent authority

In accordance with the Animal Diseases Act (441/2013) laboratory must notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995. Salmonella is notifiable in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. Salmonella in Gallus gallus and in turkeys is classified as an animal disease to be controlled according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

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

Results of the investigation
Salmonella spp. was not detected in breeding or fattening flocks of turkeys in 2018.

National evaluation of the recent situation, the trends and sources of infection
The Salmonella situation in turkey flocks has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Domestic turkey meat is not considered to be an important source of human salmonellosis cases in Finland.

12.7. Description of Monitoring/Surveillance/Control programmes system: Salmonella in food - Meat from bovine animals - food sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme:
At slaughterhouses: together at least 3000 carcasses are sampled each year randomly from the cattle population. Sampling is carried out by food business operator under supervision of the official veterinarian.
At cutting plants: Sampling is compulsory for all cutting plants. Sampling is done as random sampling, the frequency is depended on the production capacity of the cutting plant. Sampling is carried out by the food business operator under the supervision of the official veterinarian.

Frequency of the sampling
Sampling is distributed evenly throughout the year so that the required number of samples based on the production capacity is reached.

Type of specimen taken
At slaughterhouse: surface swab of the carcass
At cutting plant: fresh meat

Methods of sampling
At slaughterhouse: 2 surface swab samples are taken from a carcass before chilling. A total area of 1400 cm2 is swabbed. Sampling sites: the upper inner part of hind legs including the pelvic entrance and the cut surface area of the abdomen and the chest.
Cutting plants: A sample consists of at least 25 grams of crushed meat taken from a cleaning tool of a conveyer belt, from tables or from a similar point.

Definition of a positive finding
Foodstuff is considered to be positive when Salmonella spp. is isolated from a sample.

Diagnostic/analytical methods used
ISO 6579:2002 or NMKL No 71:1999 or NMKL N:o 187:2007

2. Measures in place

The control program/strategies in place
The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of positive findings or single cases
After a positive salmonella result increased sampling is carried out at the slaughterhouse or at the cutting plant. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment.

3. Notification system in place to the national competent authority

The laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Salmonella Control in Meat Establishments (134/2012).

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

Results of the investigation
Salmonella spp. was not detected in slaughterhouse carcass swab samples or bovine meat samples from cutting plants. Findings of salmonella spp. in bovine meat are rare.

National evaluation of the recent situation, the trends and sources of infection
The Salmonella situation in domestic bovine meat is very favourable and findings are rare.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Domestic bovine meat is not considered to be an important source of human salmonellosis cases in Finland.

12.8. Description of Monitoring/Surveillance/Control programmes system: Salmonella in food - Meat from broilers (Gallus gallus) - food sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
At slaughterhouses: carcases are sampled according to the requirements of the Regulation 2073/2005.
Cutting plants not connected to the slaughterhouses: meat batches are sampled according to the requirements of the Regulation 2073/2005.
At meat processing plant: Minced meat, meat preparations and meat products; according to the Regulation 2073/2005

Frequency of the sampling
At slaughterhouses: at least one sampling session (neck skin of 15 birds) must be carried out each week. Small slaughterhouses (less than 150 000 birds slaughtered annually) may reduce sampling frequency.
At cutting plants: according to the Regulation 2073/2005.
At meat processing plant: Minced meat, meat preparations and meat products; according to the Regulation 2073/2005

Type of specimen taken
At slaughterhouse: neck skin
At cutting plant: fresh meat
At meat processing plant: According to the Regulation 2073/2005

Methods of sampling
At slaughterhouse: neck skins from 15 poultry carcases are sampled at random during each sampling session. A piece of approximately 10 g from neck skin shall be obtained from each poultry carcase. The neck skin samples from three poultry carcases from the same flock of origin shall be pooled before examination in order to form 5 x 25 g final samples.
At cutting plants: five samples of at least 25 g of the same batch are collected and analysed separately.
Meat processing plant: according to the Regulation 2073/2005.

Definition of a positive finding
At slaughterhouse, cutting plant and at meat processing plant:
Batch is considered to be positive when Salmonella spp is isolated from a sample

Diagnostic/analytical methods used
Bacteriological method: ISO 6579:2002 or NMKL No 71:1999 or NMKL No 187/2007

2. Measures in place

Preventive measures in place
All flocks must be tested for Salmonella before slaughter. If the flock is Salmonella positive, meat must be heat treated in an approved establishment.

The control program/strategies in place
The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Recent actions taken to control the zoonoses
In 2012, the sampling system at slaughterhouses and cutting plants was totally amended. Before 2012, sampling was not compulsory at slaughterhouses, and at cutting plants the samples taken were single crushed meat samples instead of batch based sampling. The reason for this amendment was the amendment of the Regulation 2073/2005. Earlier the Salmonella criterion for broiler meat was a process hygiene criterion, and crushed meat sampling at the cutting plants was assessed to be equivalent to the sampling of neck skin samples at the slaughterhouses. When a food safety criterion based on neck skin samples was introduced, the sampling of crushed meat was not any more considered to be equivalent. In 2012, also the data collection from the samplings by food business operators of batches of minced meat and meat preparations started at the central level.

Measures in case of the positive findings or single cases
The positive batch is rejected/withdrawn from the market. In addition, after a positive salmonella result increased sampling is carried out in the establishment. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment. The measures are the same for all Salmonella serovars.

3. Notification system in place to the national competent authority

Laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Salmonella Control in Meat Establishments (134/2012).

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

Results of the investigation
Salmonella spp. was not detected in domestic broiler meat in 2018.

National evaluation of the recent situation, the trends and sources of infection
Salmonella situation in domestic broiler meat has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Domestic broiler meat is not considered to be an important source of human salmonellosis cases in Finland.

12.9. Description of Monitoring/Surveillance/Control programmes system: Salmonella in food - Meat from pig - food sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme: - at slaughterhouses: at least 3000 carcasses of fattening pigs and sows are sampled each year randomly from the populations. Sampling is carried out by the food business operator under supervision of the official veterinarian. - at cutting plants: Sampling is compulsory for all cutting plants. The sampling is done as random sampling, the frequency depending on the production capacity of the cutting plant. Sampling is carried out by the food business operator under the supervision of the official veterinarian.

Frequency of the sampling
Sampling is distributed evenly throughout the year so that the required number of samples base on the production capacity is reached.

Type of specimen taken
At slaughterhouse: surface swab of the carcass
At cutting plant: fresh meat

Methods of sampling
At slaughterhouse: 3 surface swab samples are taken from a carcass before chilling. A total area of 1400 cm2 is swabbed. Sampling sites: the upper inner part of hind legs including the pelvic entrance; the cut surface area of the abdomen and the chest; and the cheek.
Cutting plants: A sample consists of at least 25 grams of crushed meat taken from a cleaning tool of a conveyer belt, from tables or from a similar point.

Definition of a positive finding
Foodstuff is considered to be positive when Salmonella spp. is isolated from a sample.

