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 2017

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 2017.

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)**	**herd/flock**
Cattle (bovine animals)	Cattle (bovine animals)	11,528	894,475	272,621	
	Cattle (bovine animals) - calves (under 1 year) - veal calves	10,820	306,998		
	Cattle (bovine animals) - dairy cows and heifers	7,752	284,563		
	Cattle (bovine animals) - meat production animals	3,702	298,854		
	Cattle (bovine animals) - mixed herds	2,126	38,437		
Deer	Deer - farmed	23	302	19	
	Deer - wild			70	
Ducks	Ducks	966	3,422	14,167	
Gallus gallus (fowl)	Gallus gallus (fowl)	1,392	10,996,803	79,671,579	5,215
	Gallus gallus (fowl) - breeding flocks, unspecified			330	
	Gallus gallus (fowl) - broilers	367	6,945,600	73,116,384	3,884
	Gallus gallus (fowl) - laying hens	1,025	4,051,203	3,443	1,114
Geese	Geese	310	502	3,711	
Goats	Goats	962	7,803	329	
Moose	Moose - wild			377	
Mouflons	Mouflons			5	
Pheasants	Pheasants	507	96,200		
Pigs	Pigs	1,223	1,120,168	1,964,669	
	Pigs - breeding animals	799	199,520	35,001	
	Pigs - fattening pigs	1,120	1,052,151	1,929,668	
Reindeers	Reindeers	4,430	193,142	60,988	
Sheep	Sheep	3,936	144,206	57,600	
Solipeds, domestic	Solipeds, domestic - horses	16,000	74,200	1,252	
Turkeys	Turkeys	698	32,159	882,887	700
Wild boars	Wild boars - farmed	152	550	339	

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	Number of isolations of Brucella infections	Number of abortions due to Brucella abortus	Number of animals tested by microbiology under investigations of suspect cases
FINLAND	96	0	0	0	11,528	0	894,475	0	0	11,528	91	205	0	0	109

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

Region	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	0	0	0	4,898	0	152,009	87	3,856	4,898	17

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	11,543	0	894,736	0	0	0	5	0	11,543

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	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Dogs - pet animals - Unspecified - Unknown - animal sample - blood - Clinical investigations - Official sampling - Suspect sampling	Not Available	animal	2	0	Brucella	0
	Dogs - pet animals - Unspecified - Unknown - animal sample - blood - Unspecified - Official sampling - Not specified	Not Available	animal	5	1	Brucella canis	1
	Dogs - pet animals - Unspecified - Unknown - animal sample - Clinical investigations - Official sampling - Suspect sampling	Microbiological tests	animal	17	0	Brucella	0
	Moose - wild - Unspecified - Not Available - animal sample - blood - Monitoring - Official sampling - Selective sampling	Not Available	animal	1	0	Brucella	0
	Pigs - Unspecified - Not Available - animal sample - blood - Surveillance - Official sampling - Selective sampling	Not Available	animal	1731	0	Brucella	0
	Pigs - Unspecified - Not Available - animal sample - Clinical investigations - Official sampling - Suspect sampling	Microbiological tests	animal	21	0	Brucella	0
	Reindeers - Unspecified - Not Available - animal sample - blood - Monitoring - Official sampling - Selective sampling	Not Available	animal	50	0	Brucella	0
	Seals - wild - Unspecified - Not Available - animal sample - Clinical investigations - Official sampling - Suspect sampling	Not Available	animal	7	1	Brucella	1
	Wild boars - farmed - Unspecified - Not Available - animal sample - blood - Surveillance - Official sampling - Selective sampling	Not Available	animal	43	0	Brucella	0
	Zoo animals, all - Unspecified - Not Available - animal sample - blood - Monitoring - Official sampling - Selective sampling	Not Available	animal	3	0	Brucella	0

Table Campylobacter:CAMPYLOBACTER in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	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	Not Available	slaughter animal batch	1630	29	Campylobacter jejuni	29
	Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Objective sampling	Not Available	slaughter animal batch	338	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	Method	Total units tested	Total units positive	N of clinical affected herds	Zoonoses		N of units positive
Not Available	Cattle (bovine animals) - Artificial insemination station - Not Available - Not Available - Monitoring - Official sampling - Objective sampling	animal	Not Available	6	0			Coxiella	0
	Cattle (bovine animals) - Farm - Not Available - Not Available - Clinical investigations - Private sampling - Suspect sampling	animal	Not Available	85	0			Coxiella	0

Table Echinococcus:ECHINOCOCCUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	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	Not Available	animal	272671	0	Echinococcus	0
	Deer - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	19	0	Echinococcus	0
	Deer - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	621	0	Echinococcus	0
	Dogs - Unspecified - Finland - animal sample - faeces - Unspecified - Not applicable - Suspect sampling	Not Available	animal	2	0	Echinococcus	0
	Foxes - wild - Natural habitat - Finland - animal sample - faeces - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	217	0	Echinococcus multilocularis	0
	Goats - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	329	0	Echinococcus	0
	Moose - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	377	2	Echinococcus granulosus	2
	Moose - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	Not Available	animal	20	0	Echinococcus	0
	Mouflons - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	6	0	Echinococcus	0
	Pigs - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	1964669	0	Echinococcus	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - faeces - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	339	0	Echinococcus multilocularis	0
	Reindeers - semi-domesticated - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	Not Available	animal	35	1	Echinococcus granulosus	1
	Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	60988	6	Echinococcus granulosus	6
	Sheep - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	57600	0	Echinococcus	0
	Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	1252	0	Echinococcus	0
	Voles - wild - Natural habitat - Finland - animal sample - Survey - Official sampling - Objective sampling	Not Available	animal	371	0	Echinococcus	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	339	0	Echinococcus	0
	Wild boars - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	26	0	Echinococcus	0
	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	57	10	Echinococcus granulosus	10
Etelä-Pohjanmaa	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	1	0	Echinococcus granulosus	0
Pohjanmaa	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	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	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	Real-Time PCR (qualitative or quantitative)	animal	1	0	Echinococcus granulosus	0
Varsinais-Suomi (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	5	0	Echinococcus granulosus	0
Kanta-Häme (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	2	0	Echinococcus granulosus	0
Etelä-Karjala (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	3	0	Echinococcus granulosus	0
Pohjois- ja Itä-Suomi	Reindeers - semi-domesticated - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	Not Available	animal	35	1	Echinococcus granulosus	1
	Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	60988	6	Echinococcus granulosus	6
Pohjois-Savo (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	7	0	Echinococcus granulosus	0
Pohjois-Karjala (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	14	4	Echinococcus granulosus	4
Kainuu (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	12	5	Echinococcus granulosus	5

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Pohjois-Pohjanmaa (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	8	1	Echinococcus granulosus	1
Lappi (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	Real-Time PCR (qualitative or quantitative)	animal	2	0	Echinococcus granulosus	0

Table Escherichia coli:ESCHERICHIA COLI in animal

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	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	OIE method for E.coli O157 in animal faecal samples	2	2	VTEC O157	Not Available	VT2, gene identified, subtype unspecified ;VT1, gene identified, subtype unspecified	eae positive	2
	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		Not Available	Unspecified	2	2	VTEC O103	Not Available	VT1, gene identified, subtype unspecified	eae positive	1
								VTEC O26	Not Available	VT1, gene identified, subtype unspecified	eae positive	1
	Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Objective sampling	animal	10	Gram	OIE method for E.coli O157 in animal faecal samples	625	9	VTEC O157	Not Available	VT2, gene identified, subtype unspecified ;VT1, gene identified, subtype unspecified	eae positive	9

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Method	total units tested	total units positive	Zoonoses	ANTH	VTX	AG	N units positive
Not Available	Vegetables - leaves - Retail - Denmark - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	1	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Vegetables - leaves - Retail - European Union - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	1	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Vegetables - leaves - Retail - Finland - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	45	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Vegetables - leaves - Retail - France - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	3	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Vegetables - leaves - Retail - Guatemala - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	1	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Vegetables - leaves - Retail - Italy - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	14	1	VTEC other than O157 O26 O103 O111 O145	Not Available	VT2, gene identified, subtype unspecified	eae negative	1
	Vegetables - leaves - Retail - Netherlands - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	4	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Vegetables - leaves - Retail - Spain - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	2	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Vegetables - leaves - Retail - Sweden - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	13	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Vegetables - leaves - Retail - Unknown - Not Available - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	19	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0

