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 2021

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 2021.

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)	9,583	834,716	257,680	
	Cattle (bovine animals) - calves (under 1 year)	8,744	289,759		
	Cattle (bovine animals) - dairy cows and heifers	5,971	344,867		
	Cattle (bovine animals) - meat production animals	5,757	196,090		
	Cattle (bovine animals) - mixed herds	2,406	164,216		
Deer	Deer - farmed	43	1,333	110	
	Deer - wild			2,655	
Ducks	Ducks	1,432	1,136,717	11,880	
Gallus gallus (fowl)	Gallus gallus (fowl)	473	13,865,226	82,370,966	5,710
	Gallus gallus (fowl) - breeding flocks for broiler production line	23	468,282	569,019	
	Gallus gallus (fowl) - broilers	138	8,499,274	81,800,939	4,081
	Gallus gallus (fowl) - laying hens	330	3,654,338	1,008	1,353
Geese	Geese	295	202,608	4,590	
Moose	Moose - wild			196	
Pheasants	Pheasants	471	232,926		
Pigs	Pigs	937	1,108,257	1,942,376	
	Pigs - breeding animals	472	99,852	34,798	
	Pigs - fattening pigs	824	504,399	1,907,578	
Reindeers	Reindeers	4,298	177,651	56,038	
Small ruminants	Goats	1,076	9,180	748	
	Sheep	4,218	137,645	51,221	
Solipeds, domestic	Solipeds, domestic - horses	16,000	74,000	757	
Turkeys	Turkeys	35	287,180	921,752	321
Wild boars	Wild boars - farmed	21	529	183	
	Wild boars - wild			0	

DISEASE STATUS TABLES

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

Region	Zoonotic agent	Number of infected herds	Total number of herds
FINLAND	Brucella	0	9,583

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

Region	Zoonotic agent	Number of infected herds	Total number of herds
FINLAND	Brucella	0	5,294

DISEASE STATUS TABLES

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

Region	Zoonotic agent	Number of herds with status officially free	Number of infected herds	Total number of herds
FINLAND	Mycobacterium bovis	9,583	0	9,583

Table Tuberculosis in farmed deer

Region	Zoonotic agent	Number of infected herds	Total number of herds
FINLAND	Mycobacterium bovis	0	43

PREVALENCE TABLES

Table Brucella:BRUCELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Alpacas - farmed - Farm - Finland - animal sample - blood - Unspecified - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	1	0	Brucella	0
	Alpacas - farmed - Farm - Finland - animal sample - organ/tissue - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	3	0	Brucella	0
	Alpacas - farmed - Farm - United Kingdom - animal sample - blood - Unspecified - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	3	0	Brucella	0
	Deer - farmed - Farm - Finland - animal sample - organ/tissue - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	1	0	Brucella	0
	Deer - farmed - Farm - Sweden - animal sample - blood - Unspecified - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	11	0	Brucella	0
	Deer - zoo animals - Zoo - Finland - animal sample - blood - Unspecified - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	2	0	Brucella	0
	Dogs - pet animals - Veterinary clinics - Finland - animal sample - blood - Clinical investigations - Official sampling - Suspect sampling	N_A	Serum agglutination test (SAT)	animal	6	0	Brucella	0
	Dogs - pet animals - Veterinary clinics - Finland - animal sample - blood - Unspecified - Private sampling - Not specified	N_A	Serum agglutination test (SAT)	animal	1	0	Brucella	0
	Dogs - pet animals - Veterinary clinics - Finland - animal sample - organ/tissue - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	10	0	Brucella	0
	Hares - Natural habitat - Finland - animal sample - organ/tissue - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	1	0	Brucella	0
	Moose - wild - Natural habitat - Finland - animal sample - organ/tissue - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	1	0	Brucella	0
	Moose - zoo animal - Zoo - Finland - animal sample - organ/tissue - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	1	0	Brucella	0
	Other ruminants - zoo animals - Zoo - Finland - animal sample - blood - Unspecified - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	2	0	Brucella	0
	Pigs - Farm - Finland - animal sample - blood - Clinical investigations - Private sampling - Suspect sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	2	0	Brucella	0
	Pigs - Farm - Finland - animal sample - blood - Monitoring - Official sampling - Selective sampling	N_A	Indirect ELISA (I-ELISA)	animal	1052	0	Brucella	0
	Pigs - Farm - Finland - animal sample - blood - Unspecified - Official sampling - Selective sampling	N_A	Not Available	animal	605	0	Brucella	0
	Pigs - Farm - Finland - animal sample - organ/tissue - Clinical investigations - Private sampling - Suspect sampling	N_A	Microbiological tests	animal	20	0	Brucella	0
	Pigs - Slaughterhouse - Finland - animal sample - blood - Surveillance - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	324	0	Brucella	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Rabbits - pet animals - Veterinary clinics - Finland - animal sample - blood - Clinical investigations - Private sampling - Suspect sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	3	0	Brucella	0
	Reindeers - zoo animals - Zoo - Finland - animal sample - blood - Unspecified - Official sampling - Selective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	1	0	Brucella	0
	Seals - wild - Natural habitat - Finland - animal sample - organ/tissue - Clinical investigations - Official sampling - Suspect sampling	N_A	Microbiological tests	animal	8	0	Brucella	0
	Wild boars - farmed - Farm - Finland - animal sample - blood - Monitoring - Official sampling - Selective sampling	N_A	Not Available	animal	16	0	Brucella	0
	Wild boars - wild - Natural habitat - Finland - animal sample - blood - Monitoring - Official sampling - Census	N_A	Indirect ELISA (I-ELISA)	animal	685	19	Brucella, unspecified sp.	19

Table Campylobacter:CAMPYLOBACTER in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Census	Sampling in June-October	Not Available	slaughter animal batch	1728	149	Campylobacter coli	5
							Campylobacter jejuni	142
							Campylobacter lari	2
	Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Objective sampling	Sampling in January-May and in November-December	Not Available	slaughter animal batch	380	2	Campylobacter jejuni	2

Table Campylobacter:CAMPYLOBACTER in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Meat from broilers (Gallus gallus) - carcase - chilled - Slaughterhouse - Finland - food sample - neck skin - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	26	Gram	N_A	ISO 10272-2:2017 Campylobacter	585	1	Campylobacter, unspecified sp.	1

Table Cysticercus:CYSTICERCUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	All carcasses arriving to meat inspection	Visual inspection	animal	257680	0	Cysticercus	0
	Cattle (bovine animals) - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Objective sampling	Samples from carcasses after meat inspection	Visual inspection	animal	433	0	Cysticercus	0
	Pigs - breeding animals - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Visual inspection	animal	34798	0	Cysticercus	0
	Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Visual inspection	animal	1907578	0	Cysticercus	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Visual inspection	animal	183	0	Cysticercus	0

Table Echinococcus:ECHINOCOCCUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
FINLAND	Cattle (bovine animals) - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	257680	0	Echinococcus	0
	Deer - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	110	0	Echinococcus	0
	Deer - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: only meat inspected animals, not all hunted animals	Visual inspection	animal	2655	0	Echinococcus	0
	Goats - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	748	0	Echinococcus	0
	Moose - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: only meat inspected animals, not all hunted animals	Visual inspection	animal	196	0	Echinococcus	0
	Pigs - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	1942376	0	Echinococcus	0
	Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	56038	0	Echinococcus	0
	Sheep - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	51221	0	Echinococcus	0
	Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	757	0	Echinococcus	0
	Voles - wild - Natural habitat - Finland - animal sample - Survey - Official sampling - Objective sampling	N_A	Visual inspection	animal	618	0	Echinococcus	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	183	0	Echinococcus	0
Pohjois- ja Itä-Suomi	Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	population: meat inspected animals	Visual inspection	animal	56038	0	Echinococcus	0

Table Escherichia coli:ESCHERICHIA COLI in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	N_A	Other methods based on PCR detection of stx genes	herd/flock	1	1	STEC O26	1
	Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Objective sampling	N_A	OIE method for E.coli O157 in animal faecal samples	animal	241	0	Shiga toxin-producing Escherichia coli (STEC)	0

Table Escherichia coli:ESCHERICHIA COLI in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Meat from bovine animals - carcase - Slaughterhouse - Finland - food sample - carcase swabs - Surveillance - Industry sampling - Objective sampling	single (food/feed)	1400	Square centimetre	N_A	ISO/TS 13136:2012 (including the EU-RL adaptation for O104:H4)	358	48	STEC O103	1
									STEC O109	2
									STEC O113	9
									STEC O116	2
									STEC O130	2
									STEC O15	2
									STEC O150	1
									STEC O153	1
									STEC O157	1
									STEC O168	5
									STEC O178	3
									STEC O181	1
									STEC O185	3
									STEC O2	3
									STEC O22	1
									STEC O26	1
									STEC O5	2
									STEC O6	1
									STEC O74	3
									STEC O8	1
									STEC O91	2
									STEC, unspecified	4

Table Francisella:FRANCISELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Hares - Natural habitat - Not Available - animal sample - Monitoring - Official sampling - Convenient sampling	N_A	Indirect Immunofluorescent Antibody test (IFAT)	animal	199	30	Francisella tularensis	30
	Muskrats - wild - Natural habitat - Not Available - animal sample - Unspecified - Official sampling - Convenient sampling	N_A	Indirect Immunofluorescent Antibody test (IFAT)	animal	1	1	Francisella tularensis	1

Table Salmonella:SALMONELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - breeding bulls - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	Herds of origin of AI-bulls	Not Available	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	Both faecal samples and environmental swab samples are taken	Not Available	109	9	Salmonella Altona	5
									Salmonella Enteritidis	1
									Salmonella Kentucky	1
									Salmonella Typhimurium	2
	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Industry sampling - Selective sampling	herd/flock		N_A	N_A	Not Available	2866	16	Salmonella Abony	1
									Salmonella Altona	4
									Salmonella Enteritidis	1
									Salmonella Infantis	1
									Salmonella Kentucky	2
									Salmonella Konstanz	1
									Salmonella Overschie	1
									Salmonella Typhimurium	6
	Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Not specified	animal		N_A	N_A	Not Available	1143	1	Salmonella Konstanz	1
	Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	N_A	Not Available	1134	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N	N_A	Not Available	3583	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	4081	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	N_A	Not Available	498	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for egg production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	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	N_A	Not Available	1	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for egg production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	1	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	651	4	Salmonella Enteritidis	2
									Salmonella Typhimurium	2
	Gallus gallus (fowl) - laying hens - day-old chicks - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	201	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	203	1	Salmonella Typhimurium	1
	Gallus gallus (fowl) - laying hens - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	Small holdings outside the scope of Regulation 2160/2003, selling eggs only directly to final consumers	Not Available	298	2	Salmonella Braenderup	1
									Salmonella Newport	1
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	134	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	29	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	81	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	9	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	10	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	9	0	Salmonella	0
	Pigs - breeding animals - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	Nucleus and multipler herds	Not Available	30	0	Salmonella	0
	Pigs - breeding animals - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Not specified	animal		N_A	N_A	Not Available	1132	1	Salmonella Choleraesuis	1
	Pigs - breeding animals - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	N_A	Not Available	1163	0	Salmonella	0
	Pigs - breeding animals - unspecified - boars - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	animal		N_A	Quarantine of boar	Not Available	575	0	Salmonella	0
	Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Not specified	animal		N_A	N_A	Not Available	1508	0	Salmonella	0
	Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	N_A	Not Available	1228	2	Salmonella Derby	1
									Salmonella Uganda	1

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Pigs - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		N_A	Both faecal samples and environmental swab samples are taken	Not Available	31	9	Salmonella Choleraesuis	2
									Salmonella Derby	2
									Salmonella Typhimurium, monophasic	4
									Salmonella Uganda	1
	Pigs - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Industry sampling - Selective sampling	herd/flock		N_A	Breeding herds (other than nucleus and multiplier), mixed herds, fattening pig herds	Not Available	542	4	Salmonella Derby	1
									Salmonella Enteritidis	1
									Salmonella Uganda	2
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N	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		Y	N_A	Not Available	302	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	N_A	Not Available	40	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N	N_A	Not Available	7	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		Y	N_A	Not Available	7	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N	N_A	Not Available	7	0	Salmonella	0
	Turkeys - parent breeding flocks - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	5	0	Salmonella	0
	Turkeys - parent breeding flocks - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	N_A	Not Available	7	0	Salmonella	0

Table Salmonella:SALMONELLA in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Meat from bovine animals - carcase - Slaughterhouse - Finland - food sample - carcase swabs - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	1400	Square centimetre	N_A	Not Available	2177	0	Salmonella	0
	Meat from bovine animals - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	1125	0	Salmonella	0
	Meat from broilers (Gallus gallus) - carcase - chilled - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	1271	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 - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	111	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 - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	125	0	Salmonella	0
	Meat from horse - carcase - Slaughterhouse - Finland - food sample - carcase swabs - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	400	Square centimetre	N_A	ISO 6579-1:2017 Salmonella	1	0	Salmonella	0
	Meat from pig - carcase - Slaughterhouse - Finland - food sample - carcase swabs - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	1400	Square centimetre	N_A	Not Available	2369	1	Salmonella Uganda	1
	Meat from pig - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	1391	0	Salmonella	0
	Meat from sheep - carcase - Slaughterhouse - Finland - food sample - carcase swabs - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	400	Square centimetre	N_A	ISO 6579-1:2017 Salmonella	57	0	Salmonella	0
	Meat from turkey - carcase - chilled - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	271	0	Salmonella	0
	Meat from turkey - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	27	0	Salmonella	0
	Meat from turkey - meat preparation - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	11	0	Salmonella	0
	Meat from turkey - minced meat - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	22	0	Salmonella	0

Table Salmonella:SALMONELLA in feed

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Complementary feedingstuffs - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Compound feedingstuffs for cattle - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	94	0	Salmonella	0
	Compound feedingstuffs for cattle - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Compound feedingstuffs for fish - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	25	2	Salmonella Tennessee	2
	Compound feedingstuffs for fish - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Compound feedingstuffs for fur animal - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	11	0	Salmonella	0
	Compound feedingstuffs for horses - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Compound feedingstuffs for horses - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	3	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	58	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	60	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Compound feedingstuffs for reindeers - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Compound feedingstuffs for sheep - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of cereal grain origin - barley derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Border Control Posts - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	9	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	N_A	Not Available	4	0	Salmonella	0
	Feed material of cereal grain origin - oat derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Feed material of cereal grain origin - wheat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Feed material of land animal origin - dairy products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	3	0	Salmonella	0
	Feed material of land animal origin - meat and bone meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Feed material of land animal origin - offal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Feed material of land animal origin - protein meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Feed material of marine animal origin - fish meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Feed material of marine animal origin - other fish products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - groundnut derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	6	0	Salmonella	0
	Feed material of oil seed or fruit origin - linseed derived - Border Control Posts - Estonia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - linseed derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - linseed derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Border Control Posts - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	30	2	Salmonella spp., unspecified	1
									Salmonella Yoruba	1
	Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	4	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	8	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Border Control Posts - Canada - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Liverpool	1
									Salmonella Nima	1
									Salmonella Tennessee	1
	Feed material of oil seed or fruit origin - soya (bean) derived - Border Control Posts - India - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	1	Salmonella spp., unspecified	1
	Feed material of oil seed or fruit origin - soya (bean) derived - Border Control Posts - Kazakhstan - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Border Control Posts - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	8	1	Salmonella Yoruba	1
	Feed material of oil seed or fruit origin - soya (bean) derived - Border Control Posts - United States - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	18	0	Salmonella	0
	Feed material of oil seed or fruit origin - sunflower seed derived - Border Control Posts - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	6	0	Salmonella	0
	Feed material of oil seed or fruit origin - sunflower seed derived - Border Control Posts - Ukraine - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Feed material of oil seed or fruit origin - sunflower seed derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	13	0	Salmonella	0
	Other feed material - forages and roughages - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - minerals - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - other plants - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Other feed material - other seeds and fruits - Border Control Posts - Paraguay - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	35	0	Salmonella	0
	Other feed material - tubers, roots and similar products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Other feed material - tubers, roots and similar products - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - yeast - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Pet food - final product - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	35	1	Salmonella Uganda	1
	Pet food - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	45	0	Salmonella	0
	Premixtures - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	N_A	Not Available	6	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	Sampling Details	Method	Total Units Tested Attribute	Total Units Positive Attribute	Zoonoses	CC	Spa type	ML	Units positive
Not Available	Foxes - farmed - Unspecified - Finland - animal sample - Survey - Official sampling - Convenient sampling	herd/flock		Not Available	In order to verify if a herd is MRSA positive, two types of animal samples (nasopharyngeal and paw swab samples) were collected from the same animals. Nasopharyngeal samples: from the herd, one nasopharyngeal swab sample was taken and it represented two individual animals from whom the sampling was performed by the same swab stick. Paw swab samples: from the herd one paw swab sample was taken and it represented two individual animals from whom the sampling was performed by the same swab stick (one front paw/animal). The MRSA status of the herd was evaluated based on the results of both sample types. Animal samples were taken at autopsy from animals sent for pathological-anatomical diagnosis or for corona virus screening.	MRSA 1-step isolation method-excluding the selective enrichment step (similar but not identical to the EURL-AR protocol 2018)	2	0	Methicillin resistant Staphylococcus aureus (MRSA)				0

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total Units Tested Attribute	Total Units Positive Attribute	Zoonoses	CC	Spa type	ML	Units positive
Not Available	Minks - farmed - Unspecified - Finland - animal sample - Survey - Official sampling - Convenient sampling	herd/flock		Not Available	In order to verify if a herd is MRSA positive, two types of animal samples (pharyngeal and paw samples) were collected from the same animals. Pharyngeal samples: from the herd, up to three pharyngeal swab samples were taken. Individual pharyngeal swab sample represented one to five individual animals from whom the sampling was performed by the same swab stick. Paw samples: from the herd, up to three pooled paw samples were taken. A pooled paw sample consisted of paws taken from one to five individual animals (one front paw/animal). The MRSA status of the herd was evaluated based on the results of both sample types. Animal samples were taken at autopsy from animals sent for pathological-anatomical diagnosis or for corona virus screening.	MRSA 1-step isolation method-excluding the selective enrichment step (similar but not identical to the EURL-AR protocol 2018)	47	0	Methicillin resistant Staphylococcus aureus (MRSA)				0
	Raccoon dogs - Unspecified - Finland - animal sample - Survey - Official sampling - Convenient sampling	herd/flock		Not Available	In order to verify if a herd is MRSA positive, two types of animal samples (nasopharyngeal and paw swab samples) were collected from the same animals. Nasopharyngeal samples: from the herd, one to two nasopharyngeal swab sample were taken. Individual samples represented one to three animals from whom the sampling was performed by the same swab stick. Paw swab samples: from the herd one to two paw swab samples were taken Individual samples represented one to three animals from whom the sampling was performed by the same swab stick (one front paw/animal). The MRSA status of the herd was evaluated based on the results of both sample types. Animal samples were taken at autopsy from animals sent for pathological-anatomical diagnosis or for corona virus screening.	MRSA 1-step isolation method-excluding the selective enrichment step (similar but not identical to the EURL-AR protocol 2018)	10	0	Methicillin resistant Staphylococcus aureus (MRSA)				0

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	Sampling Details	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	N_A	MRSA 1-step isolation method-excluding the selective enrichment step (similar but not identical to the EURL-AR protocol 2018)	6	0	Methicillin resistant Staphylococcus aureus (MRSA)				0
	Meat from pig - fresh - chilled - Retail - Finland - food sample - meat - Survey - national survey - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	MRSA 1-step isolation method-excluding the selective enrichment step (similar but not identical to the EURL-AR protocol 2018)	199	25	Methicillin resistant Staphylococcus aureus (MRSA)	45	728	45	1
										398	34	398	14
											2741	398	9
											4677	398	1
	Meat from pig - fresh - chilled - Retail - Germany - food sample - meat - Survey - national survey - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	MRSA 1-step isolation method-excluding the selective enrichment step (similar but not identical to the EURL-AR protocol 2018)	1	1	Methicillin resistant Staphylococcus aureus (MRSA)	398	899	398	1