Diagnostic/analytical methods used
ISO 6579:2002 or NMKL No 71:1999 or NMKL No 187:2007

2. Measures in place

The control program/strategies in place
The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of the positive findings or single cases
After a positive salmonella result increased sampling is carried out at the slaughterhouse or at the cutting plant. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment.

3. Notification system in place to the national competent authority

The laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Salmonella Control in Meat Establishments (134/2012).

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

Results of the investigation
In 2018 Salmonella Hessarek was detected in one carcass swab sample. Salmonella spp. was not detected in in any cutting plant samples in 2018.

National evaluation of the recent situation, the trends and sources of infection
The Salmonella situation in domestic pig meat is very favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Domestic pig meat is not considered to be an important source of human salmonellosis cases in Finland.

12.10. Description of Monitoring/Surveillance/Control programmes system: Salmonella in food - Meat from turkey - food sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
At slaughterhouses: carcases are sampled according to the requirements of the Regulation 2073/2005.
Cutting plants not connected to the slaughterhouses: meat batches are sampled according to the requirements of the Regulation 2073/2005.
At meat processing plant: Minced meat, meat preparations and meat products; according to the Regulation 2073/2005

Frequency of the sampling
At slaughterhouses: at least one sampling session (neck skin of 15 birds) must be carried out each week. Small slaughterhouses (less than 150 000 birds slaughtered annually) may reduce sampling frequency.
At cutting plants: according to the Regulation 2073/2005.
Meat processing plant: according to the Regulation 2073/2005.

Type of specimen taken
At slaughterhouse: neck skin
At cutting plant: fresh meat
At meat processing plant: According to the Regulation 2073/2005

Methods of sampling (description of sampling techniques)
At slaughterhouse: neck skins from 15 poultry carcases are sampled at random during each sampling session. A piece of approximately 10 g from neck skin shall be obtained from each poultry carcase. The neck skin samples from three poultry carcases from the same flock of origin shall be pooled before examination in order to form 5 x 25 g final samples.
At cutting plants: five samples of at least 25 g of the same batch are collected and analysed separately.

Definition of positive finding
At slaughterhouse, cutting plant and meat processing plant:
Batch is considered to be positive when Salmonella spp. is isolated from a sample.

Diagnostic/analytical methods used
ISO 6579:2002 or NMKL No 71:1999 or NMKL No 187/2007

2. Measures in place

Preventive measures in place
All flocks must be tested for Salmonella before slaughter. If the flock is Salmonella positive, meat must be heat treated in an approved establishment.

The control program/strategies in place
The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Recent actions taken to control the zoonoses
In 2012, the sampling system at slaughterhouses and cutting plants was totally amended. Before 2012, sampling was not compulsory at slaughterhouses, and at the cutting plants samples taken were single crushed meat samples instead of batch based sampling. The reason for this amendment was the amendment of the Regulation 2073/2005. Earlier the Salmonella criterion for turkey meat was a process hygiene criterion, and crushed meat sampling at the cutting plants was assessed to be equivalent to the sampling of neck skin samples at the slaughterhouses. When a food safety criterion based on neck skin samples was introduced, the sampling of crushed meat was not any more considered to be equivalent. In 2012, also the data collection from the samplings by food business operators of batches of minced meat and meat preparations started at the central level.

Measures in case of the positive findings or single cases
The positive batch is rejected/withdrawn from the market. In addition, after a positive salmonella result increased sampling is carried out in the establishment. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment. The measures are the same for all Salmonella serovars.

3. Notification system in place to the national competent authority

Laboratory must notify the positive results to the competent authority and to the food business operator according to MAF Decree on Salmonella Control in Meat Establishments (134/2012).

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

Results of the investigation
Salmonella spp. was not detected in domestic turkey meat in 2018.

National evaluation of the recent situation, the trends and sources of infection
The Salmonella situation in domestic turkey meat has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Domestic turkey meat is not considered to be an important source of human salmonellosis in Finland.

13. General evaluation: Salmonella in feeds

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

The incidence of salmonella in feeds has been monitored since 1960 and salmonella outbreaks originating from feed have been very rare on Finnish livestock farms. There has been two major feed-borne outbreaks in 1995 and 2009. In 1995, the outbreak caused by Salmonella Infantis was related to cattle farms and in 2009, the outbreak caused by Salmonella Tennessee spread to poultry and pig farms.

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

Salmonella bacteria may not be present in the feed (Amendment to Feed Act 502/2014, 6 §). No salmonella food outbreaks with a connection to feed contamination has been detected for decades in Finland.

13.1. Description of Monitoring/Surveillance/Control programmes system: Salmonella in feeds

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Sampling for official control is carried out according to the written directions of Finnish Food Authority, which are aligned with the Commission Regulation (EU) No 691/2013 of July 2013 laying down the methods of sampling and analysis for the official control of feed.

Frequency of sampling
Sampling of feeds from domestic manufacturing is risk-based and targeted to specified feeds. The number of samples taken is based on the amount of production, type of operation, hygienic risk and type of feed.

A feed business operator that imports high-risk feeds of plant origin from the internal market for feeding food-producing animals, fur animals or pets shall take samples of the arriving feed batches or lots in accordance with operator's risk-based own quality control plan. Imports from the internal market can also be subject to official control.

For the official salmonella control of feeds imported from third countries, samples are taken from high-risk feeds of plant origin.

Sampling of feeds on the market for salmonella control is also risk-based and targeted to specified feeds with a hygienic risk.

See also Additional information.

Type of specimen taken
Samples of feed materials are taken both from domestic and imported feed materials of animal and plant origin.

Samples of compound feeds are taken both from domestic compound feeds and imported compound feeds.

Methods of sampling (description of sampling techniques)

An aggregate sample taken from the inspected feed lot consists of incremental samples. The size of aggregate sample and the number of incremental samples depends on the size of the feed lot.

In marketing control one sample is taken from one type of feed.

Diagnostic/analytical methods used
In Finnish Food Authority salmonella is mainly analysed by realtime-PCR method and VIDAS method according to ISO 6579 – 1:2017 standard with slight modifications. Analysis methods for salmonella in approved laboratories are based on ISO 6579 – 1:2017 and/or NMKL 71:1999 standards with slight modifications and using realtime-PCR or VIDAS equipments. Serotyping is performed when salmonella is detected in a sample.

Data collection and trend watching
Reported salmonella results are based on the results of official samples stored in the information system of Finnish Food Authority. As a result of the change in legislation, from the beginning of 2013, a significant proportion of the control of salmonella was transferred to operators for own control. The data of the own control samples (sample counts, results) is not included in the reported data. As a result, the results reported before 2013 and the results from 2013 onwards are not comparable.

2. Measures in place

The control program/strategies in place
Decree of the Ministry of Agricultural and Forestry on feed business operating (No 548/2012) demands official control and feed business operators to take samples for salmonella testing. A feed business operator that produces compound feeds for food-producing animals for placing on the market shall take a sample for salmonella testing from the production environment at least once a week and from every production lines separately, where feed materials are received or compound feeds are produced from high-risk feed materials (cereal grains, seeds and fruits of oil plants, legume seeds, other seeds and fruits and products and by-products obtained from them; fish, other aquatic animals and products and by-products obtained from them).