Table Lyssavirus:LYSSAVIRUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Badgers - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Not specified	Not Available	animal	13	0	Lyssavirus	0
	Bears - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	6	0	Lyssavirus	0
	Cats - pet animals - Unspecified - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	Not Available	animal	8	0	Lyssavirus	0
	Dogs - pet animals - Unspecified - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	Not Available	animal	25	0	Lyssavirus	0
	Foxes - wild - Natural habitat - Finland - animal sample - brain - Monitoring - Official sampling - Not specified	Not Available	animal	77	0	Lyssavirus	0
	Foxes - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	6	0	Lyssavirus	0
	Lynx - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Not specified	Not Available	animal	1	0	Lyssavirus	0
	Lynx - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	29	0	Lyssavirus	0
	Marten - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Not specified	Not Available	animal	9	0	Lyssavirus	0
	Minks - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Not specified	Not Available	animal	1	0	Lyssavirus	0
	Minks - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	1	0	Lyssavirus	0
	Otter - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Not specified	Not Available	animal	12	0	Lyssavirus	0
	Otter - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	26	0	Lyssavirus	0
	Polecats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Not specified	Not Available	animal	1	0	Lyssavirus	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - brain - Monitoring - Official sampling - Not specified	Not Available	animal	251	0	Lyssavirus	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	9	0	Lyssavirus	0
	Solipeds, domestic - horses - Farm - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	Not Available	animal	1	0	Lyssavirus	0
	Wolverine - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	2	0	Lyssavirus	0
	Wolves - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Not specified	Not Available	animal	5	0	Lyssavirus	0
	Wolves - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	11	0	Lyssavirus	0
FINLAND	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	78	1	Kotalahti bat Lyssavirus (KBLV)	1
Keski-Suomi	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	1	0	Lyssavirus	0
Etelä-Pohjanmaa	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	3	0	Lyssavirus	0
Satakunta	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	4	0	Lyssavirus	0
Pirkanmaa	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	3	0	Lyssavirus	0
Helsinki-Uusimaa (NUTS level 3)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	11	0	Lyssavirus	0
Varsinais-Suomi (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	5	0	Lyssavirus	0
Kanta-Häme (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	2	0	Lyssavirus	0
Päijät-Häme (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	2	0	Lyssavirus	0
Kymenlaakso (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	2	0	Lyssavirus	0
Etelä-Karjala (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	2	0	Lyssavirus	0
Etelä-Savo (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	16	0	Lyssavirus	0
Pohjois-Savo (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	13	1	Kotalahti bat Lyssavirus (KBLV)	1
Pohjois-Karjala (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	5	0	Lyssavirus	0
Kainuu (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	2	0	Lyssavirus	0
Pohjois-Pohjanmaa (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	Not Available	animal	7	0	Lyssavirus	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	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	Not Available	93	0	Salmonella	0
	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		N_A	Not Available	47	2	Salmonella Coeln	1
								Salmonella Hessarek	1
	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Industry sampling - Not specified	herd/flock		N_A	Not Available	3161	4	Salmonella Coeln	1
								Salmonella Konstanz	1
								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	Not Available	3202	2	Salmonella Typhimurium DT 41	2
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	3352	N	Not Available	3352	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	3884	Y	Not Available	3884	3	Salmonella Livingstone	3
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock	532	N	Not Available	532	3	Salmonella Livingstone	3
	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	2	Y	Not Available	2	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	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	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	688	Y	Not Available	688	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	Not Available	177	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	Not Available	200	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	Not Available	175	2	Salmonella Typhimurium RDNC	1
								Salmonella Typhimurium U 277	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	72	Y	Not Available	72	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	Not Available	27	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period - Farm - European Union - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	Not Available	27	1	Salmonella Typhimurium DT 193	1
	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	37	Y	Not Available	37	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	Not Available	17	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	Not Available	33	0	Salmonella	0
	Pigs - breeding animals - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	Not Available	39	1	Salmonella Typhimurium RDNC	1
	Pigs - breeding animals - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	Not Available	3210	2	Salmonella Derby	2
	Pigs - breeding animals - unspecified - boars - Farm - European Union - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	animal		N_A	Not Available	131	2	Salmonella Typhimurium DT 120	2
	Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	Not Available	3209	0	Salmonella	0
	Pigs - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		N_A	Not Available	69	8	Salmonella Derby	7
								Salmonella Typhimurium RDNC	1
	Pigs - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Industry sampling - Not specified	herd/flock		N_A	Not Available	290	1	Salmonella Mbandaka	1
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	Not Available	262	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	311	Y	Not Available	311	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N_A	Not Available	49	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N	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	7	Y	Not Available	7	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	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	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	Not Available	4	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	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	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	Not Available	3174	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	Not Available	1669	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	Not Available	248	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	Not Available	28	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	Not Available	74	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	Not Available	171	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	Not Available	6403	0	Salmonella	0
	Meat from pig - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	Not Available	1192	0	Salmonella	0
	Meat from spent hens (Gallus gallus) - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	Not Available	6	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	Not Available	69	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	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	Not Available	23	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	Not Available	13	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	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	Not Available	3	0	Salmonella	0
	Compound feedingstuffs for cattle - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	84	0	Salmonella	0
	Compound feedingstuffs for cattle - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	9	0	Salmonella	0
	Compound feedingstuffs for fish - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	2	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	Not Available	3	0	Salmonella	0
	Compound feedingstuffs for horses - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Compound feedingstuffs for horses - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	6	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	49	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	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	Not Available	49	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	Not Available	4	0	Salmonella	0
	Compound feedingstuffs for reindeers - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	2	0	Salmonella	0
	Compound feedingstuffs, not specified - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	14	0	Salmonella	0
	Feed material of cereal grain origin - barley derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	2	0	Salmonella	0
	Feed material of cereal grain origin - barley derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	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	Not Available	3	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Feed material of cereal grain origin - oat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	2	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	Not Available	8	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	Not Available	7	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	2	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	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	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	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Feed material of cereal grain origin - wheat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	5	0	Salmonella	0
	Feed material of cereal grain origin - wheat derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Feed material of land animal origin - dairy products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	2	0	Salmonella	0
	Feed material of land animal origin - meat and bone meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	2	0	Salmonella	0
	Feed material of land animal origin - offal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	8	0	Salmonella	0
	Feed material of land animal origin - offal - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Feed material of marine animal origin - fish meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Feed material of marine animal origin - other fish products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Feed material of marine animal origin - other fish products - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	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	Not Available	3	0	Salmonella	0
	Feed material of oil seed or fruit origin - linseed derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - other - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - European Union - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	11	1	Salmonella Gatineau	1
	Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - Non European Union - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	35	4	Salmonella Tennessee	4
	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	Not Available	16	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Border inspection activities - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	31	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	Not Available	23	1	Salmonella Havana	1
	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	Not Available	5	0	Salmonella	0
	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	Not Available	25	0	Salmonella	0
	Other feed material - forages and roughages - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	3	0	Salmonella	0
	Other feed material - miscellaneous - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	2	0	Salmonella	0
	Other feed material - other plants - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Other feed material - other seeds and fruits - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	1	0	Salmonella	0
	Other feed material - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	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	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Other feed material - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	33	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	Not Available	5	0	Salmonella	0
	Other feed material - yeast - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	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	Not Available	39	0	Salmonella	0
	Pet food - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	106	2	Salmonella Enteritidis	1
								Salmonella Indiana	1
								Salmonella Kottbus	1
	Premixtures - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	Not Available	10	0	Salmonella	0

Table Staphylococcus:STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) in animal

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Method	Total Units Tested Attribute	Total Units Positive Attribute	Zoonoses	CC	Spa type	ML	Units positive
Not Available	Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - nasal swab - Survey - national survey - Official sampling - Objective sampling	slaughter animal batch		Not Available	Not Available	61	47	Methicillin resistant Staphylococcus aureus (MRSA)		11		9
										34		32
										108		6
										1250		1
										1255		1
										2741		25
										17061		1

Table Staphylococcus:STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) in food

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Method	Total Units Tested Attribute	Total Units Positive Attribute	Zoonoses	CC	Spa type	ML	Units positive
Not Available	Meat from pig - fresh - chilled - Retail - Denmark - food sample - meat - Survey - national survey - Official sampling - Objective sampling	batch (food/feed)	25	Gram	Not Available	14	1	Methicillin resistant Staphylococcus aureus (MRSA)		34		1
	Meat from pig - fresh - chilled - Retail - Finland - food sample - meat - Survey - national survey - Official sampling - Objective sampling	batch (food/feed)	25	Gram	Not Available	202	12	Methicillin resistant Staphylococcus aureus (MRSA)		11		1
										34		10
										2741		1
	Meat from pig - fresh - chilled - Retail - Germany - food sample - meat - Survey - national survey - Official sampling - Objective sampling	batch (food/feed)	25	Gram	Not Available	4	0	Methicillin resistant Staphylococcus aureus (MRSA)				0

Table Toxoplasma:TOXOPLASMA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	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	Histology	animal	267	1	Toxoplasma gondii	1
	Dogs - Unspecified - Finland - animal sample - Clinical investigations - Official sampling - Convenient sampling	Histology	animal	726	1	Toxoplasma gondii	1
	Hares - wild - Natural habitat - Finland - animal sample - Monitoring - passive - Official sampling - Convenient sampling	Histology	animal	95	5	Toxoplasma gondii	5
	Sheep - Farm - Finland - animal sample - Clinical investigations - Official sampling - Convenient sampling	Histology	animal	148	0	Toxoplasma	0

Table Trichinella:TRICHINELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	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	Not Available	animal	16	5	Trichinella, unspecified sp.	5
	Bears - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	Not Available	animal	178	7	Trichinella nativa	7
	Bears - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	20	1	Trichinella nativa	1
	Bears - wild - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	49	2	Trichinella nativa	2
	Beavers - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	2	0	Trichinella	0
	Dogs - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	1	0	Trichinella	0
	Eagle - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	23	0	Trichinella	0
	Falcons - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	27	2	Trichinella pseudospiralis	1
						Trichinella, unspecified sp.	1
	Foxes - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	110	49	Trichinella, unspecified sp.	49
	Lynx - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	39	12	Trichinella, unspecified sp.	12
	Marten - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	8	2	Trichinella, unspecified sp.	2
	Minks - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	7	0	Trichinella	0
	Otter - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	51	4	Trichinella, unspecified sp.	4
	Owls - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	16	0	Trichinella	0
	Pigs - breeding animals - not raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	34931	0	Trichinella	0
	Pigs - breeding animals - raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	9	0	Trichinella	0
	Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	1928570	0	Trichinella	0
	Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	482	0	Trichinella	0
	Polecats - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	2	0	Trichinella	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	226	91	Trichinella, unspecified sp.	91
	Seals - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	2	0	Trichinella	0
	Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	1252	0	Trichinella	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	339	2	Trichinella spiralis	2
	Wild boars - farmed - Unspecified - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	Not Available	animal	22	2	Trichinella pseudospiralis	2
	Wild boars - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	Not Available	animal	691	3	Trichinella britovi	1
						Trichinella nativa	1
						Trichinella, unspecified sp.	1
	Wild boars - wild - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	Not Available	animal	26	1	Trichinella nativa	1
	Wolverine - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	2	0	Trichinella	0
	Wolves - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	Not Available	animal	57	30	Trichinella, unspecified sp.	30

Table Yersinia:YERSINIA in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Vegetables - leaves - Retail - Denmark - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	1	0	Yersinia	0
	Vegetables - leaves - Retail - European Union - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	1	0	Yersinia	0
	Vegetables - leaves - Retail - Finland - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	45	2	Yersinia enterocolitica	2
	Vegetables - leaves - Retail - France - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	3	0	Yersinia	0
	Vegetables - leaves - Retail - Guatemala - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	1	0	Yersinia	0
	Vegetables - leaves - Retail - Italy - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	14	1	Yersinia enterocolitica	1
	Vegetables - leaves - Retail - Netherlands - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	4	0	Yersinia	0
	Vegetables - leaves - Retail - Spain - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	2	0	Yersinia	0
	Vegetables - leaves - Retail - Sweden - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	13	0	Yersinia	0
	Vegetables - leaves - Retail - Unknown - food sample - Survey - national survey - Official sampling - Not specified	batch (food/feed)	25	Gram	Real-time PCR (CEN TC275/WG6)	19	1	Yersinia enterocolitica	1

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

		Outbreak strenght	Strong			Weak			
Causative agent	**Food vehicle**	**N outbreaks**	**N human cases**	**N hospitalized**	**N deaths**	**N outbreaks**	**N human cases**	**N hospitalized**	**N deaths**
Campylobacter jejuni	Other, mixed or unspecified poultry meat and products thereof	1	2	0	0				
Campylobacter, unspecified sp.	Broiler meat (Gallus gallus) and products thereof	1	9	2	0	1	2	2	0
Clostridium perfringens	Mixed food					2	12	0	0
	Buffet meals	1	7	1	0				
Norovirus	Crustaceans, shellfish, molluscs and products thereof					1	7	0	0
	Fruit, berries and juices and other products thereof	1	49	0	0	1	83	7	2
	Tap water, including well water	1	58	0	0				
	Bakery products	1	12	0	0				
	Mixed food	1	50	0	0	4	72	0	0
	Buffet meals					1	22	1	0
Salmonella Bareilly	Herbs and spices	1	23	2	0				
Salmonella Enteritidis	Vegetables and juices and other products thereof	1	32	6	0				
Unknown	Vegetables and juices and other products thereof	1	10	0	0				
	Cereal products including rice and seeds/pulses (nuts, almonds)					1	3	0	0
	Mixed food	1	9	0	0	4	26	0	0
	Buffet meals					8	42	1	0
	Unknown					4	27	0	0
VTEC O157	Bovine meat and products thereof	1	3	2	0				