Table Toxoplasma:TOXOPLASMA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cats - pet animals - Veterinary activities - Finland - Not Available - Clinical investigations - Official sampling - Suspect sampling	N_A	Histology	animal	219	3	Toxoplasma gondii	3
	Dogs - pet animals - Veterinary activities - Finland - Not Available - Clinical investigations - Official sampling - Suspect sampling	N_A	Histology	animal	538	0	Toxoplasma gondii	0
	Hares - Natural habitat - Finland - Not Available - Monitoring - passive - Official sampling - Convenient sampling	N_A	Histology	animal	199	3	Toxoplasma gondii	3
	Sheep - Farm - Finland - Not Available - Clinical investigations - Official sampling - Suspect sampling	N_A	Histology	animal	64	0	Toxoplasma gondii	0

Table Trichinella:TRICHINELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
FINLAND	Bears - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Convenient sampling	Testing is done for hunter's own interest, but if meat is sold directly to consumers testing is mandatory	Not Available	animal	215	7	Trichinella nativa	6
							Trichinella pseudospiralis	1
	Bears - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	N_A	Not Available	animal	10	0	Trichinella	0
	Bears - wild - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	54	4	Trichinella nativa	4
	Pigs - breeding animals - not raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	34690	0	Trichinella	0
	Pigs - breeding animals - raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	108	0	Trichinella	0
	Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	1904914	1	Trichinella nativa	1
	Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	2165	0	Trichinella	0
	Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	757	0	Trichinella	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	183	0	Trichinella	0
	Wild boars - farmed - Unspecified - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Convenient sampling	N_A	Not Available	animal	15	0	Trichinella	0
	Wild boars - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Convenient sampling	Testing is done for hunter's own interest, but if meat is sold directly to consumers testing is mandatory	Not Available	animal	931	1	Trichinella britovi	1
							Trichinella nativa	1

Table Virus:VIRUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
FINLAND	Birds - wild - Natural habitat - Not Available - animal sample - organ/tissue - Survey - Official sampling - Selective sampling	Samples selected due to pathological findings.	Real-Time Reverse-transcription PCR	animal	25	0	West Nile virus	0
	Solipeds, domestic - horses - Farm - Finland - animal sample - blood - Survey - Official sampling - Census	Stallions producing semen for AI.	IgG ELISA	animal	72	0	West Nile virus	0
	Solipeds, domestic - horses - Farm - Finland - animal sample - blood - Survey - Official sampling - Census	Stallions producing semen for AI.	IgM-capture ELISA (MAC-ELISA)	animal	72	0	West Nile virus	0

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

when numbers referring to cases, hospitalized people and deaths are reported as unknown, they will be not included in the sum calculation

		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
Bacterial toxins	Mixed food						4	42	0	0
	Buffet meals						1	6	0	0
	Other processed food products and prepared dishes - pizza and pizza-like dishes						1	2	0	0
Campylobacter jejuni	Buffet meals		1	10	0	0				
	Unknown						1	20	5	0
	Meat from duck - meat products - ready-to-eat		1	4	0	0				
Campylobacter, unspecified sp.	Mixed food		1	12	2	0	1	10	5	0
	Buffet meals						1	4	4	0
Clostridium perfringens	Soups		1	12	0	0				
Enterotoxigenic E. coli (ETEC)	Vegetables - pre-cut		1	29	0	0				
Hepatovirus A	Raspberries, red						1	5	0	0
Histamine	Fish - Fishery products from fish species associated with a high amount of histidine - not enzyme maturated		1	9	0	0				
Listeria monocytogenes	Unknown						1	2	2	0
	Meat, mixed meat - meat products - ready-to-eat		1	4	0	0				
Norovirus	Tap water, including well water		1	5	0	0				
	Mixed food		1	27	0	0	1	76	0	0
	Buffet meals		1	15	0	0	3	79	0	0
	Bakery products - cakes - containing heat-treated cream						1	41	0	0
	Other processed food products and prepared dishes - sushi		2	22	0	0				
Salmonella Bareilly	Other processed food products and prepared dishes - sushi		1	4	0	0				
Salmonella Enteritidis	Mixed food		1	9	4	0	1	2	1	0
	Other processed food products and prepared dishes		1	12	0	0				
Salmonella Kedougou	Vegetables - pre-cut		1	13	0	0				
Salmonella Typhimurium Not typable	Vegetables - pre-cut		2	784	2	0				
Staphylococcal enterotoxins	Bakery products - pastry						1	4	0	0
STEC O103	Vegetables - pre-cut		1	76	0	0				
STEC O26	Milk, cows' - raw milk		1	4	1	0				
Unknown	Tap water, including well water						1	2	0	0
	Mixed food						2	5	0	0
	Buffet meals						1	7	0	0
	Unknown						1	5	0	0

Causative agent	Food vehicle	Outbreak strenght	Strong			Weak			
			N outbreaks	N human cases	N hospitalized	N deaths	N outbreaks	N human cases	N hospitalized	N deaths
Unknown	Fish - farmed - trout						1	7	0	0
	Other processed food products and prepared dishes - pizza and pizza-like dishes						1	2	0	0
	Strawberries						1	4	1	0
Yersinia enterocolitica	Mixed food						1	4	0	0
Yersinia enterocolitica - serotype O:3	Unknown						1	5	1	0

Strong Foodborne Outbreaks: detailed data

Causative agent	H	AG	VT	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	unk	Not Available	Not Available	Not Available	1018	General	Meat from duck - meat products - ready-to-eat	N_A	Product-tracing investigations;Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Domestic premises	Household	France	Unprocessed contaminated ingredient;Cross-contamination	N_A	1	4	0	0
					1072	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	10	0	0
Campylobacter, unspecified sp.	unk	Not Available	Not Available	Not Available	1012	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Other contributory factor	N_A	1	12	2	0
Clostridium perfringens	unk	Not Available	Not Available	Not Available	1057	General	Soups	Soup from elk meat	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	Multiple places of exposure in one country	Others	Finland	Storage time/temperature abuse;Inadequate chilling	N_A	1	12	0	0
Enterotoxigenic E. coli (ETEC)	unk	Not Available	Not Available	Enteroaggregative E. coli (EAEC)	1081	General	Vegetables - pre-cut	N_A	Product-tracing investigations;Descriptive environmental evidence;Descriptive epidemiological evidence;Analytical epidemiological evidence	Canteen or workplace catering	Farm	Unknown	Unprocessed contaminated ingredient	N_A	1	29	0	0

Causative agent	H	AG	VT	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
Histamine	unk	Not Available	Not Available	Not Available	1037	General	Fish - Fishery products from fish species associated with a high amount of histidine - not enzyme maturated	mackerel	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	Unknown	Sweden	Unknown	N_A	1	9	0	0
Listeria monocytogenes	unk	Not Available	Not Available	Not Available	1023	Continuation of an outbreak reported last/previous year	Meat, mixed meat - meat products - ready-to-eat	N_A	Product-tracing investigations;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	Processing plant	Finland	Cross-contamination	N_A	1	4	0	0
Norovirus	unk	Not Available	Not Available	Not Available	1006	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	Unknown	Water source	Unknown	Untreated drinking water;Other contributory factor	N_A	1	5	0	0
					1058	General	Other processed food products and prepared dishes - sushi	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	Finland	Other contributory factor;Infected food handler	N_A	1	9	0	0
					1062	General	Other processed food products and prepared dishes - sushi	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	Finland	Infected food handler	N_A	1	13	0	0
					1073	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	15	0	0

Causative agent	H	AG	VT	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	unk	Not Available	Not Available	Not Available	1079	General	Mixed food	N_A	Descriptive environmental evidence;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence;Analytical epidemiological evidence	Camp or picnic	Camp or picnic	Unknown	Other contributory factor;Infected food handler	N_A	1	27	0	0
Salmonella Bareilly	unk	Not Available	Not Available	Not Available	1021	General	Other processed food products and prepared dishes - sushi	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Other contributory factor;Cross-contamination	N_A	1	4	0	0
Salmonella Enteritidis	unk	Not Available	Not Available	Not Available	1075	General	Mixed food	N_A	Descriptive environmental evidence;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in one country	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	9	4	0
					989	General	Other processed food products and prepared dishes	appetizer	Product-tracing investigations;Descriptive environmental evidence;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence;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	Finland	Unprocessed contaminated ingredient;Cross-contamination	N_A	1	12	0	0

Causative agent	H	AG	VT	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Salmonella Kedougou	unk	Not Available	Not Available	Not Available	1087	Continuation of an outbreak reported last/previous year	Vegetables - pre-cut	zuccini	Product-tracing investigations;Descriptive environmental evidence;Descriptive epidemiological evidence	Multiple places of exposure in one country	Farm	Spain	Unprocessed contaminated ingredient	N_A	1	13	0	0
Salmonella Typhimurium Not typable	unk	Not Available	Not Available	Not Available	1014	General	Vegetables - pre-cut	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	School or kindergarten	Farm	Unknown	Unprocessed contaminated ingredient	N_A	1	728	0	0
					998	General	Vegetables - pre-cut	tomatoe cubes	Product-tracing investigations;Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Farm	Poland	Unprocessed contaminated ingredient	N_A	1	56	2	0
STEC O103	unk	eae positive	Shiga toxin production, Stx1	Not Available	1080	General	Vegetables - pre-cut	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Camp or picnic	Unknown	Unknown	Unprocessed contaminated ingredient	N_A	1	76	0	0
STEC O26	unk	eae positive	Shiga toxin production, Stx2	Not Available	1035	General	Milk, cows' - raw milk	N_A	Descriptive environmental evidence;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Domestic premises	Household	Unknown	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	4	1	0

Weak Foodborne Outbreaks: detailed data

Causative agent	H	AG	VT	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
Bacterial toxins	unk	Not Available	Not Available	Not Available	1002	General	Mixed food	N_A	Descriptive environmental evidence; Descriptive epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Unknown	Storage time/temperature abuse	N_A	1	8	0	0
					1005	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;Inadequate chilling	N_A	1	3	0	0
					1063	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	25	0	0
					981	General	Other processed food products and prepared dishes - pizza and pizza-like dishes	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	Finland	Storage time/temperature abuse;Inadequate heat treatment	N_A	1	2	0	0
					987	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	0	0
					997	General	Mixed food	N_A	Descriptive epidemiological evidence	Domestic premises	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Storage time/temperature abuse	N_A	1	6	0	0
Campylobacter jejuni	unk	Not Available	Not Available	Not Available	1016	General	Unknown	N_A	Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school)	Unknown	Unknown	Unknown	N_A	1	20	5	0
Campylobacter, unspecified sp.	unk	Not Available	Not Available	Not Available	1009	General	Mixed food	N_A	Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	10	5	0

Causative agent	H	AG	VT	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.	unk	Not Available	Not Available	Not Available	1066	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	4	0
Hepatovirus A	unk	Not Available	Not Available	Not Available	1008	General	Raspberries, red	frozen	Product-tracing investigations;Descriptive epidemiological evidence	Multiple places of exposure in one country	Farm	Serbia	Unprocessed contaminated ingredient;Inadequate heat treatment	N_A	1	5	0	0
Listeria monocytogenes	unk	Not Available	Not Available	Not Available	1045	General	Unknown	N_A	Descriptive epidemiological evidence	Hospital or medical care facility	Unknown	Unknown	Unknown	N_A	1	2	2	0
Norovirus	unk	Not Available	Not Available	Not Available	1019	General	Buffet meals	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	7	0	0
					1022	General	Bakery products - cakes - containing heat-treated cream	N_A	Product-tracing investigations;Descriptive environmental evidence;Descriptive epidemiological evidence	Multiple places of exposure in one country	Unknown	Unknown	Unknown	N_A	1	41	0	0
					1055	General	Buffet meals	N_A	Descriptive epidemiological evidence	Unknown	Unknown	Unknown	Unknown	N_A	1	59	0	0
					1074	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	76	0	0
					986	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	13	0	0
Salmonella Enteritidis	unk	Not Available	Not Available	Not Available	995	General	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Other contributory factor;Cross-contamination	N_A	1	2	1	0

Causative agent	H	AG	VT	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
Staphylococcal enterotoxins	unk	Not Available	Not Available	Not Available	982	General	Bakery products - pastry	N_A	Descriptive epidemiological evidence	Domestic premises	Unknown	Finland	Unknown	N_A	1	4	0	0
Unknown	unk	Not Available	Not Available	Not Available	1007	General	Tap water, including well water	N_A	Descriptive environmental evidence; Descriptive epidemiological evidence	Domestic premises	Water source	Unknown	Untreated drinking water	N_A	1	2	0	0
					1028	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
					1029	General	Other processed food products and prepared dishes - pizza and pizza-like dishes	N_A	Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	2	0	0
					1036	General	Fish - farmed - trout	N_A	Descriptive epidemiological evidence	Domestic premises	Unknown	Unknown	Unknown	N_A	1	7	0	0
					1039	General	Buffet meals	N_A	Descriptive epidemiological evidence	Canteen or workplace catering	Unknown	Unknown	Unknown	N_A	1	7	0	0
					1040	General	Strawberries	N_A	Descriptive environmental evidence; Descriptive epidemiological evidence	Domestic premises	Unknown	Finland	Unknown	N_A	1	4	1	0
					1068	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	2	0	0

Causative agent	H	AG	VT	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	unk	Not Available	Not Available	Not Available	1070	General	Mixed food	N_A	Descriptive environmental evidence; Descriptive epidemiological evidence	Unknown	Unknown	Unknown	Unknown	N_A	1	3	0	0
Yersinia enterocolitica	unk	Not Available	Not Available	Not Available	999	General	Mixed food	N_A	Descriptive epidemiological evidence	School or kindergarten	Unknown	Unknown	Unknown	N_A	1	4	0	0
Yersinia enterocolitica - serotype O:3	unk	Not Available	Not Available	Not Available	1001	General	Unknown	N_A	Descriptive epidemiological evidence	Multiple places of exposure in one country	Unknown	Unknown	Unknown	N_A	1	5	1	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

Sampling details:

	AM substance	Chloramphenicol	Ciprofloxacin	Ertapenem	Erythromycin	Gentamicin	Tetracycline
	ECOFF	**16**	**0.5**	**0.5**	**8**	**2**	**2**
	Lowest limit	**2**	**0.125**	**0.125**	**1**	**0.25**	**0.5**
	Highest limit	**64**	**32**	**4**	**512**	**16**	**64**
	N of tested isolates						
MIC	**N of resistant isolates**						
<=0.125			97	148			
<=0.25						1	
0.25			16	16			
<=0.5							168
0.5				6		41	
<=1					138		
1						128	2
<=2		84					
2					28		
4		82	7		3		
8		4	37				
16			13				
128					1		

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

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

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

Analytical Method:

Country of Origin: Finland

Sampling details:

	AM substance	Chloramphenicol	Ciprofloxacin	Ertapenem	Erythromycin	Gentamicin	Tetracycline
	ECOFF	16	0.5	0.5	8	2	2
	Lowest limit	2	0.125	0.125	1	0.25	0.5
	Highest limit	64	32	4	512	16	64
	N of tested isolates						
MIC	N of resistant isolates						
<=0.125			2	5			
<=0.5							5
0.5						3	
<=1					5		
1						2	
<=2		5					
8			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

Sampling details:

	AM substance	Chloramphenicol	Ciprofloxacin	Ertapenem	Erythromycin	Gentamicin	Tetracycline
	ECOFF	16	0.5	0.5	4	2	1
	Lowest limit	2	0.125	0.125	1	0.25	0.5
	Highest limit	64	32	4	512	16	64
	N of tested isolates						
MIC	N of resistant isolates						
<=0.125			2	2			
<=0.25						1	
<=0.5							2
0.5						1	
<=1					2		
<=2		2					

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Finland

Sampling details:

	AM substance	Chloramphenicol	Ciprofloxacin	Ertapenem	Erythromycin	Gentamicin	Tetracycline
	ECOFF	16	0.5	0.5	4	2	1
	Lowest limit	2	0.125	0.125	1	0.25	0.5
	Highest limit	64	32	4	512	16	64
	N of tested isolates						
MIC	N of resistant isolates						
<=0.125			131	138			
<=0.25						28	
0.25			6	4			
<=0.5							139
0.5			1			104	
<=1					141		
1						10	2
<=2		137					
2					1		
4		5	1				
8			3				
64							1

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											1					
<=0.25					1	1									1	
<=0.5										1						
<=1			1						1							
<=2														1		
2																1
<=4		1										1				
<=8							1									
8				1												
32													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								4								
<=0.03											5					
0.03								1								
<=0.25					5	5									5	2
<=0.5										5						
0.5																3
<=1			5						5							
<=2				1										5		
<=4		5										5				
4				4												
<=8							5									
16													4			
32													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								4								
<=0.03											4					
<=0.25					4	3									3	1
<=0.5										4						
0.5						1									1	3
<=1			4						4							
<=2														3		
<=4		4										4				
4				3										1		
<=8							4									
8				1												
16													2			
32													2			

Table Antimicrobial susceptibility testing of Salmonella Braenderup 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

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
0.03								1								
0.064											1					
<=0.25					1	1									1	1
<=0.5										1						
<=1			1						1							
<=2														1		
<=4		1										1				
<=8							1									
8				1												
64													1			

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1										
<=0.5										1						
0.5															1	1
<=1									1							
<=2														1		
2			1													
<=4		1										1				
<=8							1									
8				1												
16													1			

Table Antimicrobial susceptibility testing of Salmonella Choleraesuis in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: environmental sample

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1									1	
<=0.5										1						
0.5																1
<=1			1						1							
<=2														1		
<=4		1										1				
<=8							1									
8				1												
16													1			

Table Antimicrobial susceptibility testing of Salmonella Choleraesuis in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1									1	
<=0.5										1						
0.5																1
<=1			1						1							
<=2														1		
<=4		1										1				
<=8							1									
8				1												
16													1			

Table Antimicrobial susceptibility testing of Salmonella Derby in Pigs - fattening pigs

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											1					
<=0.25					1										1	
<=0.5										1						
0.5						1										1
<=1			1						1							
<=2														1		
<=4		1														
<=8							1									
8				1								1				
16													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

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											2					
0.03								1								
<=0.25					2										2	1
<=0.5										2						
0.5						2										1
<=1			2						2							
<=2														2		
<=4		2										2				
<=8							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: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											1					
<=0.25					1										1	1
<=0.5										1						
0.5						1										
<=1			1						1							
<=2														1		
<=4		1										1				
<=8							1									
8				1												
16													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25						1									1	
<=0.5										1						
0.5					1											1
<=1									1							
<=2														1		
2			1													
<=4		1										1				
<=8							1									
8				1												
16													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1									1	
<=0.5										1						
0.5																1
<=1									1							
<=2														1		
2			1													
<=4		1										1				
<=8							1									
8				1												
16													1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: environmental sample

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Selective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1										1	
<=0.5										1						
0.5						1										
<=1									1							
1																1
<=2														1		
2			1													
<=4		1										1				
4				1												
<=8							1									
16													1			