Measures in case of the positive findings
If salmonella bacteria are found in imported feed lots, prohibition of taking into use and placing on the market, is immediately issued. Finnish Food Authority grants upon request permission to decontaminate the lots of feed materials containing salmonella. The decontaminations must be carried out according to instructions of Finnish Food Authority. After decontaminations, Finnish Food Authority does resampling to verify that lots are free from salmonella, after which Finnish Food Authority gives permissions to use the lots as feed.

If salmonella bacteria is found in a sample from the production environment taken in connection with the reception of lots, production, storage or loading of feed, or from feed produced, the feed business operator shall ensure that the following measures are taken, as applicable: 1) tracing the source of the salmonella bacteria in the feed raw materials; 2) tracing the source of the salmonella bacteria in the establishment; 3) enhanced sampling from the production environment to establish the extent of salmonella infection; 4) enhanced sampling from feed; 5) enhanced cleaning and disinfection; 6) enhanced sampling from the production environment to assess the success of the cleaning and disinfection; 7) suspending feed production and distribution. A feed business operator shall cooperate with Finnish Food Authority.

3. Notification system in place to the national competent authority

Notification system is mandatory and feed operators must inform Finnish Food Authority immediately of salmonella suspicions or findings (Amendment to Feed Act 502/2014, 21 §).

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

In official control salmonella was detected in 11 lots of imported feed material of plant origin, in one sample of domestic feed material of animal origin taken from processing plant and in two pet food samples and in two samples of feed intended for wild birds taken from the market.

In addition to official control salmonella was detected in the own control of feed operators in 13 lots of imported feed material of plant origin and in one lot of imported feed material of animal origin.

During the last few years imported feed materials of plant origin have been the most risky in terms of salmonella contamination. Instead, salmonella findings have been relatively rare in feed materials and compound feeds manufactured in Finland. Compound feeds that have been salmonella positive have been almost without exception compound feeds intended for fur animals. Salmonella has not been found in samples taken in connection with manufacturing of pet food.

5. Additional information

[1)] Feeds of animal origin from third countries are imported via designated BIPs, where they are submitted for veterinary border inspection. The border control veterinarians carry out official controls of feeds of animal origin from third countries to verify compliance with aspects of the Finnish Feed Act in accordance with Regulation (EC) 882/2004.

[2)] In Finland, Animal Health Association ETT keeps a 'positive list' of feed operators that are committed to take salmonella samples of each batch of imported feed materials and compound feeds for farmed animals in Finland, and to start using the feed only after a negative salmonella result. The samples are taken by an inspector authorised by Finnish Food Authority or by a sampler with sufficient expertise and analysed for salmonella at a laboratory approved by Finnish Food Authority or at a laboratory that uses an accredited method to test feed for salmonella. Feed companies also have quality contracts related to transporting and storing animal feed or a regular auditing procedure for transportation and storage. The positive list is published online on ETT web pages: https://www.ett.fi/rehut/positiivilista.

14. General evaluation: Toxoplasma

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

Toxoplasmosis caused by *Toxoplasma gondii* is endemic in Finland, and the prevalence of infection in wild animals and domestic ungulates is higher in the southern than in the northern parts of the country. This circumstance has been interpreted to reflect the human population density differences in Finland, which in turn affect the domestic cat density.

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

During the beginning of the Millennium, the yearly number of reported human infections has fluctuated between 15 and 50 (about 3 to 9 cases per million inhabitants). In 2018, 18 human toxsoplasmosis cases were reported in Finland[8]. The source of human infection is not known, but it is supposed that humans get infected similarly as elsewhere in the world.

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

In a recent study of the Finnish feline biobank, it was found that the risk of *T. gondii* seropositivity in Finnish cats was significantly associated with the cat breed; long-haired breeds had high seropositivity[9]. Whether this also reflects on breed differences in oocyst production, is currently unknown.

[8] The National Institute of Health and Welfare, 2019. Infectious disease register. Available at: https://thl.fi/ttr/gen/rpt/tilastot.html

[9] Must K, Hytönen MK, Orro T, Lohi H, Jokelainen P.Toxoplasma gondii seroprevalence varies by cat breed. PLoS One. 2017 Sep 8;12(9):e0184659. doi: 10.1371/journal. pone.0184659. eCollection 2017

14.1. Description of Monitoring/Surveillance/Control programmes system: Toxoplasma

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Annual surveillance of *Toxoplasma* spp. in animals is passive in Finland. It is based on the microscopy of histological tissue samples, whether the animal was showing any clinical signs of infection or not. Some animals, especially wild hares, due to their high susceptibility to toxoplasmosis, have typical lesions visible in necropsy, but in many cases, the infection is subclinical.

Type of specimen taken and diagnostical/analytical methods used
Sample material from wild, production and pet animals are taken in case of clinical suspicion, but often just to elucidate the unknown cause of death. The samples were submitted for necropsy to the Finnish Food Safety Authority Evira either by owners of pet or production animals, veterinarians, or by a citizen, often a hunter, who has found a dead wild animal. Histological tissue (brain, liver, kidney, lung, spleen) samples are H-E stained and examined by microscopy. No sensitive specific methods, such as immunohistochemistry, was used for screening.

Case definition
An animal, where typical tissue cysts were found is defined as a case.

2. Measures in place

No control measures. No vaccination program in small ruminants. However, the Finnish Food Safety Authority Evira and the National Institute for Health and Welfare warn pregnant women against eating raw meat, including salami and dried reindeer meat because of the risk of *T. gondii* infection.

3. Notification system in place to the national competent authority

Toxoplasma ssp. is classified as a monthly reported animal disease in swine, sheep, goats, dogs, cats and ferrets according to Decree No 1010/2013 of the Ministry of Agriculture and Forestry.

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

Results of the investigations
Toxoplasma spp. was rarely reported in samples from cats, dogs, goats, sheep and wild hares. More detailed, the results of the investigations can be found in the tables.

Probably the best indicator species of *T. gondii* in the nature are wild hares (European brown and mountain hares) due to their distinct pathology. During the period ranging from the year 2000 to 2017, 5 - 25% infected hares have been identified among the animals submitted to necropsy.

National evaluation of the situation, the trends and sources of infection
Although *Toxoplasma gondii* is endemic in Finland, clinical human infections are quite rare, or are seldom reported.