Strong Foodborne Outbreaks: detailed data

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Campylobacter jejuni	Not Available	695	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	Multiple places of exposure in one country	Others	France	Unprocessed contaminated ingredient;Inadequate heat treatment;Cross-contamination	N_A	1	2	0	0
Campylobacter, unspecified sp.	Not Available	703	General	Broiler meat (Gallus gallus) and products thereof	Chicken fillet	Descriptive environmental evidence;Descriptive epidemiological evidence	Others	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Lithuania	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	9	2	0
Clostridium perfringens	Not Available	702	General	Buffet meals	N_A	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	Storage time/temperature abuse;Other contributory factor;Inadequate heat treatment;Inadequate chilling;Cross-contamination	N_A	1	7	1	0
Norovirus	Not Available	628	General	Mixed food	Ceese-cucumber rolls	Descriptive environmental evidence;Descriptive epidemiological evidence;Analytical epidemiological evidence	School or kindergarten	School or kindergarten	Unknown	Infected food handler	N_A	1	50	0	0
		658	General	Bakery products	Sandwich cake	Descriptive environmental evidence;Descriptive epidemiological evidence	Household	Household	Finland	Infected food handler	N_A	1	12	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	660	General	Fruit, berries and juices and other products thereof	Fresh strawberries	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence;Analytical epidemiological evidence	Multiple places of exposure in one country	Farm	Morocco	Unprocessed contaminated ingredient	N_A	1	49	0	0
		667	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 source	Unknown	Water treatment failure	N_A	1	58	0	0
Salmonella Bareilly	Not Available	738	General	Herbs and spices	Spices	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 one country	Unknown	Unknown	Unprocessed contaminated ingredient	N_A	1	23	2	0
Salmonella Enteritidis	Not Available	756	General	Vegetables and juices and other products thereof	Mung beans (sprouted)	Product-tracing investigations;Descriptive epidemiological evidence;Analytical epidemiological evidence	Multiple places of exposure in one country	Farm	China	Unprocessed contaminated ingredient	N_A	1	32	6	0
Unknown	Not Available	689	General	Vegetables and juices and other products thereof	Raw grated beetroot	Descriptive environmental evidence;Descriptive epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Unknown	Unprocessed contaminated ingredient;Inadequate heat treatment	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	706	General	Mixed food	Lamb dish	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	Storage time/temperature abuse;Inadequate heat treatment;Inadequate chilling	N_A	1	9	0	0
VTEC O157	Not Available	650	General	Bovine meat and products thereof	Home made ground beef steak	Product-tracing investigations;Descriptive environmental evidence;Descriptive epidemiological evidence	Household	Household	Finland	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	3	2	0

Weak Foodborne Outbreaks: detailed data

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Campylobacter, unspecified sp.	Not Available	684	General	Broiler meat (Gallus gallus) and products thereof	Chicken leg	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	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	2	2	0
Clostridium perfringens	Not Available	729	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Camp or picnic	Camp or picnic	Unknown	Storage time/temperature abuse	N_A	1	5	0	0
	Staphylococcal enterotoxins	669	General	Mixed food	Moussaka	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	7	0	0
Norovirus	Not Available	644	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	23	0	0
		645	General	Crustaceans, shellfish, molluscs and products thereof	Oysters	Descriptive environmental evidence;Descriptive epidemiological evidence	School or kindergarten	Farm	France	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	7	0	0
		652	General	Mixed food	N_A	Descriptive epidemiological evidence	Unknown	Unknown	Unknown	Unknown	N_A	1	8	0	0
		687	General	Buffet meals	N_A	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	22	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	693	General	Fruit, berries and juices and other products thereof	Frozen strawberries	Descriptive environmental evidence;Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school)	Farm	Finland	Unprocessed contaminated ingredient	N_A	1	83	7	2
		696	General	Mixed food	N_A	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	12	0	0
		710	General	Mixed food	N_A	Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school)	Residential institution (nursing home or prison or boarding school)	Unknown	Infected food handler	N_A	1	29	0	0
Unknown	Not Available	617	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
		624	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
		642	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	6	0	0
		643	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	Inadequate chilling	N_A	1	4	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	646	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	3	0	0
		663	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	3	0	0
		664	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	4	0	0
		676	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	6	0	0
		677	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 heat treatment;Inadequate chilling	N_A	1	11	0	0
		690	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
		692	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	N_A	1	4	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	694	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	6	1	0
		705	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
		709	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	5	0	0
		716	General	Cereal products including rice and seeds/pulses (nuts, almonds)	Boiled rice	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	Pakistan	Storage time/temperature abuse	N_A	1	3	0	0
		717	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	Inadequate heat treatment	N_A	1	7	0	0
		732	General	Unknown	N_A	Descriptive epidemiological evidence	Household	Unknown	Unknown	Unknown	N_A	1	8	0	0

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

Table Antimicrobial susceptibility testing of Campylobacter coli in Pigs - fattening pigs

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

	AM substance	Ciprofloxacin	Erythromycin	Gentamicin	Nalidixic acid	Streptomycin	Tetracycline
	ECOFF	**0.5**	**8**	**2**	**16**	**4**	**2**
	Lowest limit	**0.12**	**1**	**0.12**	**1**	**0.25**	**0.5**
	Highest limit	**16**	**128**	**16**	**64**	**32**	**64**
	N of tested isolates	**196**	**196**	**196**	**196**	**196**	**196**
MIC	**N of resistant isolates**	**33**	**3**	**0**	**34**	**22**	**0**
<=0.12		132		3			
0.25		31		11			
<=0.5							194
0.5				89		2	
<=1			164				
1				93		6	2
2		1	24			54	
4		5	5		59	112	
8		15			92	1	
16		10			11		
>16		2					
32					1		
>32						21	
64					1		
>64					32		
>128			3				

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: Objective sampling | Programme Code: AMR MON

Analytical Method:

Country of Origin: Finland

	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	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.12		1		1			
<=0.5							1
0.5						1	
<=1			1				
2					1		

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

	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	**29**	**29**	**29**	**29**	**29**	**29**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.12		28		2			
0.25		1		17			
<=0.5							29
0.5				9		5	
<=1			29		1		
1				1		21	
2					1	3	
4					20		
8					7		

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella Coeln 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

	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						1			

Table Antimicrobial susceptibility testing of Salmonella Coeln 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

	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						
<=1		1						1							
1														1	
<=2													1		
<=4											1				
<=8						1						1			
8			1												

Table Antimicrobial susceptibility testing of Salmonella Derby 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

	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										2					
<=0.25				2										2	2
<=0.5					2				2						
<=1		2						2							
<=2													2		
<=4											2				
4			2												
<=8						2									
16												1			
32												1			

Table Antimicrobial susceptibility testing of Salmonella Derby 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

	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	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							7								
<=0.03										7					
<=0.25				7										6	7
<=0.5					7				6						
0.5														1	
<=1		7						6							
1									1						
<=2													7		
2								1							
<=4											7				
4			4												
<=8						7									
8			3												
16												6			
32												1			

Table Antimicrobial susceptibility testing of Salmonella Hessarek 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

	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											
<=0.5					1										
0.5														1	1
1									1						
<=2													1		
2								1							
4		1													
<=8						1									
8			1								1				
16												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

	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				
<=8						1									
16			1												
32												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Finland

	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**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										3					
0.03							3								
<=0.25				3										3	3
<=0.5					3				3						
<=1		3						3							
<=2													3		
<=4											3				
<=8						3									
8			3												
16												3			

Table Antimicrobial susceptibility testing of Salmonella Mbandaka in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: environmental sample

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

	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												
16						1						1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 120 in Pigs - breeding animals - unspecified - boars

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: Denmark

	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**	**2**	**0**	**0**	**0**
<=0.015							1								
<=0.03										2					
0.03							1								
<=0.25				2											2
<=0.5					2				2						
0.5														2	
<=1		2						2							
<=2													2		
<=4											2				
<=8						2									
8			2												
>1024												2			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 193 in Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Sweden

	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						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

	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										2					
<=0.25				2										2	2
<=0.5					2				2						
<=1		2						2							
<=2													2		
<=4											2				
4			2												
<=8						2									
16												1			
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium RDNC 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

	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												
16												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium 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

	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
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

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

	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									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

	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										1					
0.03							2								
0.064										1					
<=0.25				2										2	1
<=0.5					2				2						
<=1		1						1							
1															1
<=2													2		
2		1						1							
<=4											2				
4			2												
<=8						2									
32												2			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium U 277 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

	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	
<=0.5					1				1						
0.5															1
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
32												1			

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Vegetables - leaves

Sampling Stage: Retail

Sampling Type: food sample

Sampling Context: Survey - national survey

Sampler: Official sampling

Sampling Strategy: Not specified

Programme Code: OTHER ESBL MON pnl2

Analytical Method:

Country of Origin: Italy

	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	**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		
4				1							
8			1				1				1
32						1					
64					1						

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Vegetables - leaves

Sampling Stage: Retail

Sampling Type: food sample

Sampling Context: Survey - national survey

Sampler: Official sampling

Sampling Strategy: Not specified

Programme Code: OTHER ESBL MON

Analytical Method:

Country of Origin: Italy

	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	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25														1	
<=0.5									1						
0.5															1
<=1								1							
<=2													1		
<=4											1				
>4				1											
<=8						1						1			
8			1												
>8					1										
>64		1													

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

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

	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	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**
MIC	**N of resistant isolates**	**15**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**21**	**32**	**0**	**20**
<=0.015							166								
<=0.03										175					
0.03							8								
0.064							1								
<=0.25				175										159	102
<=0.5					175				128						
0.5														16	52
<=1	3							174							
1									42						1
<=2		19											143		
2	73							1	5						
<=4											173				
4	79	94													
<=8						167						76			
8	5	62									1				
16						7						66			
32											1	12	1		
>32															20
64						1							6		
>64	15												25		
>1024												21			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

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

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	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
MIC **N of resistant isolates**	**3**	**8**	**7**	**7**	**8**	**7**	**0**	**0**	**0**	**0**
<=0.015							4			
<=0.03									8	
0.03							3			
<=0.064			1							
0.064							1			
<=0.12						1		3		
0.12	5									
0.25	2							4		
0.5								1		
1			2		1					
2		2	3			1				1
4		3	1		1	4				
8		1		1	3	1				4
16	1	1	1		2	1				3
32				3	1					
64				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	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
MIC	**N of resistant isolates**	**3**	**8**	**7**	**7**	**8**	**7**	**0**	**0**	**0**	**0**
>64			1		2						

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

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

	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	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
MIC	**N of resistant isolates**	**8**	**0**	**8**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**6**	**0**	**4**
<=0.015							7								
<=0.03										8					
0.03							1								
<=0.25														8	3
<=0.5									7						
0.5															1
<=1								8							
1					1				1						
<=2													2		
2				3											
<=4											8				
4			3	2	2										
>4				3											
<=8						8						2			
8			4		3										
>8					2										
16			1										1		
>32															4
64													1		
>64		8											4		
>1024												6			