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

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: AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											2					
0.03								1								
<=0.25					2	2									1	1
<=0.5										2						
0.5															1	1
<=1			2													
<=2														2		
2									2							
<=4		2										2				
4				1												
<=8							2						1			
8				1												
32													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
0.03								1								
0.064											1					
<=0.25					1										1	1
<=0.5										1						
0.5						1										
<=1									1							
<=2				1										1		
2			1													
<=4		1										1				
<=8							1									
16													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
<=0.25					1											1
0.5															1	
<=1									1							
1						1										
<=4	1															
<=8							1									
8				1				1		1						
>32			1											1		
>64												1				
>512													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											2					
0.03								1								
<=0.25					2										1	1
<=0.5										1						
0.5						1									1	
<=1			1						2							
1						1										1
<=2														1		
<=4		2										1				
4				1												
<=8							2									
8				1				1								
16										1						
32													1			
>32			1											1		
>64												1				
>512													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1										1	
<=0.5										1						
0.5						1										
<=1			1													
1																1
<=2														1		
2									1							
<=4		1										1				
<=8							1									
8				1												
16													1			

Table Antimicrobial susceptibility testing of Salmonella Konstanz 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: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1										1	
<=0.5										1						
0.5						1										
<=1			1						1							
1																1
<=2														1		
<=4		1										1				
<=8							1									
8				1												
16													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1									1	
<=0.5										1						
0.5																1
<=1			1													
<=2														1		
2									1							
<=4		1										1				
<=8							1									
8				1												
32													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1									1	
<=0.5										1						
0.5																1
<=1			1						1							
<=2														1		
<=4		1										1				
<=8							1									
8				1												
32													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											2					
0.03								1								
<=0.25					2	2									1	
<=0.5										2						
<=1									1							
1																1
<=2														1		
2			1						1						1	
<=4		2										2				
<=8							2									
8				2												
16													1			
>16																1
>32			1											1		
>512													1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											2					
0.03								5								
0.064											4					
<=0.25					5	4									4	
<=0.5										6						
0.5					1	1										2
<=1			2						3							
1						1									2	2
<=2														4		
2			2						1							
<=4		6										6				
4				2					1							
<=8							6									
8				4												
16									1				2			
>16																2
32													2			
>32			2											2		
>512													2			

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

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											1					
<=0.25					1	1									1	1
<=1			1						1							
1										1						
<=2														1		
<=4		1										1				
4				1												
<=8							1									
32													1			

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

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: AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											1					
<=0.25					1	1										
<=0.5										1						
<=1			1						1							
1															1	
<=4		1										1				
<=8							1									
8				1												
16													1			
>16																1
>32														1		

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1									1	
0.5																1
<=1			1						1							
1										1						
<=2														1		
<=4		1										1				
4				1												
<=8							1									
16													1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium, monophasic in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
0.03								3								
0.064											3					
<=0.25					2	1										2
<=0.5										3						
0.5					1	2									3	
<=1									2							
1																1
<=2														1		
2			1						1							
<=4		3										3				
4				2												
<=8							3									
8				1												
32													1			
>32			2											2		
>512													2			

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

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1										1	1
0.5						1										
<=1									1							
1										1						
<=2														1		
2			1													
<=4		1										1				
<=8							1									
8				1												
16													1			

Table Antimicrobial susceptibility testing of Salmonella Uganda in Pigs - fattening pigs

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1									1	
<=0.5										1						
<=1			1						1							
1																1
<=2														1		
<=4		1										1				
4				1												
<=8							1									
32													1			

Table Antimicrobial susceptibility testing of Salmonella Uganda in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1	1									1	
<=0.5										1						
<=1			1													
1																1
<=2														1		
2									1							
<=4		1										1				
4				1												
<=8							1									
16													1			

Table Antimicrobial susceptibility testing of Salmonella Uganda in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											2					
0.03								2								
<=0.25					2	2									2	
<=0.5										2						
0.5																2
<=1			1						2							
<=2														2		
2			1													
<=4		2										2				
4				1												
<=8							2									
8				1												
16													1			
32													1			

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Minks - farmed

Sampling Stage: Unspecified

Sampling Type: animal sample - faeces

Sampling Context: Survey

Sampler: Official sampling

Sampling Strategy: Convenient sampling

Programme Code: OTHER ESBL MON pnl2

Analytical Method:

Country of Origin: Finland

Sampling Details:

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

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Minks - farmed

Sampling Stage: Unspecified

Sampling Type: animal sample - faeces

Sampling Context: Survey

Sampler: Official sampling

Sampling Strategy: Convenient sampling

Programme Code: OTHER ESBL MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**64**	**8**	**0.5**	**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														
MIC	**N of resistant isolates**														
<=0.015							1								
<=0.03										1					
<=0.25														1	1
<=0.5									1						
<=1								1							
<=2													1		
2					1										
<=4											1				
4			1												
>4				1											
<=8						1									
16												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

Sampling Details:

AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
ECOFF	**8**	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**64**	**8**	**0.5**	**2**
Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
N of tested isolates															
MIC / **N of resistant isolates**															
<=0.015							160								
<=0.03										170					
0.03							9								
0.064							1								
<=0.25				170	158									170	67
<=0.5									147						
0.5					12										58
<=1								168							
1									22						19
<=2			5										141		
2		51						2	1						5
<=4	168										169				
4		96	64										5		
<=8						163						95			
8	2	9	100								1				
16			1			7						50			
>16															21
32												4			
>32		14											24		
>512												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: WGS ESBL MON

Analytical Method:

Country of Origin: Finland

Sampling Details:

AM substance	Amikacin	Ampicillin	Azithromycin	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Chloramphenicol	Ciprofloxacin	Colistin	Ertapenem	Gentamicin	Imipenem	Meropenem	Nalidixic acid	Sulfamethoxazole	Temocillin	Tetracycline	Tigecycline	Trimethoprim
ECOFF	**8**	**8**	**16**	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**16**	**0.064**	**2**	**0.064**	**2**	**0.5**	**0.125**	**8**	**64**	**16**	**8**	**0.5**	**2**
Lowest limit	**4**	**1**	**2**	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.125**	**8**	**0.015**	**1**	**0.015**	**0.5**	**0.125**	**0.03**	**4**	**8**	**0.5**	**2**	**0.25**	**0.25**
Highest limit	**128**	**32**	**64**	**32**	**64**	**64**	**64**	**128**	**128**	**64**	**8**	**16**	**2**	**16**	**16**	**16**	**64**	**512**	**128**	**32**	**8**	**16**
N of tested isolates																						
MIC **N of resistant isolates**																						
<=0.015											12		10									
<=0.03																20						
0.03											6		9									
<=0.064				3		2																
0.064													1									
<=0.125															8							
0.125				7																		
<=0.25																					20	11
0.25				8					2		1				12							
<=0.5														20								
0.5						1																6
<=1												20										
1					4	5																1
<=2																				15		
2					4	8		1	6										4			
<=4	20																17					
4			2		10	4	1	6	7										2	3		
<=8										16								14				
8			17	1			1	9	4								2		12			
>8											1											
16			1	1			3	4	1	4								3	2			
>16																						2
32							7															
>32		20																		2		
64							7															
>64					2		1										1					
>512																		3				

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from bovine animals - fresh - chilled

Sampling Stage: Border Control Posts

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: Brazil

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	8	16	0.25	0.5	16	0.064	2	2	0.125	8	64	8	0.5	2
	Lowest limit	4	1	2	0.25	0.25	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	128	32	64	4	8	64	8	16	16	16	64	512	32	8	16
	N of tested isolates															
MIC	N of resistant isolates															
<=0.015								1								
<=0.03											1					
<=0.25					1	1									1	
<=0.5										1						
0.5																1
<=1									1							
<=2														1		
<=4		1										1				
4			1													
<=8							1						1			
8				1												

OTHER ANTIMICROBIAL RESISTANCE TABLES

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

Programme Code	Matrix Detailed	Zoonotic Agent Detailed	Sampling Strategy	Sampling Stage	Sampling Details	Sampling Context	Sampler	Sample Type	Sampling Unit Type	Sample Origin	Comment	Total Units Tested	Total Units Positive
CARBA MON	Meat from bovine animals - fresh - chilled	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Border Control Posts	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Brazil	N_A	1	0
				Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Finland	N_A	299	0
										Germany	N_A	7	0
										Ireland	N_A	1	0
										Netherlands	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	8	0
										Finland	N_A	304	0
										Germany	N_A	1	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	307	0
ESBL MON	Meat from bovine animals - fresh - chilled	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Border Control Posts	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Brazil	N_A	1	0
				Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Finland	N_A	299	0
										Germany	N_A	7	0
										Ireland	N_A	1	0
										Netherlands	N_A	1	0

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
ESBL MON	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	8	0
										Finland	N_A	304	0
										Germany	N_A	1	0
OTHER CARBA MON	Foxes - farmed	Escherichia coli, non-pathogenic, unspecified	Convenient sampling	Unspecified	One faecal sample was taken from animals originating from the same herd. With one swab stick, sample was taken from two animals. Animal samples were taken at autopsy from animals sent for pathological-anatomical diagnosis or for corona virus screening.	Survey	Official sampling	animal sample - faeces	herd/flock	Finland	N_A	2	0

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
OTHER CARBA MON	Minks - farmed	Escherichia coli, non-pathogenic, unspecified	Convenient sampling	Unspecified	One to three faecal samples were taken from animals originating from the same herd. With one swab stick, sample was taken from one to five individual animals. Animal samples were taken at autopsy from animals sent for pathological-anatomical diagnosis or for corona virus screening.	Survey	Official sampling	animal sample - faeces	herd/flock	Finland	N_A	47	0

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
OTHER CARBA MON	Raccoon dogs	Escherichia coli, non-pathogenic, unspecified	Convenient sampling	Unspecified	One to two faecal samples was taken from animals originating from the same herd. With one swab stick, sample was taken from one to three animals. Animal samples were taken at autopsy from animals sent for pathological-anatomical diagnosis or for corona virus screening.	Survey	Official sampling	animal sample - faeces	herd/flock	Finland	N_A	10	0

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
OTHER ESBL MON	Foxes - farmed	Escherichia coli, non-pathogenic, unspecified	Convenient sampling	Unspecified	One faecal sample was taken from animals originating from the same herd. With one swab stick, sample was taken from two animals. Animal samples were taken at autopsy from animals sent for pathological-anatomical diagnosis or for corona virus screening.	Survey	Official sampling	animal sample - faeces	herd/flock	Finland	N_A	2	0

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
OTHER ESBL MON	Raccoon dogs	Escherichia coli, non-pathogenic, unspecified	Convenient sampling	Unspecified	One to two faecal samples was taken from animals originating from the same herd. With one swab stick, sample was taken from one to three animals. Animal samples were taken at autopsy from animals sent for pathological-anatomical diagnosis or for corona virus screening.	Survey	Official sampling	animal sample - faeces	herd/flock	Finland	N_A	10	0

Latest Transmission set

Table Name	Last submitted dataset transmission date
Antimicrobial Resistance	13-Dec-2022
Esbl	21-Jul-2022
Animal Population	21-Jul-2022
Disease Status	21-Jul-2022
Food Borne Outbreaks	21-Jul-2022
Prevalence	05-Nov-2022

ZOONOSES MONITORING

FINLAND

TEXT FORMS FOR THE 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 2021

Table of contents

1. Institutions and Laboratories involved in zoonoses monitoring and reporting

Finnish Zoonosis Centre
Finnish Zoonosis Centre forms a cooperation body between the Finnish Food Authority 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.

The Finnish Food Authority
The operation of the Finnish Food Authority focuses 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. It is the central competent authority for food and feed control as well as for animal health and welfare control. Its duties also include surveillance activity, scientific research and risk assessment on food safety and animal diseases. It operates also as the national reference laboratory at its own field. It was responsible for the texts and tables of the report concerning animals, foodstuffs, feedstuffs, antimicrobial resistance, foodborne outbreaks and data on animal population and slaughtered animals.

Certified food laboratories and animal diagnostic laboratories
Laboratories analysing official samples, statutory own-check samples and samples taken for national control programmes are designated by the Finnish Food Authority. The competence assessments, i.e., accreditation of the laboratories is carried out by the Finnish Accreditation Service FINAS according to the international criteria EN ISO/IEC 17025.

2. Animal population

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

Data on holdings and live animals:
Bovines, sheep, goats, pigs, farmed wild boar: Finnish Food Authority Animal register, Situation as of 1.4.2021.
Pheasant, geese, mallard, ducks, deer: Animal keeping and holding place register, Situation as of 6.5.2022.
Poultry: Natural Resources Institute Finland: Statistics, Number of livestock 1.4.2021
Horses: Suomen Hippos, the Finnish Trotting and Breeding Association, year 2020.
Reindeers: Statistics of the Reindeer Herders' Association situation as of 31.5.2021, representing 2020/2021 reindeer herding year: 1 June-31 May.

Data on slaughtered animals: Meat inspection statistics of Finnish Food Authority and Regional State Administrative Agency of Lapland for the year 2021.

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

Bison are included in the total bovine population, but not in dairy cows and heifers or meat production animals. Mixed herds are counted as herds with both dairy and meat production animals on the same holding, animals in this category are also included in the other bovine population numbers. Holdings are counted as the number of locations housing animals. Wild boar, or pigs kept as a hobby (micropigs or minipigs) are not included in the pig categories. Breeding pigs includes sows, boar and young breeding pigs. Fattening pigs does not include piglets. For poultry, mainly farms with more than 50 birds are included. The number of laying hens is the number of laying hens over 16 weeks old.

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 ten years later the number was 80, so the number of animals in a typical bovine holding has increased notably.

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

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

3. General evaluation: Brucellosis

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

Brucellosis in human is rare in Finland. In the 2000s, the annual number of reported human infections has varied between 0 - 2 (Finnish National Infectious Diseases Register). Two cases were reported only once in 2007 and he origin of these infections remained unknown.

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 a disease-free status from infection with *B. abortus, B. melitensis* and *B. suis* in bovine animal populations according to the Commission implementing regulation EU 2021/620. The disease-free status was established (for *B. abortus*) by Commission Decision 94/960/EC of 28 December 1994, confirmed by Commission Decision 2003/467/EC and Council Directive 64/432/EEC.

Finland has also been granted a disease-free status from infection with *B. abortus, B. melitensis, B. suis*) in ovine and caprine animal populations, according to the regulation EU 2021/620. The disease-free status was established (for *B. melitensis*) by Commission Decision 94/965/EC of 28 December 1994.

Porcine brucellosis (*B. suis*) has never been detected in domestic pigs in Finland. In 2015 *B. suis* biovar 2 was isolated from wild boars and this type has since then been found occasionally in wild boars.

Brucellosis has no relevance in public health in Finland. In 2021, no human cases were detected. The national 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

Testing strategy

The surveillance of *Brucella abortus* in Finland is based on active and syndromic surveillance conducted every second year, targeted monitoring and investigation of suspect cases.

For active surveillance, samples are collected from 10% of all dairy herds, the herds are selected randomly. For syndromic surveillance dairy herds with an increased number of abortions during the previous year are selected. The most recent survey of this type was performed during the year 2020.

Targeted monitoring of animals used for artificial insemination is performed according to the Decree No 329/2021 of the Ministry of Agriculture and Forestry.

Investigation of suspect cases is targeted towards all bovine herds.

Methods of sampling

Bulk milk samples are taken from the dairy herds chosen for active surveillance and from the herds that are monitored for sending bulls to AI centers.

Blood samples are taken from the AI bulls before entering the quarantine accommodation of the semen collection centre, during the quarantine period and at the collection centre.

In suspect cases aborted foetus, placental tissue, vaginal mucus and/ or blood samples are collected from the cows that have aborted**.**

Diagnostic methods used

For serological investigation, the Rose Bengal test (RBT) on individual serum samples and the indirect ELISA test on bulk milk samples were used for the detection of antibodies against *Brucella*.

In case of positive result for blood in the Rose Bengal test, confirmation of the result by complement fixation test (CFT) was performed. If the indirect ELISA test of a bulk milk was positive, a new bulk milk sample was collected and retested by indirect ELISA test. If the new bulk milk sample was still positive, blood samples from 20 animals of the farm preferring animals with abortions or from animals in close contact with them, were collected and tested by RBT and the positive result obtained in RBT was confirmed by CFT. If the CFT test would be positive, the tissue samples from seropositive animals would have been cultured and investigated by bacteriological methods for the presence of *Brucella* bacteria. In 2020 there was no seropositive cases.

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

Case definition

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

2. Measures in place

Measures for *B. abortus*, *B. melitensis* and *B. suis* (in bovine animals) are defined in the Animal Health Law EU 2016/429 and Commission delegated regulation EU 2020/689 as well as in the national Animal Disease Act No 76/2021 and the Decree No 327/2021 of the Ministry of Agriculture and Forestry. The measures include investigation of all suspected cases by the veterinary authority, notification procedures and movement restrictions of animals in suspected herds and culling or slaughtering of the positive animals or herd in case of confirmed disease.

The animal health requirements of semen of bulls are in the Commission delegated regulation (EU) 2020/686 annex II and in the Decree No 329/2021 of the Ministry of Agriculture and Forestry.

3. Notification system in place to the national competent authority

A suspected or confirmed brucellosis in bovines must be notified “as soon as practicable” by the owners etc. and “without delay” by authorities.

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

22 bulk milk samples and 118 serum samples were tested related to targeted monitoring of AI bulls. One bulk milk sample was serologically positive and therefore three more bulk milk samples and 24 serum samples from the same farm were tested to rule out brucellosis infection at the farm.

94 bacteriological examinations of animals from 71 farms, 96 blood samples of animals from 17 farms and 1 bulk milk sample, were tested by serological methods due to abortion or neonatal death.

Two serum samples were tested for import purposes.

Additionally, bulk milk samples from 9 farms were collected in BVD- monitoring program and tested also for Brucella antibodies.

No brucellosis cases in bovine animals were recorded in 2021.

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

1. Monitoring/Surveillance/Control programmes system

Testing strategy

An active surveillance program is performed and 25% of those sheep and goat farms, that keep over 10 ewes or nanny goats, are randomly selected, and samples are taken from the animals originating from those farms that send animals to slaughter.
Blood samples, which are collected as part of the voluntary Maedi Visna/CAE health monitoring program, are also tested for antibodies for *Brucella*.

In addition, targeted monitoring is performed on animals used for artificial insemination. The animal health requirements for semen of sheep and goats are in the Decree No 329/2021 of the Ministry of Agriculture and Forestry.

In suspect cases, aborted foetus, placental tissue, vaginal mucus and/ or blood samples are collected from the ewes or female goats that have aborted.

Methods of sampling

In the active surveillance program blood samples are collected at slaughterhouses, and the collection is supervised by the official veterinarian. From herds belonging to the voluntary Maedi Visna/CAE health monitoring program, blood samples are collected from live animals, by a municipal veterinary officer.

Monitoring of AI animals includes blood samples taken from live animals at the quarantine of the semen collection centre, during the quarantine period and at the semen collection centre.

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

Diagnostic methods used

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

Case definition

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

2. Measures in place

Measures for *B. abortus*, *B. melitensis* and *B. suis* (in caprine and ovine animals) are defined in the Animal Health Law EU 2016/429 and Commission delegated regulation EU 2020/689 as well as in the national Animal Disease Act No 76/2012 and the Decree No 327/2021 of the Ministry of Agriculture and Forestry. These include investigation of all suspected cases by the veterinary authority, notification procedures and movement restrictions of animals in suspected herds 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 Commission delegated regulation (EU) 2020/686 annex II and in the Decree No 329/2021 of the Ministry of Agriculture and Forestry.

3. Notification system in place to the national competent authority

B. abortus, B. melitensis and *B. suis* infection in ovine and caprine animals is a notifiable disease and a suspected or confirmed brucellosis in ovine or caprine animals must be notified “as soon as practicable” by the owners etc. and “without delay” by authorities.

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

In 2021 altogether 3432 animals from (3106 sheep and 326 goats) were tested for *Brucella* antibodies in active surveillance program from slaughterhouses and Maedi-Visna/CAE health monitoring program, all with negative results.
In addition, bacteriological examination on organ samples of 9 animals from five sheep farms was performed due to abortion or neonatal death. All examined samples were negative for presence of *Brucella* bacteria.