15. General evaluation: Trichinellosis

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

Three cases of human trichinellosis originating from imported pork were diagnosed around 1890. The last autochthonous human cases (three) originated from eating bear meat in 1977. The first diagnosis in domestic swine was made in 1954. There were very few pig cases until 1981 when the number of Trichinella positive pigs started to increase reaching even over one hundred of infected swine a year. In the 2000's, however, the number of diagnosed cases in pigs decreased again to a couple of animals a year, and in 2005-2009 no cases were found. In 2010, only one positive pig was found. Since 2011, no positive pigs have been found. The infection was known in the brown bear and other wildlife during the 1950s, but since the 1980s trichinellosis has been found to be prevalent among wild carnivores especially in the southern part of the country, where all the four European species (*Trichinella spiralis*, *T. nativa*, *T. britovi* and *T. pseudospiralis*) have been reported. The raccoon dog *Nyctereutes procyonoides* has been recognised as the central host species harbouring all four Trichinella species. In Finland, domestic pork testing for Trichinella was initiated during the 1860s. In 1923, meat inspection including Trichinella testing of swine carcasses became mandatory in municipalities with more than 4000 inhabitants, and later in the entire country.

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

National evaluation of the recent situation, the trends and sources of infection
Trichinellosis has not reemerged in domestic swine during the past five years. However, no sign of decrease in incidence in wildlife has been seen. The apparent change in swine during past decades may be due to the pig production becoming more intensive with bigger and more modern industrialized units. In wildlife, a big proportion of infections are caused by *T. nativa*, the arctic species, which does not readily infect swine.
Analysis of *Trichinella* species in wildlife in 2014 revealed a marked decrease in the occurrence of *T. spiralis*, the most important species in swine. In an earlier Finnish study (material from 1999-2005), the proportion of *T. spiralis* was 12.8% in infected wildlife, but in 2014 it was only 0.7%. *T. nativa* infected 80% and 93% of Trichinella positive wildlife in 1999-2005 and 2014, respectively. If this finding reflects a true change in Trichinella species distribution in nature it would mean decreased infection pressure on domestic swine. In 2018, the prevalence of *Trichinella* spp. remained high in carnivores. Only two *Trichinella* species, *T. nativa* in carnivores and *T. pseudospiralis* in birds and one lynx, were found but the species in most cases has not been determined yet. The sample size i.e. effort did not change essentially from previous year.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)
Trichinella testing is mandatory to all commercial pork production except for swine originating from officially recognized controlled housing conditions (one holding in 2018). Hunters need to be continuously informed about the risks of eating not tested, undercooked bear, badger, lynx, wild boar or other carnivore or omnivore meat.

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

The Trichinella species present in Finland have been identified and the study on the epidemiology of different Trichinella species will continue. Understanding the epidemiology of the various Trichinella species will help in controlling of the risk.

15.1. Description of Monitoring/Surveillance/Control programmes system: Trichinella in animals – horses

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Every single slaughtered horse is tested for Trichinella at the slaughterhouse as part of meat inspection. Trichinella testing is mandatory for horses at meat inspection.

Frequency of the sampling
All slaughtered horses are introduced to official meat inspection and trichinella testing.

Type of specimen taken
Muscle sample of 10 grams from tongue, masseters or diaphragm.

Methods of sampling (description of sampling techniques)
Sampling and analysing are done according to 2015/1375 EU.

Case definition
Positive result from testing according to 2015/1375 EU.

Diagnostic/analytical methods used
Methods in use are the magnetic stirrer method for pooled sample digestion and mechanically assisted pooled sample digestion method, accordant with regulation 2015/1375.

2. Measures in place

The control strategies in place
Trichinella testing at meat inspection is mandatory. Routine meat inspection eliminates infected carcasses from human consumption.

Measures in case of the positive findings
Positive animals are removed from the food chain. If a horse is found infected with Trichinella, the carcass will be destroyed. The competent authority will investigate the farm of origin, source and possible spread of infection and decide about further action.

3. Notification system in place to the national competent authority

Trichinellosis is a notifiable disease in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. Positive result in Trichinella testing at meat inspection must be notified and confirmed at National Reference Laboratory in the Finnish Food Safety Authority (Evira).

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

Results of the investigation
No horses were found to be positive for trichinellosis. Equine trichinellosis has never been found in Finland.

National evaluation of the recent situation, the trends and sources of infection
Trichinella incidence and prevalence in domestic horses in Finland seem to be negligible in spite of its persisting abundance in wildlife.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection
The risk of obtaining trichinellosis from horse meat is negligible.

15.2. Description of Monitoring/Surveillance/Control programmes system: Trichinella in animals - Pigs

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Pigs: Trichinella testing is mandatory to all commercial pork production except for swine originating from officially recognized controlled housing conditions according to regulation 2015/1375. During year 2018, one holding had the status of being officially recognized for controlled housing conditions. In total 578 pigs originating from this holding were not examined for trichinellosis in the year 2018. All other pigs are examined for trichinellosis at obligatory, official meat inspection at the slaughterhouse. Finland implemented the possibility provided in Article 3 paragraph 3 b of Regulation (EU) No 2015/1375 to cease testing for Trichinella of pigs originating in holdings or compartments applying controlled housing conditions. Finnish Food Safety Authority Evira (from 1.1.2019 onwards the Finnish Food Authority) is the competent authority that officially recognizes holdings and compartments applying controlled housing conditions. Some pigs originating from controlled housing conditions are slaughtered at a slaughterhouse which tests all slaughtered pigs for trichinella. Therefore, some pigs from controlled housing conditions are tested for trichinella.

Farmed wild boar: all animals slaughtered in a slaughterhouse must be tested for Trichinella. Trichinella testing is not mandatory when the meat is not meant for general consumption, but the owner may voluntarily test the meat used for his own consumption.

Frequency of the sampling
Trichinella testing is mandatory to all commercial pork production except for swine originating from officially recognized controlled housing conditions according to regulation 2015/1375 (one holding in 2018). All other pigs and wild boar are examined for trichinellosis at meat inspection.

Type of specimen taken
The sample for Trichinella test from pigs and wild boar is taken primarily from the diaphragm muscle and secondarily from tongue, masseter or abdominal muscles.

Methods of sampling (description of sampling techniques)
Muscle sample is taken according to 2015/1375 at meat inspection.

Case definition
A positive case is a pig from which the Trichinella test (2015/1375) is positive i.e. Trichinella larva have been detected in the test from a pooled muscle sample and/or a single sample. All positive results must be sent to the national reference laboratory in the Finnish Food Safety Authority for confirmation and identification of the
species.

Diagnostic/analytical methods used
Diagnostic methods used are in accordance with 2015/1375. In Finland the methods used are the magnetic stirrer method with pooled samples and mechanically assisted pooled sample digestion method (Stomacher).

2. Measures in place

The control strategies in place
Routine meat inspection eliminates infected carcasses from human consumption.

Measures in case of the positive findings
If a pig is found infected with Trichinella, the carcass will be destroyed. The competent authority will investigate the farm of origin, source and possible spread of infection and decide about further action.

3. Notification system in place to the national competent authority

Notification system in place
Trichinellosis is a notifiable disease in all animals according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. A positive result in Trichinella testing at meat inspection must be notified and confirmed at National Reference Laboratory in the Finnish Food Safety Authority (Evira).

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

Results of the investigation including description of the positive cases and the verification of the Trichinella species
Trichinella was not found in either pigs or farmed wild boar in 2018.