OTHER ANTIMICROBIAL RESISTANCE TABLES

Table Antimicrobial susceptibility testing of Methicillin resistant Staphylococcus aureus (MRSA) in Meat from pig - fresh - chilled

Sampling Stage: Retail | Sampling Type: food sample - meat | Sampling Context: Survey - national survey

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

Analytical Method:

Country Of Origin:Denmark

Spa Type	Multilocus Seq	Clonal Complex	MIC	AM Substance	Cefoxitin	Chloramphenicol	Ciprofloxacin	Clindamycin	Erythromycin	Fusidic acid	Gentamicin	Kanamycin	Linezolid	Mupirocin	Penicillin	Quinupristin/Dalfopristin	Rifampicin	Streptomycin
				Performed CC MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
				Performed MLST MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
				ECOFF	4	16	1	0.25	1	0.5	2	8	4	1	0.12	1	0.03	16
				Lowest limit	0.5	4	0.25	0.12	0.25	0.5	1	4	1	0.5	0.12	0.5	0.016	4
				Highest limit	16	64	8	4	8	4	16	64	8	256	2	4	0.5	32
34			<=0.016														1	
			<=0.25				1											
			<=0.5							1				1				
			<=1								1		1					
			>2												1			
			<=4									1						
			>4					1								1		
			8			1												
			>8						1									
			16		1													
			>32															1

Table Antimicrobial susceptibility testing of Methicillin resistant Staphylococcus aureus (MRSA) in Meat from pig - fresh - chilled

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Survey - national survey

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country Of Origin:Finland

Spa Type	Multilocus Seq	Clonal Complex	MIC	AM Substance	Cefoxitin	Chloramphenicol	Ciprofloxacin	Clindamycin	Erythromycin	Fusidic acid	Gentamicin	Kanamycin	Linezolid	Mupirocin	Penicillin	Quinupristin/Dalfopristin	Rifampicin	Streptomycin
				Performed CC MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
				Performed MLST MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
				ECOFF	4	16	1	0.25	1	0.5	2	8	4	1	0.12	1	0.03	16
				Lowest limit	0.5	4	0.25	0.12	0.25	0.5	1	4	1	0.5	0.12	0.5	0.016	4
				Highest limit	16	64	8	4	8	4	16	64	8	256	2	4	0.5	32
11			<=0.016														1	
			<=0.25				1											
			<=0.5							1				1				
			0.5						1									
			<=1								1							
			2										1			1		
			>2												1			
			<=4									1						1
			4					1										
			8		1	1												
34			<=0.016														10	
			<=0.25				9											
			<=0.5							10				9				
			0.5				1		8									
			<=1								10							
			1											1				
			2										10			7		
			>2												10			
			<=4			1						10						4
			4					1								1		
			>4					9								2		
			8			8												3
			>8						2									
			16		8	1												
			>16		2													
			>32															3
2741			<=0.016														1	
			<=0.25				1											
			<=0.5							1				1				
			<=1								1							
			2										1					
			>2												1			
			<=4									1						1
			>4					1								1		
			8			1												
			>8						1									
			16		1													

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
CARBA MON	Meat from bovine animals - fresh - chilled	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Australia	N_A	2	0
										Brazil	N_A	2	0
										Denmark	N_A	2	0
										Finland	N_A	279	0
										Germany	N_A	5	0
										Netherlands	N_A	9	0
										Paraguay	N_A	1	0
										United Kingdom	N_A	1	0
										Uruguay	N_A	1	0
	Meat from pig - fresh - chilled	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Denmark	N_A	14	0
										Finland	N_A	287	0
	Pigs - fattening pigs	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring - EFSA specifications	Official sampling	animal sample - caecum	slaughter animal batch	Finland	N_A	299	0
ESBL MON	Meat from bovine animals - fresh - chilled	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Australia	N_A	2	0
										Brazil	N_A	2	0
										Denmark	N_A	2	0
										Finland	N_A	279	0
										Germany	N_A	5	0
										Netherlands	N_A	9	0
										Paraguay	N_A	1	0
										United Kingdom	N_A	1	0
										Uruguay	N_A	1	0
	Meat from pig - fresh - chilled	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Denmark	N_A	14	0
										Finland	N_A	287	0

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
OTHER CARBA MON	Vegetables - leaves	Escherichia coli, non-pathogenic, unspecified	Not specified	Retail	N_A	Survey - national survey	Official sampling	food sample	batch (food/feed)	Denmark	N_A	1	0
										European Union	N_A	1	0
										Finland	N_A	45	0
										France	N_A	3	0
										Guatemala	N_A	1	0
										Italy	N_A	14	0
										Netherlands	N_A	4	0
										Spain	N_A	2	0
										Sweden	N_A	13	0
										Unknown	N_A	19	0
OTHER ESBL MON	Vegetables - leaves	Escherichia coli, non-pathogenic, unspecified	Not specified	Retail	N_A	Survey - national survey	Official sampling	food sample	batch (food/feed)	Denmark	N_A	1	0
										European Union	N_A	1	0
										Finland	N_A	45	0
										France	N_A	3	0
										Guatemala	N_A	1	0
										Netherlands	N_A	4	0
										Spain	N_A	2	0
										Sweden	N_A	13	0
										Unknown	N_A	19	0

European Food Safety Authority

Latest Transmission set

Table Name	Last submitted dataset transmission date
Antimicrobial Resistance	25-Jul-2018
Esbl	25-Jul-2018
Animal Population	25-Jul-2018
Disease Status	25-Jul-2018
Food Borne Outbreaks	25-Jul-2018
Prevalence	21-Jan-2019

Table of contents

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 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

The operation of Evira is 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. Evira is a central competent authority for food and feed control as well as for animal health and welfare control. The duties of Evira also include surveillance activity, scientific research and risk assessment on food safety and animal diseases. Evira operates also as a national reference laboratory in its own field. Evira is 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.

2. Animal population

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

Data on holdings and live animals: Animal keeping and holding place register (pheasant, turkey, geese, mallard, ducks etc), Evira Animal register (sheep, goats, pigs), Evira Bovine register (bovine inc. Bison Bison), Evira Poultry register (Gallus gallus), Natural Resources Institute Finland: Structure of agricultural and horticultural enterprises. Horses: Suomen Hippos, the Finnish Trotting and Breeding Association. Reindeers: Statistics of the Reindeer Herders' Association. Farmed deer: Provincial veterinary offices. Data on slaughtered animals: Meat inspection statistics of Finnish Food Safety Authority Evira.

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

Fattening pigs contains all pigs except boars and sows. Bisons are included in the Bovine population.

Data on holdings and live animals: Final data, situation as of 1.12.2015 (pigs, sheep, goat, bovine). Data on reindeers: Final data, 2016/2017, reindeer herding year: 1 June-31 May.

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 now eight years later the number is 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 the northern Finland.

3. General evaluation: *Brucella*

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 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 hunted wild boars.

Brucellosis has no relevance to the public health in Finland. The situation remains favourable.

3. Additional information

Vaccination against brucellosis is prohibited in Finland.

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Surveillance is targeted on dairy herds with increasing numbers of abortions. All samples (tissue and/or blood) sent for investigations due to abortions are tested also for brucellosis.

All bulls intended 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 bulls are also tested annually at the semen collection centre thereafter. Tank milk samples of herds of origin sending bulls to the semen collection centre are tested annually.

Methods of sampling
The samples are taken from live animals at the quarantine accommodation of the semen collection centre or the semen collection centre (blood) or farm (blood or tank milk). In suspect cases, blood or aborted foetuses, placental tissue and vaginal mucus are collected from cows that have aborted.

Diagnostic methods used
For bacteriological investigation, tissue samples are cultured and the isolated stain is identified by PCR methods. For serological investigation, the rose Bengal test (RBT) of individual serum samples and the ELISA test of tank milk sample are used for the detection of antibodies. In case of a positive result in the rose Bengal test, confirmation of the result is performed by complement fixation test (CFT). In case

of a positive result in the ELISA test, a new tank milk sample is collected and tested by ELISA test. If the new tank milk sample is still positive by ELISA test, blood samples from 20 animals are tested by RBT test and the positive results obtained in RBT are confirmed by CFT test. If the CFT test is still positive, the tissue samples from seropositive animals are cultured and investigated by microbiological methods for the presence of Brucella bacteria.

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

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 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 of 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

No brucellosis cases were recorded in 2017. The situation remains favourable.

5. Description of Monitoring/Surveillance/Control programmes system: *Brucella* in sheep and goats

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
At least 5% of the sheep and goats over six months of age are randomly sampled and tested annually, for monitoring purposes.
Individual blood samples are taken by an official veterinarian.
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.

Methods of sampling
Samples (blood) are taken from live animals at the quarantine accommodation of the semen collection centre, at the semen collection centre, or at farm. In suspect cases blood or aborted foetuses, placental tissue and vaginal mucus are collected from the aborted animals.

Diagnostic methods used

For bacteriological investigation, tissue samples of aborted materials are cultured and the isolated stain is identified by PCR methods. For serological investigation, the rose Bengal test (RBT) of individual serum sample is used to detect antibodies. Positive RBT test result, is confirmed by CFT test.

Case definition
The animal is regarded seropositive when the confirmation by CTF is positive, and the animal is considered infected when Brucella bacteria is isolated from tissue (culture and confirmation by PCR methods).

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 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 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

No brucellosis cases were recorded in 2017. The situation remains favourable.

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Surveillance 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 a 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 the semen collection centre are tested annually. Blood samples are taken from farmed wild boars on voluntarily bases at the time of slaughter. All these samples are tested also for brucellosis.

Methods of sampling
Samples (blood) 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 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.

Diagnostic methods used
For bacteriological investigation, tissue samples of aborted materials are cultured, and isolated stain identified by PCR methods. For serological investigation, rose Bengal test 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.

Case definition
The animal is considered seropositive, if one of the confirmation tests is positive, and the animal is considered 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

No brucellosis cases were recorded in 2017. The situation remains favourable.

7. General evaluation: Mycobacterial diseases, 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.

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

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

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

8. 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 examination is performed on all slaughtered animals and samples are sent for examination if there is a suspicion of tuberculosis.

Clinical suspect cases are investigated by pathological 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 a semen collection centre. The bulls are tested annually at the semen collection centre thereafter.

Deer in the farms that are in the voluntary control program are tested regularly with intradermal comparative test. An official veterinarian is responsible for performing the tests.

Frequency of the sampling
AI-bulls: Continuous testing (annually) at the semen collection centre. 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.

Type of specimen taken
Lymph nodes or tuberculotic lesions.

Methods of sampling (description of sampling techniques)
Testing in live animals is done by intradermal tuberculin testing, in deer intradermal comparative test.

Bovine animals: In suspect cases, biopsy of a lymph node or a whole lymph node is taken from a living animal. One or more tuberculotic lesions are collected from a dead animal. These samples are divided

into two parts, one of which is sent without preservatives and the other part in 10 % buffered formalin solution.