No brucellosis cases in sheep and goat were recorded in 2021.

Finland

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

1. Monitoring/Surveillance/Control programmes system

Testing strategy

For surveillance of porcine brucellosis**,** a targeted monitoring is performed on animals used for artificial insemination and farms that belong to the special level in the health classification register of swine herds. Also, animals that are imported or intended for export are tested. For farmed wild boar, there is a health monitoring program for African swine fever and those samples are also tested for brucellosis.

Passive surveillance is based on animals sampled due to abortion.

Methods of sampling

Boars used for artificial insemination are tested according to Decree No 329/2021 of the Ministry of Agriculture and Forestry.

Farms that belong to or are aiming to the special health status system of pigs send blood samples from slaughtered pigs according to the rules of Animal Health Association ETT. Those samples are also used for surveillance of brucellosis.

Blood samples from animals that are imported or exported are sampled on farms before export or after import.

In suspect cases, blood or aborted foetuses, placental tissue and vaginal mucus are collected from animals that have aborted. Individual blood samples from suspect animals are taken by an official veterinarian.

Diagnostic methods used

For serological testing, Rose Bengal test (RBT) or iELISA test on individual serum samples are used. Seropositive sample is always retested and confirmed by both serological tests.

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

Case definition

An animal is considered seropositive, if one of the serological 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* infection in swine are defined in the Animal Disease Act No 441/2013 and in the Decree No 326/2021 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authority, notification procedures and movement restrictions of animals in suspected herds and culling or slaughtering of the positive herd in case of confirmed disease.

The animal health requirements of semen of boars are in the Commission delegated regulation (EU) 2020/686 annex II and in the Decree No 329/2021 of the Ministry of Agriculture and Forestry.

3. Notification system in place to the national competent authority

B. abortus, B. melitensis and *B. suis* in kept swine is a notifiable disease and a suspected or confirmed brucellosis in swine must be notified “as soon as practicable” by the owners etc. and “without delay” by authorities.

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

In 2021 altogether 1983 blood samples collected from live animals or from slaughterhouses were tested for the presence of *Brucella* antibodies, all with negative results. This includes targeted monitoring of AI boars and special health status level farms and also samples that are tested related to export and import. In addition, bacteriological examinations on organ samples of 20 animals from 5 farms due to abortion, neonatal death or orchitis was performed, all with negative results.

No brucellosis cases in pigs were recorded in 2021.

7. General evaluation: Bovine Tuberculosis

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

In the 2000s, no human *Mycobacterium bovis* infections have been reported in Finland (National Infectious Disease registry).

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 a disease-free status from infection with *Mycobacterium tuberculosis* complex (MTBC) (in *Bison*, *Bos*, *Bubalus*) according to the Commission implementing regulation EU 2021/620. The disease-free status (for *M. bovis*) was established by Commission Decision 94/959/EC of 28 December 1994, confirmed by Commission Decision 2003/467/EC in 2003 and Council Directive 64/432/EEC.

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

Disease-free status of MTBC was maintained during the reporting year. The entire country is free of the disease.

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

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

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

All AI-bulls are tested by intradermal tuberculin test within 30 days before entering the quarantine accommodation of a semen collection centre. The bulls are tested annually at the semen collection centre thereafter. In addition, samples are taken from all suspected cases.

Deer: The voluntary control program ended in 2021 due to renewal of EU-legislation.

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

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

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

Case definition
The interpretation of official intradermal tuberculin tests (single intradermal test and intradermal comparative test) is performed according to guidance in the websites of the EURL or in OIE Manuals.

An animal is considered positive if MTBC (*M*. *bovis* or *M. caprae* or *M. tuberculosis*) is isolated.
In case of a suspicion in one animal, all the animals in the herd are investigated with intradermal testing, as defined above.

2. Measures in place

The control program/strategies in place
The measures for control of MTBC infection are defined in the Animal Health Law EU 2016/429 and Commission delegated regulation EU 2020/689 as well as in the Animal Diseases Act No 76/2021 and the Decree No 327/2021 of the Ministry of Agriculture and Forestry. The measures include investigation of all suspected cases by the veterinary authorities, notification procedures and movement restrictions of animals in the suspected herds and culling or slaughtering of the positive animals or herd in case of confirmed disease.

The animal health requirements of semen of bulls are in the Commission delegated regulation (EU) 2020/686 annex II and in the Decree No 329/2021 of the Ministry of Agriculture and Forestry.

Measures in case of the positive findings or single cases
Official restrictions: no trade of live animals, or reproductive cells, milk can be delivered only to an approved establishment for pasteurization. The culling or slaughtering of the positive animals, or all the animals in the herd, will be conducted. Epidemiological investigation is conducted, and contact herds

investigated. Restrictions can be lifted after eradication; repopulation is permitted after the premises have been empty for 6 months. Alternatively, if all the animals in the herd are not culled, restrictions are lifted after all the remaining animals are tested according to EU 2020/687.

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

3. Notification system in place to the national competent authority

Notification is mandatory. *Mycobacterium tuberculosis* complex -infections are classified as a list B disease (EU 2018/1882) in *Bison*, *Bos* and *Bubalus*, and as a notifiable disease according to Act 76/2021 and Degree 325/2021 of the Ministry of Agriculture and Forestry. A suspected or confirmed MTBC must be notified “as soon as practicable” by the owners etc. and “without delay” by authorities.

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

Results of the investigation
No *Mycobacterium bovis* (or *M. caprae* or *M. tuberculosis* complex) were detected in cattle or farmed deer in 2021.

Altogether 257680 bovine animals were slaughtered and subjected to a routine post mortem examination. Samples were collected from seven suspicious animals during meat inspection and from one animal during autopsy. All the samples were examined at the Finnish Food Authority with negative results.
In total**,** 51 intradermal tuberculin tests were performed on young bulls prior to their movement to a semen collection centre in another Member State, all with negative results.

No samples from farmed deer were sent to the Finnish Food Authority for bacteriological examination in 2021.

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 5099 and was lower than usual at 1798 in 2021[1]. Since 1998 campylobacters have been a more commonly reported cause of enteritis than salmonella. All Finnish broiler slaughterhouses have voluntarily monitored the prevalence of campylobacter in broilers at slaughter as a part of the own-check program since the 1990's. The national campylobacter monitoring program has been ongoing since 2004. The program consists of compulsory monitoring of broiler slaughter batches, interventions at slaughter and voluntary measures at the holdings.

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

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

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)
According to one study in the late summer, thermophilic campylobacters were 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. Unpasteurized milk, poultry and contaminated drinking water have been suspected as sources of outbreaks in recent years. Campylobacters are an occasional finding in broiler cecum samples. It is therefore important to maintain a high level of hygienic practices when handling poultry at slaughter, and other stages in production as well as informing consumers about hygienic handling of meat in the kitchen.

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

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

[1] National Institute of Health and Welfare, Infectious disease register
[2] National Institute of Health and Welfare, 2021. Kampylobakteerin esiintyvyys. Available at: https://thl.fi/fi/web/infektiotaudit/seuranta-ja-epidemiat/tartuntatautirekisteri/tartuntataudit-suomessa-vuosiraportit/tautien-esiintyvyys/kampylobakteerin-esiintyvyys.
[3] National Institute of Health and Welfare, Report: Infectious diseases in Finland 2017, http://urn.fi/URN:ISBN:978-952-343-243-7

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 for slaughterhouses that slaughter more than 150 000 broilers per year. Samples are taken at slaughter by the slaughterhouse staff as a mandatory part of the own check program. From June to October, when the prevalence is known to be highest, all broiler slaughter batches are sampled. 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. A slaughter batch stands for all broilers from the same rearing flock slaughtered on the same day.

Frequency of the sampling
Census sampling of all broiler slaughter batches between June and October. Sampling scheme for random sampling accounting for an expected prevalence of 1%, (accuracy 1%, confidence level 95%) in broiler slaughter batches during winter between January and May, and between November and December. For random sampling, a total target of **330** samples, was set. The target number was allocated between the four biggest slaughterhouses (accounting for >99% of all broilers slaughtered in Finland), and the number of samples to be collected by each slaughterhouse was proportionated, based on their slaughtering volume from the previous year. At the slaughterhouse, sampling was evenly distributed between all the random sampling months, and the sampled batches were selected randomly

Type of specimen taken
Caecum samples

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

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

Diagnostic/analytical methods used
EN ISO 10272-1

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.

The control program/strategies in place
The Finnish campylobacter program is compulsory for all broiler slaughterhouses that slaughter more than 150 000 broilers per year.

Measures in case of the positive findings
If campylobacters are detected in two consecutive growing batches reared at the same holding, all broilers origination from that 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 campylobacter findings in poultry must be reported to the authorities (Ministry of Agriculture and Forestry decree 325/2021) as well as all positive flocks tested according to requirements in Decree on Zoonoses (316/2021). All suspected campylobacter isolates are sent to the national reference laboratory for confirmation. Infections with campylobacters are classified as a monthly reported animal disease in all birds according to Decree 325/2021 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
In 2021, a total of 1728 slaughter batches were sampled between June and October. Thermophilic campylobacters were detected in 149 (8,6 %) of these slaughter batches. Campylobacter jejuni was detected in 142, C. coli in five and C. lari in two slaughter batches. Between January-May and November-December, 380 slaughter batches were sampled in total and thermophilic campylobacters, C. jejuni, were detected in two (0,5 %) of these slaughter batches. The number of campylobacters detected during the summer was higher 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. Description of Monitoring/Surveillance/Control programmes system: Campylobacter in food- Gallus gallus (fowl) - broilers –food sample

1. Monitoring/Surveillance/Control programmes system

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

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

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

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

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

Diagnostic/analytical methods used
EN ISO 10272-2

2. Measures in place

Vaccination policy
There is no vaccination against campylobacter in Finland.

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

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

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

3. Notification system in place to the national competent authority

All positive flocks in the monitoring programme are reported to the authorities. For neck skin samples, only the number of samples taken and the number of samples with results above the limit of 1000 cfu/g are reported to the Finnish Food Authority.

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

Results of the investigation

In 2021 a total of 585 neck skin samples were analysed. One of the samples was found to have campylobacters over the process hygiene criterion of 1000 cfu/g.

National evaluation of the recent situation, the trends and sources of infection
The prevalence of campylobacter in Finnish broiler slaughter batches has been consistently low. Since the implementation of a national campylobacter monitoring programme for broilers in 2004, the average prevalence of campylobacters in cecum samples of broiler slaughter batches has been on average 5% during June-October and 1% during the rest of the year. Since 2018 only 0-1 samples per year have exceeded 1000 cfu/g criterion. In the EU-baseline study in 2008, only one sample of broiler neck skin samples out of 369 was found to have campylobacter over 1000 cfu/g.

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

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

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

Human Q-fever cases are rare in Finland. In the 2000s, the annual number of human cases have varied between 0-5 (Finnish National Infectious Diseases Register), and no human cases were reported in 2020. The origin of the infections remained unknown.

The first infection of *C. burnetii* in bovines in Finland was reported in 2008. The sample was collected at an artificial insemination center in connection to export investigations. Following this finding, several national surveys have been conducted to investigate *C. burnetii* antibodies in bovines, sheep and goats. In 2009 and 2018, the prevalence of *C. burnetii* antibodies in dairy herds, was investigated. In both years, antibodies were detected in less than 1% of the dairy herds tested by bulk milk samples. In 2018 also healthy meat cattle were tested in surveillance program. Seropositive blood samples were related to approximately 1% of the tested herds.

In 2010 and 2018 Q fever in sheep and goats was surveyed serologically. In 2010 all the samples from both sheep and goats were negative. In 2018 antibodies were detected in two sheep from the same farm which represents about 1% of the tested farms. All the samples from dairy goats were negative.

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

According to the results of the serological surveillance in 2018, the prevalence of Q fever in Finnish bovine, sheep and goat populations is very low.

No human cases were reported in 2021. The national situation remains favourable.

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy

Annual surveillance of Q fever in ruminants is targeted to holdings with abortions. Samples tested for antibodies against *Coxiella burnetii,* are taken passively in case of abortions from the aborted ruminants. Serological analyses are also performed as part of export investigation of healthy animals.

Type of specimen taken and diagnostical/analytical methods used
The blood samples taken from live animals at farm.

For serological investigations ELISA test is used.

Case definition
An animal is considered seropositive when the blood sample is positive in ELISA test.

2. Measures in place

No measures in place.

3. Notification system in place to the national competent authority

Q fever is classified as a notifiable disease according to Regulation EU 2016/429, as well as Animal Disease Act 76/2021.

A suspected or confirmed Q-fever in bovine, ovine or caprine animals must be notified “as soon as practicable” by the owners etc. and “without delay” by authorities (Animal Diseases Act 76/2021 and Degree 325/2021 of the MAF).

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

In 2021, blood samples from 74 dairy cows representing 15 farms with increased number of abortions and 22 meat production animals representing two farms with increased number of abortions were collected and tested for the presence of antibodies to *C. burnetii.* Also, one sample from sheep from a zoo was tested for the presence of antibodies to *C. burnetii* for export purposes. All samples were negative.

The prevalence of *C. burnetii* in Finland is very low and the situation remains favourable.

14. General evaluation: Cysticercus

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

Taenia solium cysts (cysticercus cellulosae) have never been found in Finland. Bovine cysticercosis caused by ***Taenia saginata*** (cysticercus bovis) is very rare. Single cases have been reported in cattle in 1996 and 2002 (case was not confirmed). *Taenia solium* and *Taenia saginata* infections in humans are rare. Single cases may be travel related.

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

There is no indication of infection in Finland, therefor domestic bovine and pig meat are not considered a source of infection for humans.

3. Recent specific action in the Member State

Ongoing intensified meat inspection project to verify the rarity of cysticercus bovis in domestic cattle and investigate more closely the presence of *T. saginata* infection in bovines. The project started in 2020 and continued in 2021.

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Meat inspection: All slaughtered pigs and cattle are inspected at meat inspection for cysticercus. All bovine masseter and heart muscles are examined as part of routine meat inspection at slaughter. If suspicious carcasses are found, samples are sent by the competent authority for histological examination and confirmation at the National Reference laboratory.

Additionally in 2020 and 2021, meat inspection was intensified by a project, where inspection staff at slaughterhouses were actively collecting additional samples to be sent for confirmation at the National Reference laboratory.

Frequency of the sampling
Meat inspection: census of all slaughtered bovines and pigs. Additional samples were collected during 2021 from randomly selected bovine animals at slaughter. The number of additional samples was allocated beforehand between slaughterhouses taking into consideration the capacity of the slaughterhouse. The additional samples were taken after meat inspection from slaughtered cattle (mainly dairy cows) over the age of four years. A smaller proportion of samples were collected from Highland cattle over the age of 8 months.

Type of specimen taken
In case of suspicion of cysticerci and in the additional sampling, the sample consists of a sample of masseter (2 cm x 3cm x 1cm) and heart (50-100g, right ventricle wall) muscles.

Sampling stage
Sampling was done at the slaughterhouse after meat inspection.

Sampler
Samples were taken by the competent authority at the slaughterhouse.

Diagnostic methods used and case definition:
The 433 samples were examined by a pathologist's visual inspection after making further incisions to the muscle samples. Diagnosis is confirmed by histological examination. No histological examination was needed in 2021.

2. Measures in place

Control measures in place
Compulsory meat inspection for bovines, pigs and wild boar. Carcasses with findings are either frozen or condemned.

3. Notification system in place to the national competent authority

Infections in humans are not notifiable to health authorities. *Taenia solium* (cysticercus cellulosae) in pigs is a notifiable disease according to the Decree No 325/2021 of the Ministry of Agriculture and Forestry. A suspicious finding in bovines or pigs at meat inspection must be confirmed at the National Reference Laboratory. Suspected or confirmed ***Taenia solium*** in pigs must be notified by a veterinarian, laboratory, or authorities at latest the next working day.

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

Cysticerci were not found in 2021 in either pigs or bovines by either routine meat inspection or by the enhanced meat inspection project. Domestic bovine and pig meat are not considered a source of infection for humans in Finland.

16. General evaluation: Echinococcosis

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

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

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

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

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

The low endemic *E. granulosus* strain in Finland has been described as genotype G10 (Fennoscandian cervid strain) which is nowadays considered to belong to the species *E. canadensis*. Known intermediate hosts in Finland are moose *Alces alces*, semi-domesticated reindeer *Rangifer tarandus* and wild forest reindeer *Rangifer tarandus fennicus*, while the wolf *Canis lupus* is the only definitive host in the wild. The occurrence of *E. canadensis* used to be restricted to the eastern part of the country. In the last decade, the wolf has steadily expanded its range to the west. The total number of wolves, however, has not increased markedly due to a decrease of wolves in the east. It seems that *E. canadensis* has followed its hosts. Positive moose from western Finland have been found since 2017. In the western wolf management district, one positive wolf was found both in 2018 and in 2019, but in 2020, almost half of the cases (5/11) were found there. However, in 2021, all *E. canadensis* infections were found from eastern Finland and Lapland. Continuing surveillance will show if the parasite is able to permanently establish itself in the west. New possible intermediate hosts, mainly the white-tailed deer *Odocoileus virginianus*, are abundant in Southwest Finland. So far, the zoonotic infection risk is characterized as very low. In 2021, one case of domestically acquired infection was diagnosed for the first time since 2015 when 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 monitoring is needed as well as information and education of the public. Monitoring is also needed for *E. multilocularis*, which is known to occur in neighbouring Estonia and was diagnosed in southern Sweden in 2010.

In the register for infectious diseases of the Finnish Institute for Health and Welfare, altogether 54 human echinococcosis cases were reported between 1995 and 2021. The vast majority of cases are imported.

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

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

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Mandatory meat inspection covers all known potential intermediate hosts of *E. granulosus* ***sensu lato*** slaughtered. In post-mortem inspection, lungs are palpated and incised to discover hydatid cysts. The cysts are sent to the Finnish Food Authority (FFA) for confirmation. In addition to samples from meat inspection, samples of the intermediate hosts of *E. canadensis* (moose, reindeer) are submitted by hunters or reindeer herders to examine the cause of death or disease. Most reindeer are slaughtered in a slaughterhouse and subject to meat inspection.

The rodent scientists at Natural Resources Institute Finland (LUKE) perform long-term surveys twice a year at least on 50 locations to detect fluctuations of small mammal populations. All animals are dissected, and their gross parasitological condition, including the presence of *E. multilocularis* cysts in liver, is checked. In addition, other researchers send liver samples from small mammals if they find something suspicious (usually Taeniid cysts) to the LUKE rodent scientists. In the LUKE survey in 2021, 618 voles were studied. Generally, voles 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) and water vole *Arvicola amphibius*.

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

Frequency of the sampling
Continuous sampling.

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

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

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

Diagnostic/analytical methods used
Definitive hosts: Species-specific PCR (12S rRNA) for the detection of *Echinococcus multilocularis* (fox and raccoon dog) or *E. canadensis* G10 (wolf) egg DNA in faeces or sedimentation and counting method.
Intermediate hosts: microscopy of cyst fluid and histology; PCR if deemed necessary.

2. Measures in place

The control strategies in place

Mandatory official meat inspection for surveillance of the disease and to remove infected tissues from the food chain. Examination of wild mammals for the monitoring of *E. multilocularis* and *E. canadensis*.

Other preventive measures in place
In accordance with the Commission Delegated Regulation (EU) 2018/772, dogs moved to Finland 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 or an animal health certificate in which treatments are marked. It is recommended to treat hunting dogs with anticestodal drugs both prior to and after the hunting season. Moreover, it is recommended that cervid offal (especially lungs) is not given to dogs or that offal is only fed to dogs after thorough cooking.