National evaluation of the recent situation, the trends and sources of infection
The risk of obtaining trichinellosis from pig meat is negligible. The last positive *Trichinella* case in a domestic pig was found in 2010. Now, *Trichinella* incidence and prevalence in domestic swine in Finland seem to be negligible despite of its persisting abundance in wildlife. This may be caused by the change in swine husbandry, which has become more industrialized during the 2000's. Therefore, small family farms with old pighouses have disappeared. In addition, the infection pressure caused by wildlife toward pigs has probably decreased because of the changes in distribution of *Trichinella* species prevalent in wildlife. However, wild boar meat can still pose a risk although infections have been rather rare (positive cases found ca. every other year in the last 10 years). Free-ranging wild boar can have contacts with *Trichinella* infected wild mammals and birds.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
The risk of obtaining trichinellosis from pig meat is negligible. The positive findings in farmed wild boar during the last five years indicate the importance of Trichinella examination and thorough cooking of the meat even when the meat is intended for farmer's personal use only.

5. Additional information

Number of officially recognised Trichinella-free holdings
During the year 2018, one holding was recognized officially as a holding applying controlled housing conditions according to regulation 2015/1375.

Categories of holdings officially recognised Trichinella-free
None

Officially recognised regions with negligible Trichinella risk
None

15.3. Description of Monitoring/Surveillance/Control programmes system: Trichinella in animals - wild animals

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Hunted wild game including wild boar and bears (and other carnivorous species):
If the meat is meant for general consumption it must be sent to a game handling establishment for meat inspection and it is tested for *Trichinella* spp. as a part of the meat inspection. If the meat is sold directly to a private consumer testing it is mandatory according to national regulation. If the meat is intended for private consumption in the hunter's own household, testing is not mandatory, but many hunters choose to voluntarily test the meat (samples taken as part of HACCP and own checks).

Wild animals not meant for consumption:
Samples (official sampling by the competent authority) are taken from wild animals that are submitted for targeted or general wildlife disease surveillance (passive monitoring). These animals may be hunted, euthanized (due to injury or disease) or found dead. Samples for *Trichinella* examination are taken e.g. from wild boar, brown bears, foxes, lynx, wolves, raccoon dogs, American minks, pine martens, wolverines, badgers, otters, beavers and seals as well as some raptors and scavenging birds.

Frequency of the sampling
Continuous sampling

Type of specimen taken
Sample includes muscle from the diaphragm, the masseter, the tongue and/or the hind leg. From birds, pectoral muscles are sampled.

Methods of sampling (description of sampling techniques)
Samples are taken in connection with post mortem examination and sampling for other diseases.

Case definition
A case is considered positive when *Trichinella* larvae have been detected in a test from a pooled muscle sample and/or a single sample.

Diagnostic/analytical methods used
Mechanically assisted digestion method (Stomacher).

2. Measures in place

The control strategies in place
No control programs or mechanisms in place. Hunters are advised to have trichinella testing done to the carcass if they wish to eat it and to cook the meat thoroughly.

Measures in case of the positive findings
No specific measures are in place for findings in wild animals.

3. Notification system in place to the national competent authority

Positive result in *Trichinella* testing have to be confirmed at National Reference Laboratory in the Finnish Food Safety Authority (Evira).

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

Results of the investigation including description of the positive cases
Two *Trichinella* species, *T. nativa* in carnivores and *T. pseudospiralis* in birds and one lynx, were found but the species in most cases has not been determined. The sample size i.e. effort did not change essentially from previous year.

National evaluation of the recent situation, the trends and sources of infection
In wildlife, a big proportion of infections are caused by *T. nativa*, the arctic species, which does not readily infect swine. Analysis of *Trichinella* species in wildlife in 2014 revealed a marked decrease in the occurrence of *T. spiralis*, the most important species in swine. In an earlier Finnish study (material from 1999-2005), the proportion of *T. spiralis* was 12.8% in infected wildlife, but in 2014 it was only 0.7%. *T. nativa* infected 80% and 93% of *Trichinella* positive wildlife in 1999-2005 and 2014, respectively. In 2017, the number of *Trichinella* tested, hunted wild boars increased notably compared to previous year due to increasing natural wild boar population and hunting effort. The prevalence of *Trichinella* spp. has remained high in carnivores.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Trichinella incidence and prevalence in domestic swine in Finland seem to be negligible despite its persisting abundance in wildlife. This may be caused by the change in swine husbandry, which has become more industrialized during the 2000's. Therefore, small family farms with old pighouses have disappeared. In addition, the infection pressure caused by wildlife toward pigs has probably decreased because of the changes in distribution of *Trichinella* species prevalent in wildlife. However, wild boar meat can still pose a risk although infections have been rather rare (positive cases found ca. every other year in the last 10 years). Free-ranging wild boar can have contacts with *Trichinella* infected wild mammals and birds.

16. General evaluation: Yersiniosis

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

The number of reported cases of human yersiniosis has been between around 600 per year, most of which are caused by Yersinia enterocolitica.[10]

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

National evaluation of the recent situation, the trends and sources of infection
Most of the reported human cases are presumed to be of domestic origin. The number of cases is higher than the number of domestic salmonella infections. A decreasing trend in the number of cases caused by Yersinia enterocolitica have been detected.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)
In Finland the most common bio/serotype is 4/O:3, which is found in human cases as well as in pigs and pork. Pathogenic Y. enterocolitica biotypes have also been detected in faeces of cats and dogs in Finland.

National surveys on Yersinia in food are carried out occasionally, but not in 2018**.**

[10] The National Institute of Health and Welfare, 2019. Infectious disease register. Available at: https://thl.fi/ttr/gen/rpt/tilastot.html

17. Food-borne Outbreaks

1. System in place for identification, epidemiological investigations and reporting of food-borne outbreaks

Systematic collection of information about foodborne outbreaks in Finland began in 1975. The local food control and health officials are responsible for investigating and reporting foodborne outbreaks in their area. Collection of information takes place on the basis of the Food Act (23/2006), the Health Protection Act (763/1994), the Communicable Disease Act (1227/2016), the Decree (1365/2011) concerning the follow-up and reporting of food- and waterborne outbreaks and the Communicable Diseases Decree (146/2017). Physicians have to notify all cases of communicable diseases to the National Institute for Health and Welfare (THL). The data is recorded in the National Infectious Diseases Register in Finland. The local municipal outbreak investigation group has to notify THL in case an outbreak is suspected. The local municipal outbreak investigation groups are responsible for the investigation of every suspected food- and waterborne outbreak in their area and for its reporting to the Finnish Food Safety Authority Evira. The notification and final investigation reports are submitted by an electronic reporting system, which provides the data simultaneously to all relevant authorities involved in or supporting the outbreak investigation, including the National Supervisory Authority for Welfare and Health (Valvira) which is the central coordinating authority in waterborne outbreaks. The system also stores the data in the National Food Borne Outbreaks Register (NFWDR). The system has been in use since the beginning of 2010. Evira evaluates each final municipal report in co-operation with THL in order to classify the outbreaks based on the strength of evidence. The data is recorded in the NFWDR and a national summary report on outbreaks is published by Evira every third year. By the introduction of the electronic reporting system, the pick lists used for the collection of data into the NFWDR have been harmonized with data collection on EU level by EFSA.