Deer: 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.

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. Case 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.

Diagnostic/analytical methods used
Histology, Ziehl-Neelsen staining, cultivation.

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 will be 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

Yes, *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 cases of *M. bovis* (or *M. caprae* or *M. tuberculosis* complex) were detected in cattle or farmed deer in 2017.

272671 bovine animals were slaughtered and subject to a routine post mortem examination. Samples were collected from three suspicious animals during meat inspection and from two animals during autopsy and sent to the Finnish Food Safety Authority Evira for examination. All results were negative. A total of 267 intradermal tuberculin tests were performed on AI bulls.

No samples from farmed deer were sent to Finnish Food Safety Authority Evira for bacteriological examination.

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.

9. General evaluation: Campylobacteriosis

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

The annual number of human cases has shown a rising overall trend from 1995 to 2008. Since 2008 the annual number of reported human campylobacteriosis cases has varied between 3954 and 4935, and was 4289 in 2017. Since 1998 campylobacters have been 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 programme 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.

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. 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 a national campylobacter monitoring programme 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.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)
In late summer thermophilic campylobacters are detected in 20 to 30% of retail poultry meat of domestic origin. Poultry meat is considered as a source of campylobacters in a small proportion of the sporadic cases. 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 Finnish campylobacter programme for broilers was introduced in 2004. The program consist of compulsory monitoring of broiler slaughter batches, interventions at slaughter and voluntary measures at the holdings.

10. 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. From June to October, when the prevalence is known to be highest, all broiler slaughter batches are sampled at slaughter. 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.

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.

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
A case is defined as a slaughter batch, from which confirmed isolate of Campylobacter jejuni or C. coli is detected.

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 in holdings.

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

Measures in case of the positive findings or single cases
If campylobacters are detected in two consecutive growing batches from the same holding, all the 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 the production hygiene in 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 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 2017, a total of 1630 slaughter batches were sampled between June and October, thermophilic campylobacters (C. jejuni) were detected in 29 (1,8 %) of these slaughter batches. Between January-May and November-December, in total, 338 slaughter batches were sampled, thermophilic campylobacters (C. jejuni) were detected in 1 (0,3%) of these slaughter batches. These values were slightly lower than 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.

11. General evaluation: Q-fever (Coxiella)

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

In 2008 *Coxella burnetii* (Q -fever) antibodies were found for the first time in Finland. Antibodies were found on one farm in a bovine animal tested due to the export purpose. In further studies other seropositive animals were found on the farm and *C. burnetii*-DNA was detected in bulk milk sample. No clinical cases were detected on this farm. After that surveys have been conducted to study the prevalence of *C. burnetii* antibodies in dairy cattle (2010), as well as in the goat and sheep (2011) population. The prevalence of Q-fever antibodies in cattle population was 0,2%. In the goat and sheep population Q-fever antibodies were not detected. There has never been a reported suspicion of Q-fever in animals based on diseases symptoms.

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

According to the results of surveillance study in year 2010 and 2011, the prevalence of Q-fever is low. Annually about 100 samples are tested due to the abortions on farms as well as for export purpose.

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

In 2018, a project will be conducted on the prevalence of Q-fever antibodies in dairy cattle, sheep and goat population.

12. Description of Monitoring/Surveillance/Control programmes system: Q-fever (Coxiella) in animals

1. Monitoring/Surveillance/Control programmes system

There is no monitoring system.

2. Measures in place

No measures in place.

3. Notification system in place to the national competent authority

Yes, Q-fever is a notifiable disease.

13. General evaluation: Echinococcosis

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

Echinococcus granulosus was endemic in reindeer husbandry (reindeer - reindeer herding dog -cycle), but disappeared because of control action by authorities, and 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 involves reindeer, elk (moose) and wolves. Hitherto, no other definitive hosts have been identified.

Echinococcus multilocularis has never been diagnosed in Finland. Finland is regarded as officially free from. *E. multilocularis* according to regulation (EU) No 1152/2011 .

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. It can be assumed that if the wolf population in Finland grows and expands its distribution, the parasite will benefit. New intermediate hosts may be identified in new biotopes. 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 general 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. In any case, not much can be done to reduce the prevalence in wildlife. However, it is recommended to treat hunting dogs with anticestodal drugs both prior to and after hunting season. Moreover, it is recommended that cervid offals (especially lungs) are not given to dogs or that offals are only fed to dogs after thorough cooking.

14. 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 slaughtered. In post mortem inspection, lungs are palpated and incised to discover hydatid cysts. The cysts are sent to Evira for confirmation.

Evira performs surveillance of possible definitive wild hosts (foxes, wolves, raccoon dogs) as part of targeted and general wildlife disease surveillance. 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. Longest data sets cover more than 50 years. All animals are dissected, and their gross parasitological conditions 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 2017, 371 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*. Also common shrews *Sorex araneus* (whole Finland), masked shrews *S. caecutiens* (Northern Finland) and pygmy shrews *S. minutus* have been studied.

Frequency of the sampling
Continuous sampling.

Type of specimen taken
Definitive hosts: Faeces 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: lungs are inspected during meat inspection, 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. granulosus* G10 (*E. canadensis*) (wolf) egg DNA in faeces or sedimentation and counting method. Intermediate hosts: microscopy of cyst fluid, histology, PCR

2. Measures in place

Other preventive measures than vaccination in place
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.

The control program/strategies in place
Mandatory official meat inspection to ensure food safety. Survey of wild mammals for the surveillance of *E. multilocularis* and *E. canadensis*.

Measures in case of the positive findings or single cases
Organs with cystic echinococcosis are condemned in meat inspection.

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 2017, hydatid cysts of *Echinococcus granulosus* (*E. canadensis*) were found in seven reindeer and two moose. Ten wolves out of 57 examined were found positive for *Echinococcus granulosus* (*E. canadensis*). No echinococcus infections were found in 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. The geographical distribution in wolves has apparently not changed during the last decades. In 2017, two positive moose originated from an area situated west of the traditional distribution area. The wolf population has been expanding to the west during the recent decade and *E. canadensis* may eventually follow the host population to new areas.

15. 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% 11% and 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. In addition, a new control programme for bovine holdings delivering raw milk over 2500 kg/year directly to final consumers, started in 2014. Monitoring of STEC serotypes O26, O103, O104, O111, O145 and O157 in food started in 2011 in Finland. Before that, monitoring was mostly based on serotype O157 (excluding specific research projects where STEC group was monitored).

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. The increase was partly due to changes in the VTEC diagnostics and in particular the number of non-O157 serotypes increased partly due to the development of laboratory methods. Visiting farms and cattle contact are major risk factors for infection, especially of young children. Most human infections are sporadic and their source remain 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 farm. 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. 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 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 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

Compulsory control programme for all bovine slaughterhouses started in 2004. The program consists of compulsory monitoring of slaughter bovines, interventions at the holding of origin of the animals and voluntary measures at the slaughterhouse. 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.

16. 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. Besides, cattle herds are tested as part of the epidemiological investigations related to human infections in case of suspected contact to the farm. Sampling 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

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: Animal/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 is allowed to 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

National reference laboratory Evira notifies all the 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 2017, 9 out of 625 samples (1.44 %) from slaughtered cattle were detected to be positive for VTEC O157. Four out of five herds tested due to a human case revealed positive.

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

17. Description of Monitoring/Surveillance/Control programmes system: Verotoxigenic E. coli (VTEC) in food - Vegetables – leaves –food sample

1. Monitoring/Surveillance/Control programmes system

A national survey study was conducted by Finnish Food Safety Authority Evira, Microbiology Research Unit, to monitor the presence of VTEC, enteropathogenic *E. coli* (EPEC), *Yersinia enterocolitica*, *Y. pseudotuberculosis*, and ESBL *E.coli* in green vegetables and leaves in Helsinki metropolitan area in Finland (see results for other bacteria in separate reports). Altogether 102 samples representing different batches of vegetables (3 to 5 batches per sampling) were collected on weekly basis from retail from February to October. Sample origin was domestic for 44 % of samples, foreign for 38 % of

samples and unknown for 18 % of samples. STEC bacteria were analyzed according to ISO/TS 13136:2012 in five subsamples.

2. Measures in place

Not applicable.

3. Notification system in place to the national competent authority

National reference laboratory Evira notifies those results that are considered a health risk to humans to the competent authorities.

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

Presumptive VTEC bacteria (*stx*-gene signal) was detected in 12 batches (11,8 %) of which two further defined as presumptive serotype O157:H7 signal (2,0 %) and two as presumptive serotype O45 signal (2,0 %). In 8 samples, no serotype signal was detected (serotypes O26, O45, O103, O111, O121, O145, O157:H7 were screened).

Of 12 batches with presumptive result, VTEC bacteria was confirmed by culture in one batch (1,0 %) of mixed bagged salad originating from Italy. Isolated STEC strain was *vtx*1-negative, *vtx*2-positive, *eae*-negative and represented serotype other than O26, O45, O103, O111, O121, O145, O157:H7.

Enteropathogenic *E. coli* (EPEC) was confirmed by culture in 9 samples (8,8 % of all batches). Culture confirmation was attempted on 20 batches with presumptive *eae*-gene signal (>Cq 25). Parallel analysis of generic *E.coli* (ISO 16649-2:2001) revealed <40 cfu/g of total *E.coli* in all EPEC positive samples. Thus, *E. coli* analysis indicated poorly the presence of enteropathogenic *E. coli* in vegetable samples.

18. 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.

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

The annual incidence in humans has been 0,2 -1,65 per 100 000. 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. Moreover, national surveys on L. monocytogenes in food are carried out, but not annually**.**

19. 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 km2. 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 the 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.
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 year and it could not be concluded where the researcher had become infected. Despite an epidemiological study in bats 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 a rabies-free country since 1991.Last rabies cases have been related to two imported animals (a horse from Estonia in 2003 and a dog from India in 2007) and to rabies in bats, those cases had no effect on Finland's rabies-free status. However, the infection pressure in wild carnivores' species in Russia is high and it poses a continuous risk for the reintroduction of the disease. 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. Two cases of EBLV-2 infection in humans have been confirmed, one in Finland and one in the UK, both were bat researchers. The health risk of EBLV-2 to the general public, that has little contacts with bats, is low. As no sylvatic rabies cases were detected, the risk for humans is very low at this moment. There might be a risk for the introduction of rabies through imported animals which could also pose a risk for humans.

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.

20. Description of Monitoring/Surveillance/Control programmes system: Lyssavirus (rabies) in animals

1. Monitoring/Surveillance/Control programmes system

The monitoring of rabies in pets is based on the detection of clinical signs, background information, and laboratory testing. Sampling of wildlife is a part of permanent monitoring scheme. Wild animals that are found dead in the nature and suspected animals are sent to the Finnish Food Safety Authority Evira for examination free of charge. The tests carried out include an examination for rabies. Samples

are sent by local veterinarians, hunters etc. The efficacy of rabies oral vaccination campaigns are evaluated by measuring the antibody response and bait uptake after vaccination in small carnivores, which are sent to Evira 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. 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.