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

3. Notification system in place to the national competent authority

Echinococcus multilocularis in Canidae is a notifiable disease according to the Regulation (EU) 2016/429 and Animal Disease Act 76/2021. Other Echinococcosis is a notifiable disease in all animals according to the Decree 325/2021 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 2021, hydatid cysts of *E. canadensis* were found in five reindeer at meat inspection and in two wild forest reindeer and one moose examined as part of wildlife disease monitoring. Seven wolves out of 41 examined in wildlife disease monitoring were found positive for *E. canadensis*. The wolves were found dead or put down by special permissions. No *E. multilocularis* 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 and has now established itself in the west. *Echinococcus multilocularis* has not been found in regular, national monitoring of definitive and intermediate hosts.
Human infection risk from wildlife (wolf faeces) is regarded as very low. Proper disposal of hunting offal from wild cervids is the key measure to reduce the transmission of *E. canadensis*.

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

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

Reporting of VTEC (EHEC) infections in humans has been mandatory since 1996. There has been an upward trend in the incidence, and in the last five years it has varied from 2,25-5,6/100.000 inhabitants. About 40-80% of VTEC infections are considered domestically acquired and most of them are caused by VTEC nonO157.[4] Most human cases are sporadic or family-related infection and some of them have been associated with consumption of unpasteurized milk or with a contact to cattle farms. A compulsory control programme for all bovine slaughterhouses started in 2004 for VTEC O157. The annual prevalence of VTEC O157 in slaughter cattle was clearly below 1.5% until 2012, in 2019 it exceeded 3%. In 2012, unpasteurized milk and animal contact was associated with an outbreak caused by sorbitol-fermenting VTEC O157:H7. Cattle farm-associated small outbreaks have also occurred. A resent significant VTEC foodborne outbreak was in 2016 (rucola used as garnishing for food servings, serotype ONT:H11 and O166:H28). In 2017 there was a small outbreak caused by VTEC O157 from homemade ground beef steaks made from domestic bovine meat. In 2021, STEC O103 outbreak with possible link to salad products occurred.

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). From 2013 onwards, the incidence has increased to between 1.2-5.6/ 100000.[5] The increase was partly due to changes in VTEC diagnostics and partly due to the development of laboratory methods (PCR). In 2021 the incidence in humans was 5.2/100000 and 79 % of cases were classified as being of domestic origin.[6] Most human infections are sporadic, and their source remains unknown. Visiting farms and contacts with cattle are the major risk factors for infection, especially of young children.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)
Increased VTEC O157 prevalence in slaughter cattle indicates an increasing risk in cattle production. The change has taken place since 2011, and it is statistically significant, and the trend is still upward. The number of VTEC human cases is relatively low but the disease caused can be severe and lead to death. Cattle seem to be the major reservoir of VTEC. Same PFGE and cgMLST subtypes are detected among strains isolated from human infections and cattle, indicating that cattle might be a common source of human infections in Finland.

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

The national control programme on VTEC in cattle was renewed starting May 2021. Monitoring of VTEC O157 in slaughter cattle was ended, and the monitoring of STEC in cattle carcasses was started.

[4] National Institute of Health and Welfare, 2022, Infectious disease register
[5] National Institute of Health and Welfare, 2022, Infectious disease register
[6] National Institute of Health and Welfare, 2022, Infectious disease register

19. 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
As part of the national control program launched in 2004, E. coli serotype O157 in slaughter bovines was monitored between January – April 2021. In addition, one slaughterhouse voluntarily continued the sampling also during May-October 2021. Sampling plan was evaluated for the whole year with the target number being 600 samples/year, as for the previous years. The yearly target number was divided between the bovine slaughterhouses, in relation to their slaughter capacity in the previous year. Finally, sampling was evenly distributed to reach the number of samples to be taken per month at each of the slaughterhouses. Sampling at slaughter was an animal-based approach, where the tested animals were randomly selected.

As part of the epidemiological investigation of human infections with a known contact to animal farm, cattle herds were passively tested for VTEC. In addition, the original herds of slaughter bovines tested positive for E. coli O157 at slaughter, were tested as part of the cattle EHEC control program. The examination of herds of origin of the O157 positive slaughter bovines ended with the ending of the control program, in May 2021. In case of a cattle herd investigation, a sufficient number of animals were tested to indicate if 5% of the herd carriers the bacteria or not. Sampling at the farm was done by the official municipal veterinarian.

Frequency of the sampling
Animals at slaughter: Sampling distributed evenly throughout the year
Animals at farm: Case based

Type of specimen taken
Animals at slaughter: Faeces
Animals at farm: Faeces and/or environmental swabs

Methods of sampling (description of sampling techniques)
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 the Finnish Food Authority.
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 the Finnish Food Authority laboratory for analysis.

Case definition
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.
Animals at farm: A 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.

Diagnostic/analytical methods used
Animals at slaughter: NMKL 164:2005 (ISO 16654:2001)
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.

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 (ended in May 2021).
In addition, bovine holdings which are suspected to be connected to human VTEC cases are sampled and voluntary measures may be applied at the positive farm.

Recent actions taken to control the zoonoses
The national control programme on VTEC in cattle is renewed starting in May 2021. Compulsory active monitoring of STEC from bovine carcass started in May 2021, and at the same time the monitoring of *E. coli* serotype O157 in slaughter bovines ended.

3. Notification system in place to the national competent authority

STEC-infection in animals is a notifiable disease according to the Decree No 325/2021 of the Ministry of Agriculture and Forestry. EHEC infections in humans associated with farm animal contact must be notified to the competent veterinary authority (Government Decree on Communicable Diseases 146/2017). Suspected or confirmed STEC-infections in animals must be notified by a veterinarian, laboratory, or authorities at latest the next working day.

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

Results of the investigation
In 2021, none of the 241 tested slaughtered cattle were detected to be positive for VTEC O157. Since the sampling ended in May, the estimation of the yearly prevalence and any trend change in the prevalence of VTEC O157 in slaughter cattle, is not possible.

In 2021 only one cattle herd was investigated in relation to human infections. The investigation confirmed matching serotypes between the human infection and the herd.

National evaluation of the recent situation, the trends and sources of infection
The general trend in in the prevalence of VTEC O157 in slaughter cattle 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 cgMLST subtypes are detected among strains isolated from human infections and cattle which could indicate that cattle might be a common source of human infections in Finland.

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Compulsory active monitoring of STEC in bovine carcasses started in May 2021. The monitoring requires at least 500 slaughtered bovine carcasses to be sampled yearly by the industry. Samples are divided between bovine slaughterhouses in relation to their slaughter capacity in the previous year. Sampling is evenly distributed throughout the year. Sampled carcasses are randomly selected.

Frequency of the sampling
Sampling distributed evenly throughout the year

Type of specimen taken
Carcass surface swab samples

Methods of sampling (description of sampling techniques)
Two 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. The two swabs are pooled to form one sample. The samples are sent to a designated laboratory for analysis.
If the sample is preliminarily positive, the sample is sent for confirmation at the Finnish Food Authority.

Case definition
A carcass is considered positive when an *E. coli* strain harboring *stx*-gene is isolated from the sample.

Diagnostic/analytical methods used
ISO/TS 13136:2012 or alternative method validated against ISO/TS 13136:2012

2. Measures in place

The control program/strategies in place
Compulsory monitoring of slaughtered bovine carcasses, and after STEC findings at slaughterhouses proper slaughter hygiene measures to reduce fecal contamination of carcasses.

3. Notification system in place to the national competent authority

Findings of STEC in surface swab samples are notified to the food business operator and the competent authority of the slaughterhouse. The laboratory examining the carcasses surface swabs must report the number of examined samples and positive findings to the Finnish Food Authority monthly.

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

Results of the investigation
Culture confirmed STEC was detected in 48/358 (13%) of carcasses.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
Cattle seems to be a major reservoir of VTEC. However, proper slaughter and kitchen hygiene should mitigate the risk of human infection.

21. General evaluation: Listeriosis (L. monocytogenes)

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

Since 2000 a total of 18-93 human listeriosis cases have been recorded annually. The annual incidence in humans has been 0,35 -1,68 per 100 000[7].

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

The number of human cases has increased significantly since 2009[8]. 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.

3. Monitoring/Surveillance/Control programmes system

Sampling strategy
Food business operators monitor L. monocytogenes according to the Regulation 2073/2005, supplemented by sampling done by the municipal food control authorities. Additionally, national surveys on L. monocytogenes in food are carried out, but not annually. There was no data collection on listeria nationally for monitoring in 2021.

4. Measures in place

Implementation of the microbiological criteria for listeria of Regulation 2073/2005.

5. Notification system in place to the national competent authority

Infections in humans are reported to the national infection diseases register. Findings in food are sent to the national reference laboratory for confirmation.

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

Infections and foodborne outbreaks caused by listeria are reported and investigated on a yearly basis.

[7] The National Institute of Health and Welfare, Infectious disease register.
[8] National Institute of Health and Welfare, 2021. Listerian esiintyvyys Suomessa. Available at: https://thl.fi/fi/web/infektiotaudit-ja-rokotukset/taudit-ja-torjunta/taudit-ja-taudinaiheuttajat-a-o/listeria/listerian-esiintyvyys-suomessa

22. General evaluation: Rabies

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

Human Rabies cases are rare in Finland. In the 2000s, only one human case of foreign origin in 2007 has been reported (Finnish National Infectious Diseases Register).

Rabies was common in the Finnish dog population at the beginning of the 20th century but the disease was eradicated from the country by vaccinating local dog populations during the 1950's. In April 1988, a local spot of essentially sylvatic rabies was discovered in south-eastern Finland. Between April 1988 and February 1989, a total of 66 virologically verified cases were recorded within a geographical area of 1 700 km^2. As a first measure the local dog population in the area, some 8 000 animals, were vaccinated against rabies at the expense of the state. At the same time, it was also highly recommended to vaccinate all other dogs. In co-operation with the WHO surveillance centre in Tübingen, Germany, a field campaign of oral vaccination of raccoon dogs and foxes was started in September 1988. During four distribution operations, the last one in the autumn 1990, a total of 200 000 Tübingen baits were distributed. In accordance with the WHO standards, Finland was declared rabies free in March 1991 after two years with no cases of rabies. Oral rabies vaccination is carried out annually in South East part of Finland. Rabies has been detected in an imported horse in 2003 and in an imported dog in 2007.

Rabies in bats was suspected for the first time in 1985 when a bat researcher died. He had handled bats in several countries during the previous 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 is free from rabies since 1991 in accordance with the OIE Terrestrial Animal Health Code. Finland has been granted disease-free status from infection with rabies virus in accordance with Commission Implementing Regulation (EU) 2021/620. The present control of wildlife rabies appears successful and important. Rabies in bats and the import of animals from endemic areas, however, remains a risk, which can be reduced by increasing public awareness of the disease. As no sylvatic rabies cases were detected, the risk for humans is very low at this moment. Even though lyssaviruses in bats are present in Finland, the health risk to the public, which has little contact with bats, is very low, and in 2021 no human cases were reported

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.

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

1. Monitoring/Surveillance/Control programmes system

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

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

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

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

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

The control program is approved by the European Commission for co-financing under the Regulation (EU) 2021/690 of the European Parliament and of the Council.

2. Measures in place

The control program/strategies in place
The competent authority for implementing the programme in Finland is the Finnish Food Authority. Tests included are performed at the national reference laboratory for rabies within the Finnish Food Authority. Implementation of the programme is controlled by information exchange, e.g. via e-mails and meetings with Ministry of Agriculture and Forestry. Locally the control/monitoring of rabies is carried out by regional veterinary officers and municipal veterinary officers in Finland.

The measures for control of rabies are in the Animal Health Law (Regulation (EU) 2016/429), in Commission Delegated Regulation (EU) 2020/687, in the Animal Diseases Act 76/2021 and in the Decree No 327/2021 of the Ministry of Agriculture and Forestry including investigation of all suspected cases by the veterinary authorities, notification procedures and vaccination. In case of suspicion the animal must be isolated for two weeks or euthanized and sent to the Finnish Food Authority for laboratory analysis.

Vaccination policy
Vaccination against rabies is recommended for all dogs and cats. Dogs that are used in hunting, guide dogs, sniffer dogs, and dogs that are used by the police, the frontier guard and the army must be

vaccinated against rabies (Decree No 327/2021). 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, Commission Delegated Regulation (EU) 2020/688 and Commission Delegated Regulation (EU) 2020/692.

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 300 km long zone along the south eastern border against Russia. The oral rabies vaccination programme is co-financed by the EU, based on Regulation (EU) 2021/690 of the European Parliament and of the Council.

Measures in case of the positive findings or single cases
Public health authorities are notified in all cases where a human exposure is possible. If a positive case of rabies is found, the competent authority will take the necessary measures to destroy the carcass and carry out an epidemiological investigation to find other animals and people who might have come in contact with the infected animal. The measures taken in regard of those animals depend on the nature of the contact and on whether the animal had been vaccinated against rabies or not. The Finnish Food Authority, who is responsible for carrying out the oral vaccination campaign in wild animals, will decide on whether there is a need to enlarge the area or increase the frequency of the vaccination campaign.

3. Notification system in place to the national competent authority

According to the Finnish legislation rabies has been notifiable and controlled since 1922 (Act 338/22, 29 Dec 1922). Rabies is a notifiable disease in all animals according to the Regulation (EU) 2016/429 (Carnivora, Bovidae, Suidae, Equidae, Cervidae, Camelidae), Animal Disease Act 76/2021 and Decree No 325/2021 of the Ministry of Agriculture and Forestry (other animals).

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

Results of the investigation
17 domestic animals were tested for rabies with negative results. 623 wild animals were tested, out of which 132 were indicator animals and 491 hunted animals. Also, 54 bats were analysed. Rabies was not detected.

From the oral rabies vaccination area, 403 foxes and raccoon dogs were analysed for biomarker, 323 were positive. Rabies vaccination antibodies were analysed from 284 foxes and raccoon dogs, 134 were positive.

National evaluation of the recent situation, the trends and sources of infection
Indigenous rabies has not been detected since 1989.
As no sylvatic rabies cases were detected, the risk for humans is very low at this moment. Illegal import of pet animals could pose a risk for the introduction of rabies Currently the infection pressure in wild carnivores species in Russia is, however, relevant and 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.

24. General evaluation: Salmonellosis

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

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

The number of salmonella cases in humans has decreased in the last 10 years. During the year 2021, there were 477 human cases (522 in 2020). The incidence in Finland was 9/100000. 63 % of cases were domestically acquired. The incidence of domestically acquired cases was 5,4/100000 and the incidence for cases of foreign origin was 0,8/100000.[9]

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. In a risk assessment report from 2004, an estimated maximum of 4,5 % of the total number of salmonella cases registered in Finland during the year studied were caused by pork or pork products.[10] Another risk assessment report from 2006 estimated that about 0-50 human cases, a very small percentage, were caused by table (shell) eggs.[11] According to the model in a risk assessment from 2003, the number of predicted human infections caused by broiler meat would be 39-82 per year. [12]

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

In 2021, the national Salmonella control programme was amended concerning lymph node and carcass surface swab sampling of pigs and cattle at slaughterhouses.

[9] The National Institute of Health and Welfare, Infectious disease register.
[10] Ranta J, Tuominen P, Rautiainen E, Maijala R. 2004. Salmonella in Pork Production in Finland – a Quantitative Risk Assessment, EELA publication 03/2004. https://www.ruokavirasto.fi/globalassets/tietoa-meista/julkaisut/julkaisusarjat/tutkimukset/riskiraportit/2004_3.pdf
[11] Lievonen S, Ranta J, Maijala R. 2006. Salmonella in Egg Production in Finland - a Quantitative Risk Assessment, EELA publication 04/2006. https://www.ruokavirasto.fi/globalassets/tietoa-meista/julkaisut/julkaisusarjat/tutkimukset/riskiraportit/kananmunasalmonella_sisus-4_2006.pdf
[12] Maijala R, Ranta J. 2003. Salmonella in broiler production in Finland - a quantitative risk assessment EELA publication 04/2003 https://www.ruokavirasto.fi/globalassets/tietoa-meista/julkaisut/julkaisusarjat/tutkimukset/riskiraportit/broilersalmo_5.pdf

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme: Cattle

Slaughterhouse: Animals from the cattle population are sampled each year at slaughterhouses. Sampling is carried out by the food business operator under supervision of the official veterinarian. Until May 2021, a minimum of 3000 lymph node samples were yearly collected from randomly selected animals at slaughter. Starting in May 2021, the salmonella control program was amended so that the minimum number of yearly collected lymph node samples is 2100 of which at least 780 samples are selected randomly and at least 1320 samples are targeted and selected based on risk. Each food business operator selects individually the method of targeting the sampling. For example, sampling may be targeted to animals from large units (holdings), previously known salmonella positive herds, or targeted to a specific time of the year when findings are more likely. All random sampling at slaughterhouses has an animal-based approach, not herd based.

Farm:
Targets of sampling: All animals that are sent to semen collection centres and the herds of origin of AI - bulls and heifers are sampled by the food business operator. All bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumers, as well as herds delivering raw milk to establishments from which milk is delivered to final consumers without any heat treatment, are sampled by the food business operator. All 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 positive herds are sampled several times by the food business operator during the sanitation and eradication process and at least once by the official veterinarian before the restrictions are lifted.

Frequency of the sampling

Animals at farm:
The animals sent to semen collection centres 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 animals that are sent to semen collection centres are sampled not more than 12 months before the animal is sent to quarantine.
Bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumers or to establishments from which milk is delivered to final consumers without any heat treatment, are sampled annually (between July and November).

Animals at slaughter:
The number of samples to be taken at each slaughterhouse (the proportion of the total yearly samples to be collected) during the year is calculated based on the capacity of the slaughterhouse in the previous year. The number of samples to be taken for the year 2021 was calculated according to the new yearly target (amended in May 2021). Random sampling: Sampling is distributed evenly throughout the year. Due to the amendments in the programme in May, a greater proportion of the random samples have been taken between January-April. Targeted risk-based sampling: The frequency and distribution of the sampling during the year is decided by each food business operator so that the required number of samples is reached, risk-based sampling was started in May.

Type of specimen taken

Animals at farm:
Routine sampling: faeces

Suspect sampling and sampling before restrictions are lifted: faeces and environmental swab samples

Animals at slaughter:
Lymph nodes

Methods of sampling

Animals at farm:
Sampling of herds sending animals to semen collection centers 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, the youngest or the most recently calved 40 animals are sampled and from the rest of the animals every second is sampled. In herds with over 200 animals, the youngest or the most recently calved 40 animals are sampled, from the next youngest 160 animals every second is sampled, and from the remaining animals every fifth is sampled. If there are animals suffering from diarrhoea, they are preferred in sampling. The samples of a maximum of 20 animals are pooled for analysis.
For herds sending animals to the semen collection center, a maximum of five pooled samples are taken in the regular sampling.
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, and a maximum of five samples from the same area or subject can be pooled for analysis. If feedstuffs are suspected to be contaminated with Salmonella, they are analysed, and swab samples from the feeding systems are also taken.
Sampling of salmonella positive herds for lifting the restrictions: a faecal sample is collected from each animal, and a maximum of 20 samples may be pooled together for analysis. In addition, 10-100 environmental swab samples are taken from different areas of the premises, and a maximum of five samples from the same area or subject can be pooled for analysis.

Animals at slaughter:
From each carcass five ileo-caecal lymph nodes are taken and divided into two equal parts. The lymph node parts from an animal forms a sub-sample. Sub-samples of five animals are pooled together forming the sample that is analysed. If the analysed sample is positive, each of the five individual sub-samples are analysed separately.

Case definition

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

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

Diagnostic/analytical methods used

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

Animals at slaughter:
ISO 6579:2002 or NMKL No 71:1999 or ISO 6579:2002 / Amendment 1:2007

2. Measures in place

Vaccination policy
Vaccination against Salmonella is not allowed in Finland.