2. Description of the types of outbreaks covered by the reporting

All general domestic food- and waterborne outbreaks must be reported in Finland. Illness of at least two persons with similar symptoms from a single source is considered a cluster and a suspected outbreak. Sporadic cases and infections acquired abroad are not included in the NFWDR, whereas they are included in the infectious disease register. Family outbreaks are reported if commercial foodstuffs are suspected of being the source of illness or several persons are at risk. Obligatory reporting includes definite communicable diseases and traditional foodborne agents such as those causing intoxications. Foodborne outbreaks caused by chemical agents other than toxins and biological amines produced by microorganisms are included in the national register though they are not reported to EFSA.

3. National evaluation of the reported outbreaks in the country

Trends in numbers of outbreaks and numbers of human cases involved:
In 2018, the municipal food control authorities notified 75 food- and waterborne outbreaks, of which 73 (97%) were associated with food and two (3%) with drinking water. The total number of outbreaks was higher than in recent years. Since 2001, most of the annually reported outbreaks have been foodborne. The number of reported outbreaks has fluctuated between 32 and 75 with a few year intervals. The lowest number, 32 outbreaks, was recorded in 2007.

The number of human cases typically varies between 800 and 2000 annually and follows the number of outbreaks. Despite the high number of outbreaks reported in 2018, the number of human cases (1947) was within the typical range. Usually about 50% of the reported outbreaks annually have been medium size when evaluated by the number of cases per outbreak (11-100 persons infected). In 2018 most (42 outbreaks; 56%) were small, 30 outbreaks (40%) were medium sized and the rest three outbreaks (4%) were large (over 100 persons infected).

The relevance of the different causative agents, food categories and the agent/food category combinations:
During the last ten years the most common causative agent identified has been norovirus. In 2018 norovirus caused 25 (34%) foodborne and two waterborne outbreaks. Other causative agents identified in 2018 were Salmonella (5), Campylobacter (3), Bacillus cereus (2), Yersinia enterocolitica (2), Clostridium perfringens (1), Cryptosporidium (1), Histamine (1) and Listeria monocytogenes (1), causing a total of eight foodborne outbreaks. In 32 (44%) of the foodborne outbreaks the causative agent remained unknown. However, in most of these cases the investigations showed descriptive epidemiological association between eating a certain food or meal and becoming ill. The most common vehicle (63%) reported in 2018 was a buffet meal or mixed food and no specific food item was determined as the cause of the outbreak. The investigations revealed a specific food to be the vehicle of the outbreak in only 14 (19 %) outbreaks. Of these, the most common vehicles were crustaceans, shellfish, molluscs and products thereof (5; 7%), and different kind of meat and products thereof (5; 7%).

The relevance of the different type of places of food production and preparation in outbreaks:
In 40 (55%) outbreaks in 2018, the place of exposure was a restaurant. In 25 (34%) outbreaks the place of origin of problem was in a restaurant. Six (8%) of the food borne outbreaks were related to contamination at primary production (oysters and supposedly vegetables). The place of origin of problem remained unknown in 35 (48%) of the outbreaks.

Evaluation of the severity and clinical picture of the human cases:
Altogether 1947 persons were reported to have fallen ill in food- and waterborne outbreaks in 2018. The number of patients afflicted by food poisoning was 1475 (76%), while 472 persons (24%) were infected through contaminated drinking water. According to the reports, a total of 51 persons were hospitalized in nine outbreaks. Four deaths were reported.

4. Descriptions of single outbreaks of special interest

An unexpected number of gastroenteritis following a wedding dinner in July 2018 was notified to a local Environmental Health Unit. An outbreak investigation was conducted in collaboration with the National Institute of Health and Welfare (THL). A detailed list of food items served was obtained. All the 92 wedding participants were e-mailed a questionnaire on potential symptoms and food items consumed while leftovers from the buffet were tested. Forty-six eligible participants answered the survey, including 36 cases. Wedding participants who had eaten pork filet were more likely to have fallen ill. The pork was cooked and chilled one day prior to the event. It was supposed to be served cold, but it had been kept on the table at room temperature during the dinner for several hours. *Clostridium perfringens* was detected in the leftover pork filet in high concentration along with *Staphylococcus aureus* and *Bacillus cereus*. *C. perfringens* was also found in 4 stool samples out of 5 collected. The results strongly indicate that the pork filet served at this wedding was the source of the outbreak.

5. Control measures or other actions taken to improve the situation

In general, all food- and waterborne outbreaks are investigated by local food control and health officials. In widespread outbreaks, the central administration is in charge of coordinating the investigations. An investigation comprises an epidemiological investigation, detection of contributing factors, sampling and revision of the in-house control system. Information received about foodborne outbreaks, contributory factors and causative agents are analyzed and actively used in the education and training of food control officials and food business operators. Since January 2005, all food handlers whose work entails special risks related to food hygiene or who handle unpacked, perishable foodstuffs have to demonstrate their proficiency either by obtaining a hygiene proficiency certificate or a certificate of vocational qualification. Independent Proficiency Examiners accredited by the Finnish Food Safety Authority Evira organize hygiene proficiency examinations in different parts of the country. Information and recommendations about identified causative agents, risk foods or raw material are given to entrepreneurs, producers and consumers. The Finnish Salmonella program and the special

salmonella guarantees have successfully ensured salmonella free foodstuffs on the market and only a small number of human salmonellosis infections are domestically acquired. Other control programs have been established and other measures taken in order to control outbreaks caused by the most important zoonoses. The prevailing national system for monitoring and surveillance of zoonoses covers Campylobacter, Listeria and the EHEC bacterium in production animals or foodstuffs. The Finnish Strategy on Zoonoses was revised in 2013, highlighting Campylobacter, Yersinia, Listeria, the EHEC bacterium and norovirus as the main foodborne agents that the key actions are targeted on. The network-like Finnish Zoonosis Centre between the national organizations; the Finnish Food Safety Authority Evira and the National Institute for Health and Welfare, have ensured the collaborative efforts of both the veterinary and the health sector for monitoring and prevention of diseases transmitted between animals and people, since 2007.

18. Institutions and laboratories involved in antimicrobial resistance monitoring and reporting

Finnish Food Authority (Ruokavirasto)
The Finnish Food Authority (in 2018, the Finnish Food Safety Authority Evira) is a central competent authority and is responsible for the implementation of antimicrobial resistance monitoring programme in food-producing animals. It operates also as a national reference laboratory in the field of antimicrobial resistance. The susceptibility testing of zoonotic and indicator bacteria as well as the specific monitoring of extended-spectrum beta-lactamase producing *E. coli* are done in the national reference laboratory located in Helsinki. The campylobacter from broilers and salmonella from food-producing animals are isolated within their own national programmes and the isolates are confirmed at the Finnish Food Authority laboratories. The National reference laboratory is also responsible for the texts and tables of the report concerning antimicrobial resistance.