2. Measures in place

The control program/strategies in place
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 Evira 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.

Measures in case of the positive findings or single cases
Epidemiological investigation and information campaigns will be started. Infected animals will be destroyed and measures taken to prevent further cases.

3. Notification system in place to the national competent authority

Yes. According to the Finnish legislation rabies has been notifiable and controlled since 1922 (Act 338/22, 29 Dec 1922). Rabies is a notifiable diseases 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

Indigenous rabies has not been detected since 1989. Illegal import of pet animals could pose a risk for the introduction of rabies. As no sylvatic rabies cases were detected, the risk for humans is very low at this moment. Currently the infection pressure in wild carnivorous species in Russia is, however, high and it 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. A novel lyssavirus was detected in Brandt's bat and was designated as Kotalahti bat lyssavirus (KBLV).

21. 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. Majority of human salmonellosis cases have been acquired abroad.

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.

22. 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:

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.

All animals (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:
Sampling 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 (description of sampling techniques)
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 animals every second is sampled. In the 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 animals every fifth. 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. 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 individually samples are analysed separately.

Case definition
Animals at farm
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.

Control program/mechanisms
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 slaughterhouse (meat is heat treated), milk is allowed to 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 herd has been negative in two consecutive sampling sessions with 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

The laboratory has to notify the positive result to the competent authority and to the food business operator.

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 animals were positive (0,06 %) and the serovar was S. Typhimurium. Herds: Salmonella was detected in 6 herds (2 x S. Typhimurium, 1 x S. Konstanz, 1 x S. Hessarek and 2 x S. Coeln.)

National evaluation of the recent situation, the trends and sources of infection
Salmonella situation in cattle has been 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)
Cattle is not considered to be an important source of human salmonellosis cases in Finland.

23. 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
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 case of positive finding the flock is destructed or slaughtered and 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

Yes. The laboratory has to notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995.

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

Results of the investigation

Salmonella was detected in three broiler flocks **(0.08 %)** on the same holding in 2017. The serovar was S. Livingstone.

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

24. 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 positive finding at 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 the 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 positive finding at 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 the 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

Methods of sampling (description of sampling techniques)
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 (herd based approach)
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
Herd is positive if Salmonella spp. has been isolated from one or more faecal or environmental samples.

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

Fattening herds at slaughterhouse (herd based approach)
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 (herd based approach) 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.

Control program/mechanisms
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 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 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

Laboratory has to notify the positive result to the competent authority and to the food business operator.

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 (0.06 %) were positive. The serovar was S. S. Derby in both cases. Herds: Salmonella was detected in 11 herds. The serovars were 3 x S. Typhimurium, 7 x S. Derby, and 1 x S. Mbandaka. (S. Mbandaka and 1 x S. Typhimurium were detected from the same holdings (2 holdings) as in 2016.)

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

25. Description of Monitoring/Surveillance/Control programmes system: Salmonella in animals - Gallus gallus (fowl) - laying hens - breeding flocks for egg production and flocks of laying hens

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Laying hens flocks:
Day-old chicks are sampled at the holding after arrived by the food business operator. Rearing flocks are sampled at the holding two weeks before 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
The control program/strategies in place
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 case of positive finding the flock is destructed or slaughtered and 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

Yes. The laboratory has to notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995.

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. S. Typhimurium was detected in two holdings delivering eggs only directly to the final consumers.

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

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 important source of human salmonellosis cases in Finland.

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Breeding flocks (separate elite, grand parent and parent flocks when necessary)
The Finnish Salmonella Control Programme: -Day-old chicks are sampled by the food business operator after arrived 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 (separate elite, grand parent and parent flocks when necessary): Day-old chicks
Every flock is sampled

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period
Every flock is sampled at age of four weeks and two weeks before moving to laying unit

Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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 (separate elite, grand parent and parent flocks when necessary): Day-old chicks
Internal linings of delivery boxes
Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period
Socks/ boot swabs In cage flocks: faeces
Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period
Socks/boot swabs and dust sample In cage flocks: faeces and dust sample

Methods of sampling (description of sampling techniques)
Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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 (separate elite, grand parent and parent flocks when necessary): 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 are taken instead of boot swabs. Both samples are analysed separately. The sampling is in accordance with the Annex of Commission Regulation (EU) No 200/2010.

Case definition
Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Diagnostic/analytical methods used
Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks
Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period
Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period
Bacteriological method: ISO 6579:2002/Amd 1:2007

2. Measures in place

Vaccination policy
Breeding flocks (separate elite, grand parent and parent flocks when necessary)
Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place
Breeding flocks (separate elite, grand parent and parent flocks when necessary)
Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

Control program/mechanisms
The control program/strategies in place
Breeding flocks (separate elite, grand parent and parent flocks when necessary)
The Finnish Salmonella Control Programme, approved by Commission Decision 2007/849/EC.

Measures in case of the positive findings or single cases
Breeding flocks (separate elite, grand parent and parent flocks when necessary)
Positive flock is destructed or slaughtered and 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[(c)]

Yes. The laboratory has to notify positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995.

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

Results of the investigation
Salmonella was detected in one (3.7 %) rearing parent flock of broiler breeding line. The serotype was S. Typhimurium. The flock originated from another EU country and samples were taken at age of 4 weeks. Salmonella spp. was not detected in parent flocks of egg production line.

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.

27. 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
Breeding flocks (separate elite, grand parent and parent flocks when necessary):
The Finnish Salmonella Control Programme: 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 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 (separate elite, grand parent and parent flocks when necessary): Day-old chicks
Every flock is sampled

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

Every flock is sampled at age of 4 weeks and 2 weeks before moving to the laying unit

Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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 (separate elite, grand parent and parent flocks when necessary): Day-old chicks
Internal linings of delivery boxes

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period
Socks/ boot swabs

Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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 (description of sampling techniques)
Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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 (separate elite, grand parent and parent flocks when necessary): Rearing period
Two pairs of socks/ boot swabs samples are taken. Both pairs are analysed separately.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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 (separate elite, grand parent and parent flocks when necessary): Rearing period
Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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 (separate elite, grand parent and parent flocks when necessary): Day-old chicks
Bacteriological method: ISO 6579:2002/Amd 1:2007

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

Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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 (separate elite, grand parent and parent flocks when necessary)
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 (separate elite, grand parent and parent flocks when necessary)
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
The control program/strategies in place
Breeding flocks (separate elite, grand parent and parent flocks when necessary)
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 the positive findings or single cases
Breeding flocks
In case of positive finding the flock is destructed or slaughtered and 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

Yes. Laboratory has to notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995.

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 2017.

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

28. 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 food business operator under supervision of 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 (description of sampling techniques)
At slaughterhouse: 2 surface swab samples are taken from a carcass before chilling. A total area of 1400 cm^2 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 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 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

Laboratory has to notify the positive result to the competent authority and to the food business operator.

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
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.

29. 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 (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 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.

Control program/mechanisms
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 has to notify the positive result to the competent authority and to the food business operator.

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 2017.

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.

30. 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 (description of sampling techniques)
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 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

Laboratory has to notify the positive result to the competent authority and to the food business operator.

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 carcass swab samples or cutting plant samples in 2017.

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

31. 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.

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.

Control program/mechanisms
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 has to notify the positive results to the competent authority and to the food business operator.

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 2017.

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

32. 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.

33. 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 Evira's written directions, which are aligned on 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 the 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 Evira salmonella is analysed mainly with Vidas analyser as described in the ISO 6579:2002 with some minor modifications. Analysis methods used in approved laboratories are ISO 6579, NMKL 71 and NMKL187 or various rapid methods including salmonella strain isolation. 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 Evira's information system. 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 concerning the lots, from which the samples were taken, is immediately issued. Evira grants upon request permission to decontaminate the lots of feed materials containing salmonella. The decontaminations must be carried out according to instructions of Evira. After decontaminations, Evira does resampling to verify that lots are free from salmonella, after which Evira 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 Evira.

3. Notification system in place to the national competent authority

Notification system is mandatory and feed operators have to inform Evira 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 five lots of imported feed material of plant origin, in one lot of domestic feed material of plant origin and in two pet food samples taken from the market. In the own control of feed operators salmonella was detected in 13 lots of imported feed material of plant 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, the Animal Health Association ETT (Finnish Production Animal Health Association) 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 Evira or by a sampler with sufficient expertise and analysed for salmonella at a laboratory approved by Evira 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 .

34. General evaluation: Methicillin resistant Staphylococcus aureus (MRSA)

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

Methicillin resistant Staphylococcus aureus (MRSA) in Finnish pig population has been studied since the EU baseline study in 2008 when the first MRSA was detected from a holding with breeding pigs. Later, national MRSA surveys in pigs have been conducted mainly among the slaughtered pigs and on the top pig breeding holdings with a special-pathogen-free status. Also, the prevalence of MRSA has been evaluated in fresh pig meat at retail.

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

In a year-long survey of slaughtered pigs in 2009-2010, MRSA was found in 22% of the slaughter batches tested. In a similar survey conducted in 2016-2017, MRSA was found in 77% of the slaughter batches. In fresh pig meat, MRSA was found in 3% and 6% of the samples tested in 2015 and 2017, respectively. People who are constantly in contact with pigs, have an increased risk of becoming an MRSA carrier but MRSA is not considered as a major threat via food.

35. Description of Monitoring/Surveillance/Control programmes system: Methicillin resistant Staphylococcus aureus (MRSA) in animals - Pigs – fattening pigs

1. Monitoring/Surveillance/Control programmes system

MRSA was screened from 61 pig slaughter batches between September 2016 and September 2017. Samples were collected from slaughterhouses that accounted for 99% of all pigs slaughtered in Finland and the number of randomly taken samples from each slaughterhouse was proportional to the annual slaughter volume. The sampling was evenly distributed throughout the study period. From each slaughter batch, samples were taken from five healthy pigs.

Nasal swab samples were transported to the laboratory within one day. MRSA was screened using selective enrichment broths and solid media. The method used was adapted from the EURL protocol for dust samples. Briefly, each nasal swab was suspended in 3 ml of Mueller Hinton broth with 6.5% NaCl and incubated at 37°C for 16-20 h. Then 1 ml of the pre-enrichment broth was subsequently mixed with 9 ml of TSB broth with 75 mg/l aztreonam and 3.5 mg/l cefoxitin, and incubated at 37°C for 16-20 h. Finally, 10 µl of the enrichment broth was spread on MRSA Select2™ agar plates (BioRad) and incubated at 37°C for 20-28 h. From each animal, one suspective colony was confirmed to *Staphylococcus aureus* using MALDI-TOF (Bruker, Germany). The presence of a *mecA* gene was confirmed with PCR. All MRSA isolates were *spa* typed.

2. Measures in place

No

3. Notification system in place to the national competent authority

Yes

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

MRSA was found from 47 (77%) slaughter batches. The *spa* types found were: t034 (n=32), t2741 (n=25), t011 (n=9), t108 (n=6), t1250 (n=1), t1255 (n=1) and t17061 (n=1). From one slaughter batch, up to three different *spa* types were detected. MRSA was now more commonly detected in slaughter pigs compared to previous survey carried out in 2009-2010 with the corresponding result of 22%. Some change in the *spa* type profile was also noted: in 2009-2010, the most common *spa* types were t108 and t127. People who are constantly in contact with pigs, have an increased risk of becoming an MRSA carrier.