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

The control program/strategies in place
The Finnish Salmonella Control Programme approved by Commission Decision 94/968/EC of 28 December 1994 (amendments approved by Commission Implementing Decision (EU) 2021/477).

Recent actions taken to control the zoonoses
From May 2021 onwards, lymph node samples are taken as random sampling as well as targeted sampling based on the decision of food business operator. The risk-based samples (minimum number 1320 yearly) will enable targeted sampling to ensure that for example significant holdings producing slaughter animals are covered by the sampling. The prevalence of Salmonella spp. less than one percent in cattle can be demonstrated yearly by the 780 randomly taken lymph node samples from bovines with a confidence level of 95%.

Measures in case of the positive findings or single cases

At slaughterhouse: If a positive lymph node sample is detected in the slaughterhouse, the herd of origin is sampled by the official veterinarian.

At farm: Official restrictions: no trade of live animals except to a slaughterhouse (the meat is heat treated), or with special permission form the authorities, if the movement of animals is considered to cause no risk for transmission of Salmonella. In addition, milk can be delivered only to an approved establishment for pasteurization. Sanitation and eradication is carried out according to the holding specific plan. Restrictions are lifted after the herd has been negative in one environmental swab sampling and two consecutive fecal sampling sessions with an interval of 3-4 weeks. In certain situations, e.g., if just one faecal sample from a single animal, or just one environmental sample was positive for salmonella, faecal samples are taken only once. Epidemiological investigation is carried out by the official veterinarian. Contact herds are sampled. Feedingstuffs and feeding systems are analysed for Salmonella if they are considered to be a possible source of the infection.

3. Notification system in place to the national competent authority

Salmonella is notifiable in all animals according to the Decree No 325/2021 of the Ministry of Agriculture and Forestry. Salmonella in cattle is classified as an animal disease to be controlled according to Decree No 325/2021 of the Ministry of Agriculture and Forestry. In accordance with the Animal Diseases Act (76/2021) and MAF Decree on Zoonoses (316/2021) laboratories must 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
Lymph node sampling at slaughterhouses: One positive sample was found (S. Konstanz) in the frame of the targeted sampling.

Herds: Salmonella was detected in 25 herds (8 x S. Typhimurium, 9 x S. Altona, 3 x S. Kentucky, 2 x S. Enteritidis, 1 x S. Konstanz, 1 x S.Infantis, 1 x S. Abony and 1 x S. Overschie. In one herd two different serotypes were found during 2021: S. Typhimurium and S. Kentucky.

National evaluation of the recent situation, the trends and sources of infection
Salmonella situation in cattle has been favourable for years, as in the 2010s Salmonella has been detected in around 5-15 herds per year. In 2018 there was however an unusually high number of

cases, and this trend continued in 2019. While in 2020 the number of salmonella cases in cattle decreased again (17 herds), the increasing trend in case numbers seems to continue in 2021.

Out of the 25 positive new herds nine herds were contact herds to another positive case, two were sampled due to clinical symptoms and two after salmonella was cultured from samples of dead calves that were sent for obduction. The remaining herds were found in other samplings (e.g. for selling of animals) done by the food business operator.

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

26. 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: boot swabs. Samples taken by the official veterinarian: boot swabs and dust or dust swab sample

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

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

Diagnostic/analytical methods used
Broiler flocks: Before slaughter at farm
Bacteriological method: ISO 6579, latest version

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 (amendments approved by Commission Implementing Decision (EU) 2021/477)

Measures in case of the positive findings or single cases

Broiler flocks: Before slaughter at farm
In the case of a positive finding the flock is destructed or slaughtered and the meat heat treated. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out.
Feedingstuffs are analysed for Salmonella, unless feed can unambiguously be ruled out as the cause of the infection, or if the role of feed in the infection has already been confirmed. The measures are the same for all salmonella serovars.

3. Notification system in place to the national competent authority

Salmonella has been notifiable since 1995. Salmonella is notifiable in all animals according to the Decree No 325/2021 of the Ministry of Agriculture and Forestry. Salmonella in *Gallus gallus* and in turkeys is classified as an animal disease to be controlled according to Decree No 325/2021 of the Ministry of Agriculture and Forestry. In accordance with the Animal Diseases Act (76/2021) the laboratory must 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 broiler flocks in 2021.

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

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

27. 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
Targets of sampling:

Breeding herds:

At farm:
All nucleus and multiplier herds, as well as quarantines of boars intended for sperm collection, are sampled at the holding by the operators.
Suspected herds (clinical symptoms or a positive finding at the slaughterhouse or other suspicion) are sampled at the holding by the official veterinarian. After a Salmonella finding positive herds are sampled several times by the operator during the sanitation and eradication process and at least once by the official veterinarian before restrictions are lifted.

At slaughterhouse:
Sows (including boars) are sampled each year from the sow population at the slaughterhouses. Sampling is carried out by the food business operator under supervision of the official veterinarian. Until May 2021, a minimum number of 3000 lymph node samples was collected each year.
Starting in May 2021 the program was amended so that the minimum number of lymph node samples collected each year is 2100 of which at least 780 samples are taken at random and at least 1320 targeted and collected based on risk. All random sampling at slaughterhouses has an animal-based approach, not herd based. Each food business operator selects individually the method of targeting the sampling. For example, sampling may be targeted to animals from large units (holdings), previously known salmonella positive herds, or targeted to a specific time of year when findings are more likely.

Fattening herds:

At farm:
Suspected herds (clinical symptoms or a positive finding at the slaughterhouse or other suspicion) are sampled at the holding by the official veterinarian. After a Salmonella finding herds are sampled several times by the operator during the sanitation and eradication process and at least twice by the official veterinarian before restrictions are lifted.

At slaughterhouse:
Fattening pigs are sampled each year from the slaughter population at the slaughterhouses. Sampling is carried out by the food business operator under supervision of the official veterinarian. Until May 2021, a minimum number of 3000 lymph node samples was collected each year. Starting in May 2021 the program was amended so that the minimum number of lymph node samples collected each year is 2100 of which at least 780 samples are taken at random and at least 1320 targeted and collected based on risk. All random sampling at slaughterhouses has an animal-based approach, not herd based. Each food business operator selects individually the method of targeting the sampling. For example, sampling may be targeted to animals from large units (holdings), previously known salmonella positive herds, or targeted to a specific time of year when findings are more likely.

Frequency of the sampling

Breeding herds at slaughterhouses: The number of samples to be taken at each slaughterhouse (the proportion of the samples collected from the yearly target) during the year is calculated based on the capacity of the slaughterhouse in the previous year. The number of samples to be taken for the year 2021 was calculated according to the new yearly sampling target. Random sampling: sampling is distributed evenly throughout the year. Due to the change in the programme in May, a greater

proportion of the random samples have been taken between January-April. Targeted risk-based sampling: The frequency and distribution of the sampling during the year is decided by each food business operator so that the required number of samples is reached, sampling started in May.

At farm: nucleus and multiplier herds once a year

Fattening herds at slaughterhouse:
The number of samples to be taken at each slaughterhouse (the proportion of the samples collected from the yearly target) during the year is calculated based on the capacity of the slaughterhouse in the previous year. The number of samples to be taken for the year 2021 was calculated according to the new yearly sampling target. Random sampling: Sampling is distributed evenly throughout the year. Due to the change in the programme in May, a greater proportion of the random samples may have been taken between January-April. Targeted risk-based sampling: The frequency and distribution of the sampling during the year is decided by each food business operator so that the required number of samples is reached, sampling started in May.

Type of specimen taken

Breeding herds
At farm:
Routine sampling: faeces
Suspect sampling and sampling before restrictions are lifted: faeces and environmental swab samples
At slaughterhouse: lymph nodes

Fattening herds
At farm:
Suspect sampling and sampling before restrictions are lifted: faeces and environmental swab samples
At slaughterhouse: lymph nodes

M**ethods of sampling**

Breeding herds at farm: Routine sampling of nucleus and multiplier herds and in quarantine of boars: Sows: One pooled sample is taken from every 100 sows or part of 100 sows. However, the maximum number of required pooled samples per holding is ten. Samples are preferably taken from nursing sows. Faecal samples of maximum of 20 animals may be pooled to one pooled sample for analysis. Growers, young breeding animals or weaned piglets (if present): Two faecal samples are taken from a group of 10-15 animals. A maximum of 20 samples from 5-15 pens may be pooled to one composite sample. The number of composite samples required from young animals is dependent on the number of sows at the holding, and the maximum number of composite samples is 15.
Suspected herds: Adult animals: Faecal sample is taken from every second nursing sow. The faecal samples of a maximum of 20 animals are pooled for analysis. 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 for analysis. Young animals (weaned piglets, growers, young breeding animals): One faecal sample is taken from each group of 10-15 animals. A maximum of 20 samples may be pooled for analysis. In addition, 5-50 environmental swab samples are taken from different areas of the premises, and a maximum of five samples from the same area or subject can be pooled for analysis. If feedstuffs are suspected to be contaminated with Salmonella, they are analysed, and swab samples from the feeding systems are also taken.
Sampling of salmonella positive herds for lifting the restrictions: Adult animals: Faecal sample is collected from every animal. A maximum of 20 samples may be pooled for analysis. Young animals: Two faecal samples are collected from each group of 10-15 animals. A maximum of 20 samples may be pooled for analysis. In addition, 10-100 environmental swab samples are taken from different areas of the premises, and a maximum of five samples from the same area or subject can be pooled for analysis.

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Breeding herds at slaughterhouse: From each carcass five ileo-caecal lymph nodes are taken. Lymph nodes are divided into two equal parts. The lymph node parts from an animal forms a sub-sample. Sub-samples of five animals are pooled together forming the sample that is analysed.. If the analysed sample is positive each of the five individual sub-samples are analysed separately.

Fattening herds at farm:
Suspected herds: One faecal sample is collected from each group of 10-15 animals. A maximum of 20 samples may be pooled for analysis. In addition, 5-50 environmental swab samples are taken from different areas of the premises, and a maximum of five samples from the same area or subject can be pooled for analysis. If feedstuffs are considered to be contaminated with Salmonella, they are analysed, and swab samples from the feeding systems are also taken.
Sampling of salmonella positive herds for releasing the restrictions: Two faecal samples are collected from each group of 10-15 animals, and a maximum of 20 samples may be pooled for analysis. In addition, 10-100 environmental swab samples are taken from different areas of the premises, and a maximum of five samples from the same area or subject can be pooled for analysis.

Fattening herds at slaughterhouse:
From each carcass five ileo-caecal lymph nodes are taken. Lymph nodes are divided into two equal parts. The lymph node parts from an animal forms a sub-sample. Sub-samples of five animals are pooled together forming the sample that is analysed.. If the analysed sample is positive each of the five individual sub-samples are analysed separately.

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

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

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

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

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

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

2. Measures in place

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

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

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994 (amendments approved by Commission Implementing Decision (EU) 2021/477).

Measures in case of positive findings or single cases
At slaughterhouse: If a positive lymph node sample is detected in the slaughterhouse, the herd of origin is sampled by the official veterinarian. At farm: Official restrictions: no trade of live animals except to slaughterhouse (meat is heat treated), or with special permission form the authorities, if the movement of animals is considered to cause no risk for transmission of Salmonella. Sanitation and eradication is carried out according to the holding specific plan. Restrictions are released after herd has been negative in one environmental swab sampling and two consecutive fecal sampling sessions with 3-4 weeks intervals. In certain situations, e.g. if just one faecal sample from a single animal, or just one environmental sample was positive for salmonella, faecal samples are taken only once. Epidemiological investigation is carried out by the official veterinarian. Contact herds are sampled. Feedingstuffs and feeding systems are analysed for Salmonella if they are considered to be a possible source of the infection.

Recent actions taken to control the zoonoses
From May 2021 onwards, lymph node samples are taken as random sampling as well as targeted sampling based on the decision of food business operator. The risk-based samples (minimum number 1320 yearly) will enable targeted sampling to ensure that significant holdings producing slaughter animals are covered by the sampling. The prevalence of Salmonella spp. less than one percent in pigs can be demonstrated yearly by the 780 randomly taken lymph node samples from pigs with a confidence level of 95%.

3. Notification system in place to the national competent authority

Salmonella is notifiable in all animals according to the Decree No 325/2021of the Ministry of Agriculture and Forestry. Salmonella in swine is classified as an animal disease to be controlled according to Decree No 325/2021 of the Ministry of Agriculture and Forestry. In accordance with the Animal Diseases Act (76/2021) and MAF Decree on Zoonoses (316/2021) the laboratory must 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 fattening pigs were positive in objective sampling (0,16%), one for serotype S. Uganda and the other for serovar S. Derby. One breeding pig was positive (0,09%) in the frame of the targeted sampling, serovar S. Choleraesuis.

Herds: Salmonella was detected in twelve herds. The serovars were 4 x S. Typhimurium (monophasic), 3 x S. Derby, 3 x S. Uganda, 2 x S. Choleraesuis, and 1 x S. Enteritidis. In one herd two different serotypes were found: S. Choleraesuis in official sampling and S. Enteritidis in industry sampling.

National evaluation of the recent situation, the trends and sources of infection
The Salmonella situation in pigs has been very favourable for years and findings are rare. In the 2010s Salmonella has been detected in around 0-10 swine herds per year, although in 2019 there was a slight increase in Salmonella findings, and this small increase was noticed again in 2021 Out of the 12 new positive herds in 2021**,** four were **contact herds to another** positive case, three were sampled because of a positive lymph node finding at the slaughterhouse and the rest were found in other samplings done by the food business operator.

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

of infection)
Pigs are not considered to be an important source of human salmonellosis cases in Finland.

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

1. Monitoring/Surveillance/Control programmes system

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

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

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

Laying hens: Production period
Every 15 weeks, first sampling at the age of 22-26 weeks

Type of specimen taken
Laying hens: Day-old chicks
linings of delivery boxes

Laying hens: Rearing period
faeces or boot swabs or faecal fabric swabs

Laying hens: Production period
faeces or boot swabs or faecal fabric swabs, dust or dust swab sample

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 are taken and pooled to one. Alternative in non-cage multi-tier houses with manure belts between each tier: one pair of boot swabs and at least two faecal fabric swabs are taken and pooled to one. In cage flocks: two samples of 150 g of naturally mixed faeces or at least four faecal fabric swabs are collected and pooled to one.

Laying hens: Production period
Two pairs of boot swabs are taken and pooled to one. Alternative in non-cage multi-tier houses with manure belts between each tier: one pair of boot swabs and at least two faecal fabric swabs are taken and pooled to one. In cage flocks: two samples of 150 g of naturally mixed faeces or at least four faecal fabric swabs 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, latest version

Laying hens: Rearing period
Bacteriological method: ISO 6579, latest version

Laying hens: Production period
Bacteriological method: ISO 6579, latest version

2. Measures in place

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

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

Control program/mechanisms
Laying hens flocks:
The Finnish Salmonella Control Programme approved by Commission Decision 2007/849/EC (amendments approved by Commission Implementing Decision (EU) 2021/477).

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

3. Notification system in place to the national competent authority

Salmonella has been notifiable since 1995. Salmonella is notifiable in all animals according to the Decree No 325/2021 of the Ministry of Agriculture and Forestry. Salmonella in *Gallus gallus* and in turkeys is classified as an animal disease to be controlled according to Decree No 325/2021 of the Ministry of Agriculture and Forestry. In accordance with the Animal Diseases Act (76/2021) the laboratory must 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 was detected in four commercial flocks of adult laying hens in 2021 (0,6%). The serovars were S. Enteritidis in two flocks and S. Typhimurium in two flocks. S. Enteritidis was detected in two flocks at the same holding at the same time. In addition, Salmonella was detected in one rearing flock (0,5%) of laying hens. The serovar was S. Typhimurium. Salmonella was also detected in two holdings delivering eggs only directly to the final consumers. The serovars were S. Newport and S. Braenderup.

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

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

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
The Finnish Salmonella Control Programme: Breeding flocks

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

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

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

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

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

Breeding flocks: Rearing period
Boot swabs or faecal fabric swabs, in cage flocks: faeces or faecal fabric swabs

Breeding flocks: Production period
Boot swabs and dust swab sample or faecal fabric swabs, in cage flocks: faeces or faecal fabric swabs

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

Breeding flocks: Rearing period
Two pairs of boot swabs are taken. Both pairs are analysed separately. Alternative in non-cage multi-tier houses with manure belts between each tier: one pair of boot swabs and at least two faecal fabric swabs. The boot swab pair is analysed individually and the faecal fabric swabs are analysed as one pooled sample. In cage flocks: two samples of 150 g faeces (analysed separately) or at least four faecal fabric swabs (analysed as two pooled samples).

Breeding flocks: Production period
One pair of boot swabs and one dust sample collected by swab are taken. Both samples are analysed separately. Alternative in non-cage multi-tier houses with manure belts between each tier: one pair of boot swabs and at least two faecal fabric swabs. The boot swab pair is analysed individually and the faecal fabric swabs are analysed as one pooled sample). In cage flocks: two samples of 150 g faeces

(analysed separately) or at least four faecal fabric swabs (analysed as two pooled samples). The sampling is in accordance with the Annex of Commission Regulation (EU) No 200/2010.

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

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

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

Diagnostic/analytical methods used
Breeding flocks: Day-old chicks
Bacteriological method: ISO 6579:2002, latest version

Breeding flocks: Rearing period
Bacteriological method: ISO 6579:2002, latest version

Breeding flocks: Production period
Bacteriological method: ISO 6579:2002, latest version

2. Measures in place

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

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

The control program/strategies in place
Breeding flocks:
The Finnish Salmonella Control Programme approved by Commission Decision 2007/849/EC (amendments approved by Commission Implementing Decision (EU) 2021/477).

Measures in case of positive findings or single cases
Breeding flocks:
A positive flock is destructed or slaughtered and the meat heat treated. Hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella, unless feed can unambiguously be ruled out as the cause of the infection, or if the role of feed in the infection has already been confirmed. The measures are the same for all Salmonella serovars.

3. Notification system in place to the national competent authority

Salmonella has been notifiable since 1995. Salmonella is notifiable in all animals according to the Decree No 325/2021 of the Ministry of Agriculture and Forestry. Salmonella in *Gallus gallus* and in turkeys is classified as an animal disease to be controlled according to Decree No 325/2021 of the Ministry of Agriculture and Forestry. In accordance with the Animal Diseases Act (76/2021) the laboratory must notify 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 *Gallus gallus* breeding flocks in 2021.

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

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

1. Monitoring/Surveillance/Control programmes system

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

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

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

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

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

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

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

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

Breeding flocks: Rearing period: boot swabs

Breeding flocks: Production period: boot swabs and dust swab sample

Meat production flocks:
Before slaughter at farm. Samples taken by the food business operator: boot swabs, Samples taken by the official veterinarian: boot swabs and dust or dust swab sample

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

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

Breeding flocks: Production period:
One pair of 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.

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

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

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

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

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

Diagnostic/analytical methods used
Breeding flocks: Day-old chicks
Bacteriological method: ISO 6579:2002. latest version

Breeding flocks: Rearing period
Bacteriological method: ISO 6579:2002, latest version

Breeding flocks: Production period
Bacteriological method: ISO 6579:2002, latest version

Meat production flocks: Before slaughter at farm
Bacteriological method: ISO 6579:2002, latest version

2. Measures in place

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

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

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

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

Control program/mechanisms
Breeding flocks:
The Finnish Salmonella Control Programme approved by Commission Decision 2009/771/EC (amendments approved by Commission Implementing Decision (EU) 2021/477).

Meat production flocks:
The Finnish Salmonella Control Programme approved by Commission Decision 2009/771/EC (amendments approved by Commission Implementing Decision (EU) 2021/477).