19. General Antimicrobial Resistance Evaluation

1. Situation and epidemiological evolution (trends and sources) regarding AMR to critically important antimicrobials (CIAs) over time until recent situation

According to the results from FINRES-Vet monitoring programme, starting from 2002, resistance was only occasionally detected in *Campylobacter* spp. isolated from food-producing animals. However, during the last decade, resistance levels have slightly changed as resistance to especially fluoroquinolones has been seen in campylobacter isolated from pigs, broilers and cattle. Macrolide resistance in campylobacter has been rare.

In addition to a very low prevalence of salmonella in food-producing animals in Finland, antimicrobial resistance in salmonella is not common. Multiresistance or resistance to critically important antimicrobials in *Salmonella enterica* has been very rare. Decreased susceptibility to colistin has mainly been detected in *S.* Enteritidis. In 2018, multi-resistant *S*. Kentucky was isolated from four cattle farms.

Resistance situation in indicator *E. coli* in food-producing animals has in overall been favourable. Resistance is most commonly found in isolates from pigs and the least in cattle. The prevalence of ESBL or AmpC producing *E. coli* is quite commonly found in broilers and broiler meat.

2. Public health relevance of the findings on food-borne AMR in animals and foodstuffs

As resistance situation is favourable in domestic food-producing animals and meat thereof, Finnish food of animal origin is likely not an important source for AMR in the human population. MRSA of animal origin has had a slight affect in human health.

3. Recent actions taken to control AMR in food producing animals and food

Finland's National Action Plan on Antimicrobial Resistance was published on 12 May 2017. It highlights the prudent use of antimicrobial drugs as well as by preventing infections and the spread of drug-resistant microbes. Prevention efforts must take into account people, animals, food and the environment. Antimicrobials must be used correctly and responsibly when treating people and animals. One of the major actions is building up an information system to collect animal species-specific usage data on antimicrobials.

20. General Description of Antimicrobial Resistance Monitoring; Campylobacter jejuni - Broilers

1. General description of sampling design and strategy

Samples originate from a national *Campylobacter* monitoring programme. For details, see text for Thermophilic *Campylobacter* in animals - *Gallus gallus* (fowl) - broilers. All isolates (one isolate per epidemiological unit) were included in the antimicrobial susceptibility testing.

2. Stratification procedure per animal population and food category

Between June and October, every slaughtered broiler production batch was sampled and between November and May, the frequency is set annually depending on production volume.

3. Randomisation procedure per animal population and food category

Census sampling of all broiler slaughter batches between June and October; random sampling (expected prevalence 1%, accuracy 1%, confidence level 95%, since 2008) of broiler slaughter batches between January and May, and between November and December.

4. Analytical method used for detection and confirmation

Details of the laboratory methodology for isolation and confirmation are described in the text Thermophilic *Campylobacter* in *Gallus gallus*.

5. Laboratory methodology used for detection of antimicrobial resistance

The susceptibility testing was performed with broth microdilution method according to CLSI using *Campylobacter jejuni* ATCC 33560 as a quality control strain. The antimicrobials tested and the epidemiological cut-off values (ECOFFs) used are laid down in Decision 2013/652/EU.

6. Results of investigation

In 2018, resistance in *C. jejuni* from Finnish *Gallus gallus* was high to nalidixic acid (25.5%) and ciprofloxacin (25.5%). No resistance was found to tetracycline, erythromycin, gentamicin or streptomycin. Resistance levels to fluoroquinolones (and tetracycline) have varied between 2014 and 2018. In 2018, resistance levels to quinolones were at the same level as in 2014. The reason for the detected resistance is not known. Antimicrobials are seldom used in the broiler production chain in Finland and not at all in the broiler production flocks since 2009 (Animal Health ETT ry, https://www.ett.fi/sisalto/ett-english).

21. General Description of Antimicrobial Resistance Monitoring; Salmonella spp. - Cattle

1. General description of sampling design and strategy

The isolates originate from the Finnish *Salmonella* control programme. For details in sampling, see text for *Salmonella* spp. in animal – Cattle (bovine animals) and *Salmonella* spp. in food – meat from bovine animals. All isolates (one isolate per epidemiological unit) are included in the antimicrobial susceptibility testing.

2. Stratification procedure per animal population and food category

Sampling is performed as described in the text for *Salmonella* spp. in animal – Cattle (bovine animals) and *Salmonella* spp. in food – Meat from bovine animals.

3. Randomisation procedure per animal population and food category

Sampling details are described in the text for *Salmonella* spp. in animal – Cattle (bovine animals) and *Salmonella* spp. in food – Meat from bovine animals. All isolates are included in the susceptibility testing.

4. Analytical method used for detection and confirmation

Details of the laboratory methodology are described in the text *Salmonella* spp. in bovine animals.

5. Laboratory methodology used for detection of antimicrobial resistance

The susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested and the epidemiological cut-off values (ECOFFs) used are laid down in Decision 2013/652/EU.

6. Results of investigation

In 2018, resistance was found in *S*. Kentucky ST198 which originated from four cattle farms. *S*. Kentucky isolates were resistant to ampicillin, ciprofloxacin, gentamicin, nalidixic acid, sulfamethoxazole and trimethoprim. Within the Finnish *Salmonella* control programme, the number of *Salmonella* spp. isolated from bovine animals has been low each year. Taken account of the low salmonella prevalence and the overall low resistance levels, the antimicrobial susceptibility situation continues to be favourable. However, the detection of multi-resistant *S*. Kentucky found commonly in Europe is concerning.

22. General Description of Antimicrobial Resistance Monitoring; Salmonella spp. - Pigs

1. General description of sampling design and strategy

The isolates originate from the Finnish *Salmonella* control programme. For details in sampling, see text for *Salmonella* spp. in animals – Pigs and *Salmonella* spp. in food – Meat from pig. All isolates (one isolate per epidemiological unit) were included in the antimicrobial susceptibility testing.

2. Stratification procedure per animal population and food category

Sampling is performed as described in the text for *Salmonella* spp. in animals – Pigs and *Salmonella* spp. in food – Meat from pig.

3. Randomisation procedure per animal population and food category

Sampling details are described in the text for *Salmonella* spp. in animal – Pigs and *Salmonella* spp. in food – Meat from pig. All isolates are included in the susceptibility testing.

4. Analytical method used for detection and confirmation

Details of the laboratory methodology are described in the text *Salmonella* spp. in pigs.

5. Laboratory methodology used for detection of antimicrobial resistance

The susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested and the epidemiological cut-off values (ECOFFs) used are laid down in Decision 2013/652/EU.

6. Results of investigation

All isolates from pigs were susceptible to the tested antimicrobials in 2018. Within the Finnish *Salmonella* control programme, the number of *Salmonella* spp. isolated from pigs has been low each year and also the resistance is not common. Therefore, the antimicrobial susceptibility situation continues to be favourable.