36. Description of Monitoring/Surveillance/Control programmes system: Methicillin resistant Staphylococcus aureus (MRSA) in food - Meat from pigs – fresh - chilled

1. Monitoring/Surveillance/Control programmes system

Altogether, 220 samples of packed fresh and chilled (not frozen) meat were collected at retail between January and October to represent the pork meat on market in Finland. Samples were randomly selected and collected from retail shops in three different NUTS-3 areas, covering approximately 46% of the Finnish population. Sampling was evenly distributed throughout the study period and allocated according to meat batches. The meat samples were sliced or diced and wrapped in vacuum or in a controlled atmosphere. Collected samples represented fresh pork meat of domestic (n=202) and non-domestic (n=18) origin.

Samples were transported refridgerated to the laboratory within one day. The temperature of the meat was measured at the laboratory at arrival. MRSA was screened using selective enrichment broths and solid media. The method used was adapted from the EURL protocol for dust samples. Briefly, 25 g of fresh pork meat was diluted in 225 ml of Mueller Hinton broth with 6.5% NaCl and incubated at 37°C for 16-20 h. Then 1 ml of the pre-enrichment broth was subsequently mixed with 9 ml of TSB broth with 75 mg/l aztreonam and 3.5 mg/l cefoxitin, and incubated at 37°C for 16-20 h. Finally, 10 µl of the enrichment broth was spread on MRSA Select2™ agar plates (BioRad) and incubated at 37°C for 20-28 h. Typical pink colonies were confirmed to *Staphylococcus aureus* using MALDI-TOF (Bruker, Germany). The presence of a *mecA* gene was confirmed with PCR. All MRSA isolates were *spa* typed.

2. Measures in place

No

3. Notification system in place to the national competent authority

No

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

Of the total of 220 meat samples tested, thirteen (5.9%) were found positive for MRSA. Twelve of these were of domestic origin. The *spa* types found were t034 (n=11, ten domestic and one non-domestic meat), t2741 (n=1, domestic meat) and t011 (n=1, domestic meat). All types belong to a clonal complex (CC) 398. Same *spa* types have also been found in pigs in Finland. Compared to

previous survey in 2015, MRSA was now slightly more common in pig meat at retail. In 2015, MRSA was found in 3% of the fresh pork meat samples investigated.

37. General evaluation: Toxoplasma

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

In 1988-1989, 20 % of pregnant women in the Helsinki region were seropositive, indicating that they were infected by *Toxoplasma gondii*. Number of recorded infections is, however, low, the incidence being between 3 and 10 cases per million people yearly.

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

In 2000-2001, 13 % of people >30 years of age were found seropositive, thus, the trend appears to have been decreasing. Of 294 Finnish veterinarians tested in 2009, 15 % were seropositive.

38. Description of Monitoring/Surveillance/Control programmes system: Toxoplasma in animals

1. Monitoring/Surveillance/Control programmes system

Passive surveillance of wild, production and pet animals is based on the material submitted to necropsy at Finnish Food Safety Authority Evira, from which histological tissue (brain, liver, kidney, lung, spleen) samples have been taken and H-E stained and examined by microscopy. An animal where tissue cysts were found was defined as a case. Normally, no sensitive methodology, such as immunohistochemistry, was used in screening. Probably the best indicator species of *T. gondii* in the nature are hares (European brown and mountain hares) due to their distinct pathology. Between 5 and 25 % have yearly been found infected between 2000 and 2016.

2. Measures in place

No control measures.

3. Notification system in place to the national competent authority

Monthly reporting for monitoring. Toxoplasma 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

In 2008-2009, a clear geographical gradient in the seroprevalence was revealed in moose and sheep. The seroprevalences were lowest (1.6 and 8.6%, respectively) in the north and highest (24.6 and 36.4%, respectively) in the south-western regions.

39. 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
Nowadays the *Trichinella* incidence in swine in Finland is low. 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 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 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, 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 2017). 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.

40. 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 meat inspection.

Frequency of the sampling
Trichinella testing is mandatory for horses at meat inspection. All slaughtered horses are introduced to official meat inspection.

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

Methods of sampling (description of sampling techniques)
Sampling and analysing is 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 program/strategies in place
Trichinella testing at meat inspection is mandatory.

3. Notification system in place to the national competent authority

Positive result in Trichinella testing at meat inspection has to be notified and confirmed at National Reference Laboratory in Evira. The Trichinella testing has been included in meat inspection of horses since 1990.

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
Equine trichinellosis has never been found in Finland.

41. 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 (one holding in 2017). In 2017, in total 632 pigs originating from officially recognized controlled housing conditions were not examined for trichinellosis. All other pigs are examined for trichinellosis at obligatory, official meat inspection in slaughterhouse.

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 2017). All other pigs are examined for trichinellosis at meat inspection.

Type of specimen taken
The sample for Trichinella test from pigs is taken primarily from 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 has been detected in the test from a pooled muscle sample and/or a single sample. All positive results have to be sent to the national reference laboratory Evira 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

Control program/mechanisms
Recent actions taken to control the zoonoses
No recent action has been taken. Current routine meat inspection eliminates infected carcasses from human consumption.

Measures in case of the positive findings or single cases
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
Yes, a positive result in Trichinella testing at meat inspection has to be notified and confirmed at National Reference Laboratory in 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
Fattening pigs and breeding sows and boars raised under controlled housing conditions in integrated production system and not raised under controlled housing conditions in integrated production system: No Trichinella infections were found in pigs in 2017.

Farmed wild boar: Trichinella infection was found in two farmed wild boar not meant for general consumption (animals had not been meat inspected).

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 in spite 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)
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 is the competent authority that officially recognizes holdings and compartments applying controlled housing conditions. The system for official recognition of controlled housing conditions was ready by the end of the year 2014. During year 2017, one holding had the status of being officially recognized for controlled housing conditions.
The positive findings in farmed wild boar indicate the importance of Trichinella examination 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 2017, 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 in 2017.

Officially recognised regions with negligible Trichinella risk
No

42. 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 a 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.

Wild animals not meant for consumption: Samples are taken from wild animals that are submitted for targeted or general wildlife disease surveillance. 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
Trichinella larva has 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

Not applicable.

3. Notification system in place to the national competent authority

Positive result in Trichinella testing at meat inspection has to be notified and confirmed at National Reference Laboratory in Evira.

4. Results of investigations and national evaluation of the situation, the trends [(d)] 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.

43. 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 400 -600 per year, most of which are caused by Yersinia enterocolitica.

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 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.

44. Description of Monitoring/Surveillance/Control programmes system: Yersinia in food - Vegetables – leaves –food sample

1. Monitoring/Surveillance/Control programmes system

A national survey study was conducted by Finnish Food Safety Authority Evira, Microbiology Research Unit, to monitor the presence of pathogenic *Yersinia enterocolitica*, *Y. pseudotuberculosis*, shiga-toxin producing *E. coli* (STEC) and extended-spectrum beta-lactamase producing *E.coli* in green vegetables and leaves in Helsinki metropolitan area in Finland (see results for other bacteria in separate reports). Altogether 102 samples representing different batches of vegetables (3 to 5 batches per sampling) were collected on a weekly basis from retail from February to October. Sample origin was domestic for 44 % of samples, foreign for 38 % of samples and unknown for 18 % of samples. Foodborne *Yersinia* was analyzed by real-time PCR according to ISO/TS 18867:2015, pathogenic *Y.enterocolitica* according to Annex B.2, method 2, and *Y. pseudotuberculosis* according to Annex C. Positive samples were further analyzed by culture according to ISO 10273:2017 (including annex D for cold enrichment).

2. Measures in place

Not applicable.

3. Notification system in place to the national competent authority

National reference laboratory Evira notifies those results that are considered a health risk to humans to the competent authorities**.**

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

Pathogenic *Y. enterocolitica* was detected by real-time PCR in four samples (3,9 %). Presence of pathogenic *Y. enterocolitica* could not be verified by culture method in these samples. Since PCR

could be more sensitive than the culture method (level of detection 63 cfu/sample), the result could reflect to small amount (below level of detection) of pathogenic *Y. enterocolitica* present in the samples. Y. pseudotuberculosis was not detected in any of the samples.

45. 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. There were no major differences in the reporting activity at the national level in 2017 compared to previous years. 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 more than 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 2017, the municipal food control authorities notified 39 food- and waterborne outbreaks, of which 38 were associated with food and one with drinking water. The total number of outbreaks was smaller than in year 2016. Since 2001, the annual number of reported outbreaks has fluctuated between 32 and 59 with a few year intervals. The lowest number so far, 32 outbreaks, was recorded in 2007. Most of the reported outbreaks are foodborne (97 % in 2017). The number of human cases follows the number of outbreaks usually varying from about 800 to 2000 disease cases annually. In 2017 the number of human cases was exceptionally low, only 560 cases. Usually about 50 % of the reported outbreaks have been medium size when evaluated by number of cases per outbreak (11-100 persons infected). In 2017 though, 12 outbreaks (31 %) were medium sized and the rest of the outbreaks were small (27 outbreaks; 69 %). During the years a few large waterborne outbreaks with a very large number of human cases have been reported. E.g. due to contaminated drinking water, a total of >8000

persons became ill in an outbreak in 2007. In 2017, no large outbreaks (over 100 persons infected) were reported.

Relevance of the different causative agents, food categories and the agent/food category combinations:
During the last ten years the most common reported recognized causative agent has been norovirus. In 2017 norovirus caused 11 (28 %) foodborne outbreaks. Other causative agents in 2017 were Campylobacter (3), Clostridium perfringens (3), Salmonella (2) and VTEC/EHEC (1) from different sources, causing nine foodborne outbreaks. In 2017 in 19 (49 %) of the foodborne outbreaks the causative agent remained unknown. In most of these cases however, the investigations showed descriptive epidemiological association between eating a certain food or meal and becoming ill. The most common vehicle (56 %) reported in 2017 was a buffet meal or mixed food where no specific food item was determined as the cause of the outbreak. The investigations revealed a specific food to be the vehicle in only 14 (36 %) outbreaks. Of these, the most common vehicles (4; 10 %) were different kind of meat and products thereof.

Relevance of the different type of places of food production and preparation in outbreaks:
In 23 (59 %) outbreaks 2017, the place of exposure was a restaurant. In 14 (36 %) outbreaks the place of origin of problem was in a restaurant. Four (10 %) of the food borne outbreaks were related to contamination at primary production (berries, mung beans and oysters). The place of origin of problem remained unknown in 13 (33 %) of the outbreaks. The water borne outbreak was caused by contamination of the well with sewage and lack of water treatment system.

Evaluation of the severity and clinical picture of the human cases:
Altogether 560 persons were reported to fall ill in food- and waterborne outbreaks in 2017. The number of patients afflicted by food poisoning was 502 persons (90 %), while 58 persons (10 %) were infected through contaminated drinking water. According to the reports, 24 persons were hospitalized in nine outbreaks. Two deaths were reported.