Measures in case of positive findings or single cases
Breeding flocks:
In case of a positive finding the flock is destructed or slaughtered and the meat heat treated. Hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella, unless feed can unambiguously be ruled out as the cause of the infection, or if the role of feed in the infection has already been confirmed. 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

Salmonella has been notifiable since 1995. Salmonella is notifiable in all animals according to the Decree No 325/2021 of the Ministry of Agriculture and Forestry. Salmonella in Gallus gallus and in turkeys is classified as an animal disease to be controlled according to Decree No 325/2021 of the Ministry of Agriculture and Forestry. In accordance with the Animal Diseases Act (76/2021) laboratory must 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 breeding or fattening flocks of turkeys in 2021.

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

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

31. 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: Carcasses are sampled each year randomly from the cattle population. Sampling is carried out by the food business operator under supervision of the official veterinarian. In 2021 the program was amended so that the minimum number of surface swab samples collected each year will be 2100 (previously 3000).
At cutting plants: Sampling is compulsory for all cutting plants. Sampling is done as random sampling; the frequency is depended on the production capacity of the cutting plant. Sampling is carried out by the food business operator under the supervision of the official veterinarian.

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

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

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

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

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

2. Measures in place

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

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

Recent actions taken to control the zoonoses

From 2021 onwards, the yearly target number of samples from bovine carcasses is 2100 (previously 3000). With 2100 randomly taken samples nationwide yearly from bovine carcasses, prevalence of Salmonella spp. less than 0.5% in beef can be demonstrated with a confidence level of 95%.

3. Notification system in place to the national competent authority

The laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Zoonoses (316/2021).

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 in 202**1**. Findings of salmonella spp. in bovine meat are rare.

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

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

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

1. Monitoring/Surveillance/Control programmes system

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

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

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

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

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

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

2. Measures in place

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

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

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

3. Notification system in place to the national competent authority

Laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Zoonoses (316/2021).

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

Results of the investigation
Altogether 254 batches of broiler carcasses, consisting of 1271 single samples, were examined for salmonella. Salmonella spp. was not detected in domestic broiler meat in 2021. Sampling of fresh meat from cutting plants was not reported for 2021.

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.

33. 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: Carcasses of both fattening pigs and sows are sampled each year randomly from the populations. In 2021 the salmonella control program was amended so that the sampling of fattening pigs and sows was merged to a single sampling group so that the sampling of pigs includes both fattening pigs and sows (and boars). The minimum number of surface swab samples collected each year for pigs is 2100 (previously 3000 samples yearly from both fattening pigs and sows). Sampling is carried out by the food business operator under supervision of the official veterinarian.

At cutting plants: Sampling is compulsory for all cutting plants. The sampling is done as random sampling, the frequency depending on the production capacity of the cutting plant. Sampling is carried out by the food business operator under the supervision of the official veterinarian.

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

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

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

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

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

2. Measures in place

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

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

Recent actions taken to control the zoonoses
In 2021 the program was amended so that the sampling of fattening pigs and sows was merged. Sampling of pigs includes both fattening pigs and sows and the minimum number of surface swab samples collected each year for pigs is 2100 (previously 3000 samples yearly from both fattening pigs and sows). As the number of slaughtered sows (including boars) comprises less than two percent of

the total number of slaughtered pigs it was considered unnecessary to retain it as a distinct animal group. In addition, the prevalence of Salmonella spp.in pork has been very low for more than twenty years. Therefore, it was not considered necessary to have surface swab sampling of carcasses of fattening pigs and sows separately. With 2100 randomly taken samples nationwide yearly from pigs, prevalence of Salmonella spp. less than 0.5% in pork can be demonstrated with a confidence level of 95%.

3. Notification system in place to the national competent authority

The laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Zoonoses (316/2021).

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

Results of the investigation
Salmonella Uganda was detected in one slaughterhouse carcass swab sample. Salmonella spp. was not detected in pork meat samples from cutting plants in 2021. Findings of salmonella spp. in pork are rare.

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

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

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

1. Monitoring/Surveillance/Control programmes system

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

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

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

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

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

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

2. Measures in place

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

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

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

3. Notification system in place to the national competent authority

Laboratory must notify the positive results to the competent authority and to the food business operator according to MAF Decree on Zoonoses (316/2021).

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

Results of the investigation
Altogether 56 batches of turkey carcasses, consisting of 271 single samples, were examined for salmonella. Salmonella spp. was not detected in domestic turkey meat in 2021.

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

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

35. Description of Monitoring/Surveillance/Control programmes system: Salmonella in food - Meat from horses, sheep and goat - food sample

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Carcasses of horses, sheep and goat are sampled at slaughterhouses according to the requirements of the Regulation 2073/2005.

Frequency of the sampling
According to the Regulation 2073/2005.

Type of specimen taken
According to the Regulation 2073/2005.

Methods of sampling
According to the Regulation 2073/2005.

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

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

2. Measures in place

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

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

3. Notification system in place to the national competent authority

The laboratory must notify the positive result to the competent authority and to the food business operator according to MAF Decree on Zoonoses (316/2021).

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 of horses or sheep. Samples from goat carcasses were not reported for 2021.

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

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

36. 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's 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 (Feed Act 1263/2020, 6 §). No salmonella food outbreaks with a connection to feed contamination has been detected for decades in Finland.

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

1. Monitoring/Surveillance/Control programmes system

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

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

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

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

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

See also Additional information.

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

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

Methods of sampling (description of sampling techniques)
An aggregate sample taken from the inspected feed lot consists of incremental samples. The size of aggregate sample and the number of incremental samples depends on the size of the feed lot.

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

Diagnostic/analytical methods used
In Finnish Food Authority salmonella is mainly analysed by real time-PCR method and VIDAS method according to ISO 6579 – 1:2017/Amd 1:2020 standard with slight modifications. Analysis methods for salmonella in approved laboratories are based on ISO 6579 – 1:2017 and/or NMKL 71:1999 standards with slight modifications and using real time-PCR or VIDAS equipment. Serotyping is performed when salmonella is detected in a sample.

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

2. Measures in place

The control program/strategies in place
Decree of the Ministry of Agricultural and Forestry on feed business operating (No 1263/2020) demands official control and feed business operators to take samples for salmonella testing. A feed business operator that produces compound feeds for food-producing animals for placing on the market shall take a sample for salmonella testing from the production environment at least once a week and from every production lines separately, where feed materials are received or compound feeds are produced from high-risk feed materials (cereal grains, seeds and fruits of oil plants, legume seeds, other seeds and fruits and products and by-products obtained from them; fish, other aquatic animals and products and by-products obtained from them).

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

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

3. Notification system in place to the national competent authority

Notification system is mandatory and feed operators must inform Finnish Food Authority immediately of salmonella suspicions or findings (Feed Act 1263/2020, 22 §).

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

In official control salmonella was detected in 6 lots of imported feed material of plant origin and in two lots of compound feedingstuffs for fish and in one sample of pet food taken from the domestic manufacturing.

In addition to official control salmonella was detected in the own control of feed operators in 15 lots of imported feed material of plant origin and in one lot of compound feedingstuffs for fish taken from the domestic manufacturing.

Salmonella positive fish feeds did not end up in the feed chain and thus food safety was not compromised.

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.

5. Additional information

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

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

38. General evaluation: Methicillin resistant *Staphylococcus aureus* (MRSA)

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

Livestock-associated Methicillin resistant *Staphylococcus aureus* (LA-MRSA) was first detected from a holding with breeding pigs during the EU baseline study in 2008, indicating a prevalence of 0.1–2.8% on Finnish piglet farms (95% probability). MRSA was not found in top pig breeding holdings with a specific-pathogen-free status in 2012-2013. Since then, MRSA prevalence has increased significantly and nowadays is considered to be commonly found in Finnish pig population. In 2016-2017, MRSA was found in 77% of the tested pig slaughter batches.

The prevalence of MRSA has increased in fresh pork at retail, being at low level in 2015 (3%) and 2017 (6%). In 2021, MRSA prevalence in fresh pork samples was 12.6%. The increase in MRSA prevalence between 2017 and 2021 can partly be explained by the method used. In 2021, the one-step enrichment method was used, and it has been shown to be more sensitive compared to the two-step enrichment which was used in previous study years.

In 2021, MRSA was studied from fur animals, but MRSA was not found.

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

The proportion of livestock-associated MRSA CC398 among all MRSA isolates found in humans has been increasing in the past few years. In 2020, 6.3% of all new MRSA cases found in humans belonged to CC398. The *spa* type t034 has been the most common finding of MRSA CC398 in humans.

People who are constantly in contact with pigs, have an increased risk of becoming MRSA carriers. On the other hand, MRSA is not considered as a major threat via food.

39. Description of Monitoring/Surveillance/Control programmes system: Methicillin resistant *Staphylococcus aureus* (MRSA) in animals – Fur animals

1. Monitoring/Surveillance/Control programmes system

In 2021, MRSA was screened from domestic, farmed fur animals. A convenience sampling was performed from fur animals sent for pathological-anatomical diagnosis or for corona virus screening to the Finnish Food Authority laboratories. Altogether, pharyngeal/nasopharyngeal swab samples originating from 59 different holdings (47 holdings with minks, two holdings with blue foxes and ten holding with raccoon dogs) were screened between January and April 2021. In addition, paw or paw swab samples were taken from the same animals.

From minks, one to three pharyngeal swab samples and one front paw/animal were taken. From animals originating from the same herd, one pharyngeal swab was taken with one swab stick from one to five individual animals. From each animal, one front paw was cut at the carpal joint and paws from one to five animals were treated as one sample.

From blue foxes, one nasopharyngeal swab sample and one paw swab sample were taken from animals originating from the same herd. One pharyngeal and one paw swab were both taken with one swab stick from two individual animals.

In addition, one or two nasopharyngeal swab samples and one or two paw swab samples were taken from animals originating from the same herd. Both samples were taken with one swab stick from one to three raccoon dogs.

Samples were transported to the laboratory within 4 days and the analysis was started within 10 days from the sampling. MRSA was screened using selective enrichment broth and solid media. Briefly, each swab sample was suspended in 3 ml of Mueller Hinton broth with 6.5% NaCl. The amount of Mueller Hinton broth used for the pooled paw samples from minks varied from 40 to 280 ml depending on the weight of the paws. After an incubation at 37°C for 16-20 h, 10 µl of the enrichment broth was spread on MRSA Select2™ (BioRad) and Brilliance MRSA 2 (Oxoid) agar plates and incubated at 37°C for 18-28 h. From each sample, the species determination of at least one presumptive colony/sample was done with MALDI-TOF (Bruker, Germany).

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 not found in any of the samples and the result was similar as in 2020.

40. 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, 206 samples of packed fresh and chilled (not frozen) meat were collected at retail between May and November 2021 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 55% 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=199) and non-domestic (n=7) origin.

Samples were transported refrigerated to the laboratory within one day. The temperature of the meat was measured at the laboratory at arrival. MRSA was screened using selective enrichment broth and solid media. The method used was adapted from the EURL protocol. 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. After incubation, 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 206 meat samples tested, 26 (12.6%) were found positive for MRSA. The *spa* types found were t034 (n=14, domestic meat), t2741 (n=9, domestic meat), t728 (n=1, domestic meat), t4677 (n=1, domestic meat) and t899 (n=1, non-domestic meat). All types except t728 belong to a clonal complex (CC) 398. The *spa* types t034 and t2741 are also common in pigs in Finland but t728 and t4677 have not previously been detected in pork or pigs in Finland. Compared to previous surveys conducted in 2015 and 2017, MRSA prevalence seen to be increasing in pig meat at retail. The increased prevalence might partly be explained by the one-step enrichment method which has been shown to be more sensitive than the previously used two-step enrichment.

41. General evaluation: Toxoplasma

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

Toxoplasmosis caused by *Toxoplasma gondii* is endemic in Finland. In the 2000s, the annual number of reported human infections has fluctuated between 15 and 50 (Finnish National Infectious Diseases Register). Serological surveys indicate that infections in wild animals and domestic ungulates are more common in the southern than in the northern parts of the country. The result is explicable by the parasite's main host, the domestic cat population, which is denser in the south where also most of Finland's inhabitants are living.

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

Probably the best indicator species of *T. gondii* in the nature are wild hares (European brown and mountain hares) due to their distinct pathology. During the period ranging from the year 2000 to 2020 among the hares submitted to necropsy, about 2 – 25 % have been identified as infected. In 2021, *Toxoplasma gondii* was rarely reported in cats and wild hares, but not in dogs, goats, or sheep.

In 2021, 11 human cases were reported. The source of human infections is not known, but it is supposed that humans get infected similarly as elsewhere in the world.

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Monitoring of wild animals is passive and is a part of the general Finnish wildlife disease surveillance. It is based on voluntary submission of animals found dead or killed by hunters, veterinary officials, and private citizens. Moreover, T*oxoplasma gondii* are passively monitored in domestic animals sent for necroscopy to the Finnish Food Authority either by veterinarians or by pet or production animal owners. The samples from the submitted wild and domestic animals are selected by the official pathologists. Sample material from wild, production and pet animals are taken in case of clinical suspicion, but often just to elucidate the unknown cause of death.

Type of specimen taken and diagnostical/analytical methods used
Histological tissue samples are taken whether the animal was showing any clinical signs of infection or not. Some animals, especially wild hares, due to their high susceptibility to toxoplasmosis, have typical lesions visible in necropsy, but in many cases in other species, the infection is subclinical, and will only be discovered by chance. Histological tissue (brain, liver, kidney, lung, spleen) samples are H-E stained and examined by microscopy. No sensitive specific methods, such as immunohistochemistry, are used for screening, but might be used for confirmation.

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

2. Measures in place

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

3. Notification system in place to the national competent authority

Toxoplasmosis is classified as a monthly reported animal disease in swine, sheep, goats, dogs, cats and ferrets according to Decree 325/2021 of the Ministry of Agriculture and Forestry.

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

Results of the investigations
In 2021, 171 European brown hares and 28 mountain hares were subject to necropsy, whereof three European brown hares were *T. gondii* positive (1.8 %). Of 219 cats, three were found ***T. gondii*** positive (1.4 %). None of the 538 dogs or 64 sheep examined was positive.

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

43. General evaluation: Trichinellosis

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

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, apart from one outdoor-reared Mangalica swine in 2021. The infection was known in the brown bear and other wildlife during the 1950s, but since the 1980s Trichinella 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.

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

National evaluation of the recent situation, the trends and sources of infection
Trichinella has not re-emerged in domestic swine during the past five years. However, no sign of decrease in prevalence in wildlife has been seen. The apparent change in swine during past decades may be due to the pig production becoming more intensive with bigger and more modern industrialized units. In wildlife, a big proportion of infections are caused by *T. nativa*, the arctic species, which does not readily infect swine.
Analysis of *Trichinella* species in wildlife in 2014 revealed a marked decrease in the occurrence of *T. spiralis*, the most important species in swine. In an earlier Finnish study (material from 1999-2005), the proportion of *T. spiralis* was 12.8% in infected wildlife, but in 2014 it was only 0.7%. *Trichinella 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.

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 2021). 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.

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

1. Monitoring/Surveillance/Control programmes system

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

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

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

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

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

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

2. Measures in place

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

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

3. Notification system in place to the national competent authority

Trichinellosis is a notifiable disease in all animals according to the Decree No 325/2021 **o**f the Ministry of Agriculture and Forestry. Positive result in Trichinella testing at meat inspection must be notified and confirmed at National Reference Laboratory in the Finnish Food Authority. Suspected or confirmed Trichinella infection in animals must be notified by a veterinarian, laboratory, or authorities at latest the next working day.

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

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

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

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

Finland

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

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
Pigs: Trichinella testing is mandatory to all commercial pork production except for swine originating from officially recognized controlled housing conditions according to regulation 2015/1375. During the year 2021, one holding had the status of being officially recognized for controlled housing conditions. In total 499 pigs originating from this holding were not examined for Trichinella infection in the year 2021. All other pigs are examined for Trichinella infection at obligatory, official meat inspection at the slaughterhouse. Finland implemented the possibility provided in Article 3 paragraph 3 b of Regulation (EU) No 2015/1375 to cease testing for Trichinella of pigs originating in holdings or compartments applying controlled housing conditions. The Finnish Food Authority is the competent authority that officially recognizes holdings and compartments applying controlled housing conditions. Some pigs originating from controlled housing conditions are slaughtered at a slaughterhouse which tests all slaughtered pigs for Trichinella. Therefore, some pigs from controlled housing conditions are tested for Trichinella.
Farmed wild boar and other pigs raised outdoors: 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 2021). All other pigs and wild boar are examined for Trichinella infection at meat inspection.

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

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

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

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

2. Measures in place

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

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

3. Notification system in place to the national competent authority

Notification system in place
Trichinellosis is a notifiable disease in all animals according to the Decree No 325/2021 of the Ministry of Agriculture and Forestry. A positive result in Trichinella testing at meat inspection must be notified and confirmed at National Reference Laboratory in the Finnish Food Authority.

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
In 2021, two *Trichinella* positive swine were confirmed. *Trichinella nativa* was found in a Mangalica pig raised outdoors. A mixed infection with *T. nativa* and *T. britovi* was found in a hunted wild boar.

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 "conventionally" reared domestic pig was found in 2010. Now, *Trichinella* incidence and prevalence in domestic swine in Finland seem to be negligible despite of its persisting abundance in wildlife. This may be caused by the change in swine husbandry, which has become more industrialized during the 2000's. Therefore, small family farms with old pighouses have disappeared. In addition, the infection pressure caused by wildlife toward pigs has probably decreased because of the changes in distribution of *Trichinella* species prevalent in wildlife*, T. nativa* currently being the overwhelmingly dominant one. However, wild boar meat can still pose a risk although infections have been rather rare (positive cases found ca. every other year in the last 10 years). Free-ranging wild boar can have contacts with *Trichinella* infected wild mammals and birds.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)
The risk of obtaining trichinellosis from pig meat is negligible. The Mangalica pig with the finding was raised outdoors, not in conventional commercial farming. The positive findings in wild boar during the last five years indicate the importance of Trichinella examination and thorough cooking of the meat even when the meat is intended for farmer's or hunter's personal use only. While *T. nativa* has very low infectivity to swine and rats, it is known to readily infect human beings.

5. Additional information

Number of officially recognised Trichinella-free holdings
During the year 2021, one holding was recognized officially as a holding applying controlled housing conditions according to regulation 2015/1375.

Categories of holdings officially recognised Trichinella-free
None

Officially recognised regions with negligible Trichinella risk
None

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

1. Monitoring/Surveillance/Control programmes system

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

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

Frequency of the sampling
Continuous sampling

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

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

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

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

2. Measures in place

The control strategies in place
No control programs or mechanisms in place. Hunters are advised to have *Trichinella* testing done to the carcass of a susceptible animal species if they wish to eat it and to cook the meat thoroughly.

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

3. Notification system in place to the national competent authority

Positive results in *Trichinella* testing must be confirmed at National Reference Laboratory in the Finnish Food Authority.

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

Prevalence of *Trichinella* spp. was high in carnivores: 46% in wolves, 50% in lynx, 40% in raccoon dogs and 48% in foxes. Two birds (an eagle-owl *Bubo bubo* and a goshawk *Accipiter gentilis*) were found *Trichinella* positive. Species identification is made in NRL of larvae found in birds and in samples sent in for meat inspection or confirmation of results. In carnivores, *T. nativa* was the most common species but *T. pseudospiralis* was found in a brown bear and and *T. pseudospiralis* in a wild boar with simultaneous *T. nativa* infection. The positive birds were infected with *T. pseudospiralis*. The sample size i.e. effort did not change essentially from previous year. Species identification of *Trichinella* larvae isolated in the ongoing surveillance of wildlife will be performed later.