23. General Description of Antimicrobial Resistance Monitoring; Salmonella spp. - Gallus gallus

1. General description of sampling design and strategy

The isolates originate from the Finnish *Salmonella* control programme. For details in sampling, see text for *Salmonella* spp. in animals - *Gallus gallus* (fowl) broilers, laying hens and breeding flocks, and *Salmonella* spp. in food – Meat from broilers. All isolates (one isolate per epidemiological unit) were included in the antimicrobial susceptibility testing.

2. Stratification procedure per animal population and food category

Sampling is performed as described in the text for *Salmonella* spp. in animals - *Gallus gallus* (fowl) broilers, laying hens and breeding flocks, and *Salmonella* spp. in food – Meat from broilers

3. Randomisation procedure per animal population and food category

Sampling details are described in the text for *Salmonella* spp. in animals - *Gallus gallus* (fowl) broilers, laying hens and breeding flocks, and *Salmonella* spp. in food – Meat from broilers. All isolates are included in the susceptibility testing.

4. Analytical method used for detection and confirmation

Details of the laboratory methodology are described in the text *Salmonella* spp. in *Gallus gallus*.

5. Laboratory methodology used for detection of antimicrobial resistance

The susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested and the epidemiological cut-off values (ECOFFs) used are laid down in Decision 2013/652/EU.

6. Results of investigation

All isolates from *Gallus gallus* were susceptible to the tested antimicrobials in 2018. Within the Finnish Salmonella control programme, the number of *Salmonella* spp. isolated from *Gallus gallus* has been very low each year and also the resistance is very rarely detected. Therefore, the antimicrobial susceptibility situation continues to be very favourable.

24. General Description of Antimicrobial Resistance Monitoring; Escherichia coli – non-pathogenic - Broilers

1. General description of sampling design and strategy

Caecum samples were collected from the three biggest slaughterhouses that accounted for >99% of all broilers slaughtered in Finland. Altogether, 289 caecum samples were collected at slaughter from healthy animals between January and December in 2018. The sampling was evenly distributed throughout the study period. From each flock, sample was taken from one bird. The samples were taken aseptically and transported refrigerated to the laboratory within 2 days. Samples taken on Fridays (from one slaughterhouse) were kept refrigerated from Friday to Monday and transported to the laboratory during the following Monday.

Indicator *E. coli* isolates (one per epidemiological unit) were randomly selected for susceptibility testing. All presumptive ESBL/AmpC/carbapenemase producing *E. coli* were tested for antimicrobial susceptibility.

2. Stratification procedure per animal population and food category

The number of randomly taken samples from each slaughterhouse was proportional to the annual slaughter volume.

3. Randomisation procedure per animal population and food category

Samples were collected randomly at slaughterhouses and in total, each sample represented a different epidemiological unit.

4. Analytical method used for detection and confirmation

In addition to isolation of indicator *E. coli*, the same samples were also screened for the presence of ESBL/AmpC and carbapenemase producing *E. coli*.

For the isolation of indicator *E. coli*, caecal content was directly spread on Brilliance *E. coli*/coliform selective agar plates (Oxoid) and incubated overnight at 37°C. Typical colonies were subsequently spread on blood agar plates and stored at -80°C until susceptibility testing.

For screening of ESBL/AmpC and carbapenemase producing *E. coli*, the latest EURL protocol was used. For specific screening of carbapenemase producing *E. coli*, CARBA and OXA-48 plates (Biomerieux) were used. Presumptive *E. coli* colonies from the selective plates were confirmed with MALDI-TOF (Bruker, Germany)

5. Laboratory methodology used for detection of antimicrobial resistance

Altogether, 173 indicator *E. coli* isolates were tested for antimicrobial susceptibility. Also, all isolates from the specific monitoring of ESBL/AmpC/carbapenemase producing *E. coli* were tested for antimicrobial susceptibility.

The susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested and the epidemiological cut-off values (ECOFFs) used are laid down in Decision 2013/652/EU. All *E. coli* isolates were tested with panel one according to Decision 2013/652/EU. If a MIC value to cefotaxime, ceftazidime or meropenem was above the ECOFF, the isolate was further tested with panel two.

6. Results of investigation

The antimicrobial resistance levels in indicator *E. coli* in broilers were mainly low or very low. The most common resistance traits were seen against ampicillin (13%), sulfamethoxazole (6%), tetracycline (6%), ciprofloxacin (6%), nalidixic acid (6%) and trimethoprim (5%). Resistance to the other monitored antimicrobials was between 0-1%. The resistance levels have been quite stable during the last decade with some variation in different years (2008, 2011, 2014, 2016 and 2018). However, resistance to ampicillin has increased between 2008 and 2018 from 4% to 13%. Also, ciprofloxacin resistance has slightly increased from 2% in 2008 to 6% in 2018.

In the specific monitoring, ESBL/AmpC-producing *E. coli* were found in 13% of the samples (1.7% ESBL and 11.4% presumptive AmpC *E. coli*) which is in the same level as in 2016 (14%). As in 2016, presumptive AmpC phenotype was more common than ESBL phenotype in the specific monitoring.

25. General Description of Antimicrobial Resistance Monitoring; Escherichia coli – non-pathogenic - Meat from broilers – fresh - chilled

1. General description of sampling design and strategy

Altogether, 300 samples of packed fresh and chilled (not frozen) meat were collected at retail between January and December to represent the broiler meat on market in Finland. Sampling was evenly distributed throughout the year and allocated according to meat batches. The broiler meat samples with skin could be sliced or diced and wrapped in vacuum or in a controlled atmosphere. The samples were of domestic origin. The samples were transported refrigerated to the laboratory within 1 day. The temperature of the meat was measured at the laboratory at arrival. From the biggest NUTS-3 area, samples were also collected on Fridays and transported to the laboratory during the same day. One isolate from each epidemiological unit (if available) was selected for susceptibility testing.

2. Stratification procedure per animal population and food category

Samples were collected from retail shops in six different NUTS-3 areas, covering approximately 55% of the Finnish population. Because of the nature of the Finnish market (small size, only a few distributors) same batches of the product can be found throughout the country.

3. Randomisation procedure per animal population and food category
Samples were randomly selected at retail shops.
4. Analytical method used for detection and confirmation
For screening of ESBL/AmpC and carbapenemase producing *E. coli*, the latest EURL protocol was used. For specific screening of carbapenemase producing *E. coli*, CARBA and OXA-48 plates (Biomerieux) were used. Presumptive *E. coli* colonies from the selective plates were confirmed with MALDI-TOF (Bruker, Germany).
5. Laboratory methodology used for detection of antimicrobial resistance
The susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested and the epidemiological cut-off values (ECOFFs) used are laid down in Decision 2013/652/EU.
6. Results of investigation
ESBL or AmpC-producing *E. coli* were detected in 15% of the samples (3% ESBL and 12% presumptive AmpC *E. coli*) which is slightly lower than in 2016 (22%). As in 2016, presumptive AmpC phenotype was more common than ESBL phenotype in the specific monitoring.