4. Descriptions of single outbreaks of special interest

In June 2017 an outbreak of Salmonella Enteritidis, involving 32 patients throughout Finland, was detected. Local health and food safety authorities, the National Institute for Health and Welfare and the Finnish Food Safety Authority Evira committed investigations to determine the cause of the outbreak and to prevent further transmission. The combined epidemiological and food trace-back evidence indicated sprouts as the potential outbreak vehicle. Consumption of ready-to-eat sprouts was the only exposure associated with infection (OR = 35; 95% CI 5.14-364.7). Mung bean seeds, originating from China, were collected from the suspected batch for microbiological analysis. Analysis of the beans, also sprouted seeds and the irrigating water, done by Evira did not prove the presence of S. Enteritidis. The investigation highlights the importance of using analytical epidemiological and food trace-back data as well as microbiological data during the course of a foodborne outbreak investigation.

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.

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

Finnish Food Safety Authority Evira

Evira is a central competent authority and is responsible for the implementation of antimicrobial resistance monitoring programme in food-producing animals. Evira 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 the other control programmes and the isolates are confirmed in Evira. *Campylobacter coli* from pigs are isolated in the national reference laboratory. National reference laboratory is also responsible for the texts and tables of the report concerning antimicrobial resistance.

47. 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 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 and no *mcr*-genes have been found.

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.

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

Due to the favourable resistance situation in domestic food-producing animals, domestic food of animal origin is not considered to have public health relevance in relation to resistance.

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

Finland's new National Action Plan on Antimicrobial Resistance was published on 12 May 2017. It highlights 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. Antimicrobial drugs must be used correctly and responsibly when treating people and animals.

48. General Description of Antimicrobial Resistance Monitoring; Campylobacter coli - Fattening pigs

1. General description of sampling design and strategy

Caecum samples were collected at slaughter from healthy animals between January and December in 2017. The sampling was evenly distributed throughout the study period. All *Campylobacter coli* isolates were selected for susceptibility testing.

2. Stratification procedure per animal population and food category

See text for Fattening pigs – Escherichia coli – non-pathogenic.

3. Randomisation procedure per animal population and food category

Samples were collected randomly at slaughterhouses. From the total number of samples (307) available in the laboratory, thermophilic campylobacters were screened from 287 samples of which 279 represented a different epidemiological unit (a holding). In total, *C. coli* was isolated from 203 samples.

4. Analytical method used for detection and confirmation

The samples were taken aseptically and transported refrigerated to the laboratory within 2 days. *C. coli* was isolated according to a modified method of NMKL 119:2007. MALDI-TOF (Bruker, Germany) was used for species identification.

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/EC.

6. Results of investigation

Moderate resistance was seen to nalidixic acid (17%), ciprofloxacin (17%) and streptomycin (11%). Resistance to erythromycin was low (1.5%). Resistance was not detected to tetracycline or gentamicin. Resistance levels were similar in 2013, only streptomycin resistance has decreased in 2017.

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

1. General description of sampling design and strategy

Samples originate from a national *Campylobacter* Control 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 1st of June and 31st of October, every slaughtered broiler production batch was sampled and between 1st of November and 31st of 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 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/EC.
6. Results of investigation
In 2017, resistance was not detected in *C. jejuni* from Finnish *Gallus gallus*. Resistance levels to fluoroquinolones and tetracycline have varied yearly since 2014 when the highest peak was observed.

50. 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/EC.

6. Results of investigation

All isolates were susceptible to the tested antimicrobials in 2017. Within the Finnish *Salmonella* control programme, the number of *Salmonella* spp. isolated from bovine animals has been relatively low each year and also the resistance is not common. Therefore, the antimicrobial susceptibility situation continues to be favourable.

51. 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/EC.

6. Results of investigation

Isolates were mainly susceptible to the tested antimicrobials in 2017. 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.

52. 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/EC.

6. Results of investigation

All isolates were susceptible to the tested antimicrobials in 2017. 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.

53. General Description of Antimicrobial Resistance Monitoring; Escherichia coli – non-pathogenic - Vegetables – leaves

1. General description of sampling design and strategy

A national survey study was conducted by Finnish Food Safety Authority Evira, Microbiology Research Unit, to monitor the presence of extended-spectrum beta-lactamase producing *E.coli* in green vegetables and leaves in Helsinki metropolitan area in Finland. Altogether, 102 samples representing different batches of vegetables (3 to 5 batches per sampling) were collected on weekly basis from retail from February to October in 2017. Sample origin was domestic for 44%, foreign for 38% and unknown for 18% of the samples.

2. Stratification procedure per animal population and food category

3. Randomisation procedure per animal population and food category

4. Analytical method used for detection and confirmation

The screening method for ESBL/AmpC and carbapenemase producing *E. coli* was adapted from the EURL protocol for meat samples. From each batch, three parallel samples of 25 g were suspended in 225 ml of BPW and continued according to the protocol. 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/EC. All *E. coli* isolates were tested with panel one according to Decision 2013/652/EC. 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

Of the 102 batches screened, one presumptive AmpC producing *E. coli* was found in mixed salad originating from Italy. The isolate was resistant only against beta-lactams. ESBL or carbapenemase producing *E. coli* was not found.

54. General Description of Antimicrobial Resistance Monitoring; Escherichia coli – non-pathogenic - Fattening pigs

1. General description of sampling design and strategy

Altogether, 307 caecum samples were collected at slaughter from healthy animals between January and December in 2017. The sampling was evenly distributed throughout the study period. Indicator *E.*

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

2. Stratification procedure per animal population and food category

Samples were collected from slaughterhouses that accounted for 99% of all pigs slaughtered in Finland and 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, 299 samples represented a different epidemiological unit (a holding).

4. Analytical method used for detection and confirmation

The samples were taken aseptically and transported refrigerated to the laboratory within 2 days. 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*.

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.

In the specific monitoring of ESBL/AmpC and carbapenemase producing *E. coli*, the latest EURL protocol was used. Briefly, 1 g of caecal content was suspended in 10 ml of buffered peptone water (BPW). Subsequently, 10 µl of the suspension was spread on MacConkey agar plates (Becton, Dickinson & Company) containing 1 mg/l cefotaxime for the detection of ESBL/AmpC producers, and on CARBA and OXA-48 plates (Biomerieux) for the detection of carbapenemase producers. MacConkey plates were incubated overnight at 44°C, and CARBA and OXA-48 plates overnight at 37°C. 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, 175 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/EC. All *E. coli* isolates were tested with panel one according to Decision 2013/652/EC. 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 pigs varied from none to moderate. The most common resistance traits were seen against tetracycline (18%), sulfamethoxazole (12%), trimethoprim (11%) and ampicillin (9%). Resistance to the other monitored antimicrobials was between 0-1%. Although ESBL/AmpC and carbapenemase producing *E. coli* were not detected among the randomly selected indicator *E. coli*, one ESBL (0.3%) and seven (2.3%) presumptive AmpC *E. coli* isolates were found in the specific monitoring.

The resistance levels have been quite stable compared to the years 2010, 2013 and 2015. Overall in 2017, resistance levels were lower or similar than in 2013 and 2015. As in 2015, presumptive AmpC phenotype was more common than ESBL phenotype in the specific monitoring.

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

1. General description of sampling design and strategy

Altogether, 301 samples of packed fresh and chilled (not frozen) meat were collected at retail between January and December to represent the pork meat on market in Finland. Sampling was evenly distributed throughout the year and allocated according to meat batches. The meat samples were sliced or diced and wrapped in vacuum or in a controlled atmosphere. Collected samples represented fresh pork meat of domestic (n=287) and non-domestic (n=14) origin. 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 three different NUTS-3 areas, covering approximately 46% of the Finnish population.

3. Randomisation procedure per animal population and food category

Samples were randomly selected at retail shops.

4. Analytical method used for detection and confirmation

Samples were transported refrigerated to the laboratory within 1 day. The temperature of the meat was measured at the laboratory at arrival. 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/EC.

6. Results of investigation

ESBL/AmpC or carbapenemase producing *E. coli* were not found. The situation has not changed compared to year 2015 when only one presumptive AmpC *E. coli* isolate was found.

56. General Description of Antimicrobial Resistance Monitoring; Escherichia coli – non-pathogenic - Meat from bovine animals – fresh - chilled

1. General description of sampling design and strategy

Altogether, 302 samples of packed fresh and chilled (not frozen) meat were collected at retail between January and December to represent the pork meat on market in Finland. Sampling was evenly distributed throughout the year and allocated according to meat batches. The meat samples were sliced or diced and wrapped in vacuum or in a controlled atmosphere. Collected samples represented fresh pork meat of domestic (n=279) and non-domestic (n=23) origin. 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 three different NUTS-3 areas, covering approximately 46% of the Finnish population.

3. Randomisation procedure per animal population and food category

Samples were randomly selected at retail shops.

4. Analytical method used for detection and confirmation

Samples were transported refrigerated to the laboratory within 1 day. The temperature of the meat was measured at the laboratory at arrival. 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/EC.

6. Results of investigation

ESBL/AmpC or carbapenemase producing *E. coli* were not found. The results are similar than in 2015 when extended-spectrum beta-lactamase producing *E. coli* were not found either.

57. General Description of Antimicrobial Resistance Monitoring; Methicillin resistant Staphylococcus aureus (MRSA) - Meat from pigs – fresh - chilled

1. General description of sampling design and strategy

Altogether, 220 samples of packed fresh and chilled (not frozen) meat were collected at retail between January and October to represent the pork meat on market in Finland. Sampling was evenly distributed throughout the study period and allocated according to meat batches. The meat samples were sliced or diced and wrapped in vacuum or in a controlled atmosphere. Collected samples represented fresh pork meat of domestic (n=202) and non-domestic (n=18) origin. 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 three different NUTS-3 areas, covering approximately 46% of the Finnish population.

3. Randomisation procedure per animal population and food category

Samples were randomly selected at retail shops.

4. Analytical method used for detection and confirmation

Details of the laboratory methodology are described in the prevalence text for Meat from pigs, *Staphylococcus aureus* (MRSA).

5. Laboratory methodology used for detection of antimicrobial resistance

The susceptibility testing was performed with broth microdilution method according to CLSI using *Staphylococcus aureus* ATCC 29213 as a quality control strain. The susceptibility to the following antimicrobials was tested: clindamycin, tetracycline, rifampicin, streptomycin, fusidic acid, penicillin, chloramphenicol, kanamycin, erythromycin, ciprofloxacin, cefoxitin, tiamulin, linezolid, quinupristin-dalfopristin, mupirocin, vancomycin, gentamicin, trimethoprim and sulfamethoxazole. The current epidemiological cut-off values (ECOFFs) were used.

6. Results of investigation

All isolates were resistant to tetracycline, clindamycin, quinupristin-dalfopristin and tiamulin. Resistance was also detected against erythromycin, streptomycin and trimethoprim.