National evaluation of the recent situation, the trends and sources of infection
The prevalence of *Trichinella* spp. has remained high in wild carnivores. In wildlife, a big proportion of infections are caused by *T. nativa*, the arctic species, which does not readily infect swine. Sporadic infections in wild boar caused by *T. nativa* have been reported elsewhere, too. However, a considerable proportion of wild boars, although *Trichinella* negative in meat inspection, have been found seropositive to *Trichinella*. This has been interpreted as evidence of exposure to T. nativa, most often not leading to infection. Analysis of *Trichinella* species in wildlife in 2014 revealed a marked decrease in the occurrence of *T. spiralis*, the most important species in swine.

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

47. General evaluation: Tularaemia

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

Human cases of tularaemia were already diagnosed in the 1930's but the disease seemed to be rather rare in Finland compared to neighbouring Sweden. Human outbreaks have been more often observed since the 1960's. In animals (mainly hares *Lepus* sp.), tularaemia has been diagnosed since the 1980's.

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

Tularaemia is considered endemic in Finland and cases occur regularly in the same areas of western and southern Finland. The occurrence varies considerably between years but typically both human and animal cases peak every third or fourth year. Since 1995, the annual number of human cases has varied between 7-926 (Finnish National Infectious Diseases Register). In 2021, 86 human cases were reported.

In the 2000's, ca. 70-150 hares have been examined annually of which 0-35 per year have been diagnosed with tularaemia. The mountain hare (*Lepus timidus*) and the European brown hare (*L. europaeus*) are the animal species most often affected. Voles (Arvicolinae) are considered the reservoir of *F. tularensis* and their cyclic population fluctuations are reflected on human and other animal cases. Humans are mostly infected by blood-feeding mosquitoes. Other notable routes are inhalation of aerosols and careless handling of infected animals. The disease is most common in late summer and autumn (July – September).

48. Description of Monitoring/Surveillance/Control programmes system: Tulareamia

1. Monitoring/Surveillance/Control programmes system

Sampling strategy

Monitoring in animals is passive and is a part of the general Finnish wildlife disease surveillance. It is based on voluntary submission of animals found dead or euthanised by hunters, veterinary officials, and private citizens.

Type of specimen taken and diagnostical/analytical methods used

Organ samples of suspected cases are taken during necropsy. Detection of *F. tularensis* is based on indirect immunofluorescence anti-body test (IFAT) of the tissue sample.

Case definition

Typical pathological lesions and positive IFAT test.

2. Measures in place

No control measures.

3. Notification system in place to the national competent authority

Tularaemia is a notifiable disease in all animals according to the Decree 325/2021 of the Ministry of Agriculture and Forestry**.**

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

Results of the investigations
In 2021, a total of 199 hares (171 European brown hares and 28 mountain hares) were necropsied. Based on pathological and bacteriological findings, 28 European brown hares and 2 mountain hares were diagnosed with tularaemia. In addition, a muskrat (*Ondatra zibethicus***)** was found tularaemia positive.

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

The case numbers in hares were high in 2020 compared to three previous years and remained on similar level in 2021. Cases were found from geographical areas previously known to be endemic but few cases were also detected in some new areas in southern Finland.

49. General evaluation: Yersiniosis

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

The number of reported cases of human yersiniosis has been between around 550 per year, most of which are caused by Yersinia enterocolitica.[13]

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

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

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

National surveys on Yersinia in food are carried out occasionally, but not in 2021**.**

[13] The National Institute of Health and Welfare, Infectious disease register.

50. General evaluation: West Nile Virus

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

WNV infection has never been detected in animals, and according to the Finnish National Infectious Diseases Register, no human WNV cases have been detected in period of 1980-2021 in Finland.

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

As there is no indication for the WNV in Finland, the risk for humans is considered very low. The national situation remains favourable.

51. Description of Monitoring/Surveillance/Control programmes system: West Nile Virus

1. Monitoring/Surveillance/Control programmes system

Sampling strategy
There is no official monitoring or surveillance programme. Birds and horses with neurological symptoms could be tested but in 2021 no such cases were detected.

In 2021 there was horse and wild bird samples tested in a research project:

- horses: healthy finnhorse stallions (representing native domestic horses), samples collected for AI health sceme (MAF Decree 780/2014)
- wild birds: found dead in wild with clinical/pathological findings matching WNV disease, samples selected by the investigating pathologist

Type of specimen taken and diagnostical/analytical methods used
Serum samples are tested by two ELISA tests (IgM and IgG) and organ samples are tested by PCR (real time RT-PCR).

Case definition
The animal is seropositive if the ELISA test is positive.
The animal is acutely infected if the IgM ELISA test is positive and/or if the PCR is positive.

2. Measures in place

There are no official control measures in place.

3. Notification system in place to the national competent authority

West Nile Fever is notifiable disease in Equidae and Aves according to the Regulation (EU) 2016/429 of the European Parliament and the Council and the Animal Disease Act 76/2021.

A suspected or confirmed WN-fever in Equidae and Aves must be notified “as soon as practicable” by the owners etc. and “without delay” by authorities (Animal Diseases Act 76/2021 and Degree 325/2021 of the MAF).

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

Results of the investigations
In 2021 in a research project 72 serum samples from 72 horses were tested for WNV antibodies (ELISA tests) with negative results, and 27 organ samples from 25 wild birds were tested for WN virus (PCR) with negative results.

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

52. Food-borne Outbreaks

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

The systematic collection of information about food-borne outbreaks in Finland began in 1975. Local outbreak investigation groups, consisting of food control and health officials, are responsible for the investigation and reporting of food-borne outbreaks in their area. Collection of information takes place based on the Food Act (297/2021), the Health Protection Act (763/1994), the Communicable Disease Act (1227/2016), the Decree concerning the follow-up and reporting of food- and water-borne outbreaks (1365/2011) and the Communicable Diseases Decree (146/2017). Physicians notify all cases of communicable diseases listed in the Communicable Diseases Decree to the National Institute for Health and Welfare (THL). The data is recorded in the National Infectious Diseases Register in Finland. The local outbreak investigation group notify THL without delay in case an outbreak is suspected. The local outbreak investigation groups investigate suspected food- and water-borne outbreaks in their area and report them to the Finnish Food Authority. The notification and investigation reports are submitted using 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 water-borne outbreaks. The investigation reports should be submitted within three months after the outbreak. In case of geographically larger outbreaks, THL and The Finnish Food Authority coordinate the investigations with the local outbreak investigation groups.
The electronic reporting system also stores the data in the National Food Borne Outbreaks Register (NFWDR). The system has been in use since 2010. By the introduction of the electronic reporting system, the pick lists used for the collection of data into the NFWDR were harmonized with the EFSA data collection at the EU level. The Finnish Food Authority evaluates each outbreak investigation report in co-operation with THL 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 every third year. In September 2021 the Finnish Food Authority published a web site with open data from the outbreaks https://avointieto.ruokavirasto.fi/#/elintarvike/rymy (only in Finnish).

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

All domestic food- and water-borne outbreaks must be reported in Finland. Illness of at least two persons with similar symptoms from a single source is considered a cluster and a suspected outbreak. Sporadic cases and infections acquired abroad are not included in the NFWDR, whereas they are included in the infectious disease register. Obligatory reporting includes all food-borne agents, also those caused by chemical agents and toxins. Food-borne 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 2021, the local outbreak investigation groups notified 48 food- and water-borne outbreaks, of which 46 (96%) were associated with food and two (4%) with drinking water. The total number of outbreaks was higher than last year but lower than the year before. Since 2001, most of the annually reported outbreaks have been food-borne. The number of reported outbreaks has fluctuated between 32 and 75 with a few year intervals. The lowest number, 32 outbreaks, was recorded in 2007.

The number of human cases involved in food-borne outbreaks typically varies between 800 and 2000 annually and usually follows the number of outbreaks. In 2021, the number of human cases (1385) was average. In 2021, like in the two previous years, most outbreaks (31 outbreaks; 65%) were small (2-10 persons fallen ill). 16 outbreaks (33%) were medium sized (11-100 persons fallen ill), and one outbreak was large (over 100 persons fallen ill).

The relevance of the different causative agents, food categories and the agent/food category combinations:
During the last ten years the most commonly identified causative agent has been norovirus. In 2021 norovirus caused nine (19%) food-borne and one water-borne outbreak. In 2021, the number of outbreaks caused by bacteria (28; 58%) was the highest for more than ten years, while the number of outbreaks with an unknown causative agent (7 food-borne, 1 water-borne; 17%) was the lowest. *Salmonella* caused seven outbreaks, one of which was very large, with more than 700 persons falling ill. Different toxin producers (*Clostridium perfringens*, *Staphylococcus aureus* and unidentified toxin producers) caused eight outbreaks and *Campylobacter sp.* six outbreaks. *Listeria monocytogenes*, VTEC and *Yersinia enterocolitica* caused two outbreaks each and ETEC and EAEC together one. Other causative agents identified in 2021 were hepatitis A virus and histamine each causing one outbreak.
The most common vehicle (54%) reported in 2021 was a buffet meal or mixed food with no specific food item determined as the vehicle of the outbreak. However, in these cases the investigations showed descriptive epidemiological association between eating a certain food or meal and becoming ill. The investigations revealed a specific food to be the vehicle of the outbreak in 17 (35 %) outbreaks.

The relevance of the different type of places of food production and preparation in outbreaks:
In 20 (42%) outbreaks in 2021, the place of exposure was a restaurant. In 11 (23%) outbreaks the place of origin of the problem leading to the outbreak was a restaurant. Four (8%) food-borne outbreaks were related to contamination at primary production (different vegetables). The place of origin of problem remained unknown in 24 (50%) of the outbreaks.

Evaluation of the severity of the human cases:
Altogether 1385 persons were reported to have fallen ill in food- and water-borne outbreaks in 2021. The number of patients afflicted by food poisoning was 1378 (99%), while 7 persons (1%) were infected through contaminated drinking water. According to the reports, a total of 28 persons were hospitalized in 11 outbreaks. No death was reported in 2021.

4. Descriptions of single outbreaks of special interest

In June, more people with salmonellosis were diagnosed in Central Finland. A total of 620 children and 108 employees fell ill after eating lunch at different kindergartens. The kindergartens were connected to a common central kitchen. The outbreak was caused by *Salmonella* Typhimurium. A similar salmonella strain was isolated from samples of both patients and a salad containing several different vegetables (lettuce, cucumber and peas).

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

In general, all food- and water-borne outbreaks are investigated by local food control and health officials. In widespread outbreaks, the central administration coordinates the investigations. An investigation comprises an epidemiological investigation, detection of contributing factors, sampling and revision of the in-house control system. Information received about food-borne outbreaks, contributory factors, food vehicles and causative agents are analysed and actively used in the education and training of food control officials and food business operators. Since January 2005, all food handlers who work on food premises and handle unpackaged easily perishable foodstuffs must demonstrate their proficiency by obtaining a hygiene proficiency certificate. Independent Proficiency Examiners accredited by the Finnish Food Authority organize hygiene proficiency examinations in different parts of the country. Information and recommendations concerning identified causative agents, risk foods or raw material are given to entrepreneurs, producers and consumers. The Finnish salmonella control programme has successfully ensured that the prevalence of *Salmonella* in meat is below 0.5 per cent. Only a small number of human salmonellosis infections are domestically acquired. The prevailing national system for monitoring and surveillance of zoonoses covers *Campylobacter* and the STEC bacterium in production animals or foodstuffs. The Finnish Strategy on Zoonoses highlights

Campylobacter, *Yersinia*, *Listeria*, the STEC bacterium and norovirus as the main food-borne agents that the key actions are targeted on. The strategy is under revision. The network-like Finnish Zoonosis Centre between the national organizations; the Finnish Food Authority and THL, 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.

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

Finnish Food Authority (Ruokavirasto)

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

54. General Antimicrobial Resistance Evaluation

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

According to the results from FINRES-Vet monitoring programme, starting from 2002, resistance was only occasionally detected in *Campylobacter* spp. isolated from food-producing animals. However, during the last decade, resistance levels have slightly changed as resistance to especially fluoroquinolones has been variably detected 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. Multidrug resistance or resistance to critically important antimicrobials in *Salmonella enterica* has been very rare. Decreased susceptibility to colistin has mainly been detected in *S.* Enteritidis but also in other serotypes. However, no known resistance mechanisms were detected. In recent years, salmonella isolates resistant to several antimicrobial have been encountered more often.

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. ESBL or AmpC producing *E. coli* were quite commonly found in broilers and broiler meat in 2016 and 2018 in Finland but the prevalence of these bacteria decreased significantly being very low both in broilers and broiler meat in 2020. The prevalence of ESBL/AmpC *E. coli* is very low in Finnish pigs and cattle as well as in beef and pork at retail.

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

As resistance situation is favorable in domestic food-producing animals and meat thereof, Finnish food of animal origin is likely not an important source for AMR in the human population.

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

Finland's current National Action Plan on Antimicrobial Resistance for the years 2017–2021 was extended by one year until the end of 2022 due to COVID-19 epidemic. The new NAP is scheduled to be prepared by the end of 2022. The current NAP highlights the prudent use of antimicrobial drugs as well as the prevention of infections and the spread of drug-resistant microbes. Prevention efforts take into account people, animals, food and the environment. Antimicrobials must be used correctly and responsibly when treating people and animals.

4. Additional information

The national production of meat of bovine animals under one year of age in Finland in less than 10000 tonnes per year, therefore the population of bovines under one year of age were not included in the resistance monitoring in 2021. Also, imported fresh meat from pigs originating from third countries was not included in the monitoring because no consignments of fresh meat from pigs were imported to Finland in 2021.

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

1. General description of sampling design and strategy

Samples from slaughter broilers originated from a national *Campylobacter* monitoring programme. For details of the sampling design and strategy, see text for Thermophilic *Campylobacter* in animals - *Gallus gallus* (fowl) - broilers. Most of the samples are collected in the summer when the prevalence of campylobacters in broilers, in Finland, is known to be the highest.

2. Stratification procedure per animal population and food category

In 2021, sampling included the slaughterhouses that accounted for >99% of all broilers slaughtered in Finland. Sampling was composed from census sampling between June and October, and random sampling during rest of the year. For the period of random sampling, the sampling was evenly distributed between the months, and the number of samples to be collected from each slaughterhouse was calculated using proportionate stratified sampling based on the production volumes of the slaughterhouses from the previous year.

3. Randomisation procedure per animal population and food category

For the period of random sampling, the tested broiler batches were selected randomly.

One isolate per epidemiological unit (flock) was included in the antimicrobial susceptibility testing.

4. Analytical method used for detection and confirmation

Details of the laboratory methodology for isolation and confirmation are described in the text for Thermophilic *Campylobacter* in animals - *Gallus gallus* (fowl) - broilers.

5. Laboratory methodology used for detection of antimicrobial resistance

The phenotypic susceptibility testing was performed with broth microdilution method according to CLSI using *Campylobacter jejuni* ATCC 33560 as a quality control strain. The antimicrobials tested are laid down in Commission Implementing Decision (EU) 2020/1729. Epidemiological cut-off values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

6. Library preparation used

Not applicable

7. Version of the predictive tool

Not applicable

8. Results of investigation

Altogether, 144 *C. jejuni* were tested for susceptibility in 2021. Resistance to the tested antimicrobials was overall low (2.8% for ciprofloxacin, 0.7% for tetracycline). Resistance to ciprofloxacin has fluctuated between 2014 and 2021 from none to 25.5% but resistance to erythromycin has always been at a low level. The reasons for increased quinolone resistance in certain years are not known as

antimicrobials are rarely used in the broiler production chain in Finland and not at all in the production-level flocks (Animal Health ETT ry).

56. General Description of Antimicrobial Resistance Monitoring; Campylobacter coli – Broilers

1. General description of sampling design and strategy

See text 55. General Description of Antimicrobial Resistance Monitoring; Campylobacter jejuni – Broilers

2. Stratification procedure per animal population and food category

See text 55. General Description of Antimicrobial Resistance Monitoring; Campylobacter jejuni – Broilers

3. Randomisation procedure per animal population and food category

See text 55. General Description of Antimicrobial Resistance Monitoring; Campylobacter jejuni – Broilers

4. Analytical method used for detection and confirmation

Details of the laboratory methodology for isolation and confirmation are described in the text for Thermophilic *Campylobacter* in animals - *Gallus gallus* (fowl) - broilers.

5. Laboratory methodology used for detection of antimicrobial resistance

See text 55. General Description of Antimicrobial Resistance Monitoring; Campylobacter jejuni – Broilers

6. Library preparation used

Not applicable

7. Version of the predictive tool

Not applicable

8. Results of investigation

Altogether, five *C. coli* isolates were tested for susceptibility in 2021. Resistance to the tested antimicrobials was overall nonexistent with the exception of ciprofloxacin, for which 3/5 (60%) of the tested isolates were resistant. This was the first year that *C. coli* from broilers was tested as part of the monitoring, so there is no data from previous years for comparison.

57. General Description of Antimicrobial Resistance Monitoring; Campylobacter coli - Pigs

1. General description of sampling design and strategy

Caecal samples were collected from animals originating from the three biggest slaughterhouses that accounted for >98% of all pigs slaughtered in Finland. Altogether, 307 caecal samples were collected at slaughter from healthy animals between February and December in 2021. Sampling was evenly distributed throughout the study period. From each epidemiological unit (slaughter batch), sample was taken from one animal. The samples were taken aseptically and transported refrigerated to the laboratory within 2 days. Samples were collected between Monday and Thursday.

2. Stratification procedure per animal population and food category

The number of randomly taken samples from each slaughterhouse was calculated using proportionate stratified sampling based on the production volumes of the slaughterhouses from the year 2020. The sampling was evenly distributed throughout the study period and the number of samples to be collected was allocated on a monthly basis. One slaughterhouse failed to deliver samples throughout the year according to the plan.

3. Randomisation procedure per animal population and food category

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

Campylobacter coli isolates (one per epidemiological unit) were randomly selected for susceptibility testing.

4. Analytical method used for detection and confirmation

Generally, the SVA protocol for isolation, identification and storage of *Campylobacter coli* for the EU monitoring of antimicrobial resistance (version 1, 2020) was followed.

In short, for the isolation of campylobacter from swine, caecal content was directly spread on mCCD (Oxoid) and Butzler (prepared in-house) agars using 10 µl loops. The plates were then incubated at 41.5 °C for 44+/- 4 hours (possibly up to 72 hours) and typical looking colonies were pure-cultured on blood agars and incubated at 41.5 °C or 37 C for 24-48 hours. Presumptive campylobacter colonies were then re-cultured on blood agars and incubated as in the first round of pure culturing.

Presumptive campylobacter colonies from the second-round pure cultures were confirmed with MALDI-TOF (Bruker, Germany).

5. Laboratory methodology used for detection of antimicrobial resistance

Altogether, 170 indicator *C. coli* isolates were tested for antimicrobial susceptibility.

The phenotypic susceptibility testing was performed with broth microdilution method according to CLSI using *Campylobacter jejuni* ATCC 33560 as a quality control strain. The antimicrobials tested are laid down in Commission Implementing Decision (EU) 2020/1729. Epidemiological cut-off values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

6. Library preparation used

Not applicable
7. Version of the predictive tool
Not applicable
8. Results of investigation
Resistance among *C. coli* from pigs was overall low or non-existent except for fluoroquinolones. Resistance was detected against ciprofloxacin (33.5%) and one isolate out of 170 (0.6%) was also resistant to erythromycin. Resistance to ciprofloxacin has been less than 20% in the two previous sampling years (2013, 2017) so an increase of more than 10 percentage points was seen in 2021. Of all the isolates included, 65.9% were susceptible to all antimicrobial classes tested.

58. 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.

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 (one serotype per epidemiological unit) are included in the antimicrobial 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 phenotypic susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Commission Implementing Decision (EU) 2020/1729. All *E. coli* isolates were tested with the first panel according to Decision (EU) 2020/1729. If a MIC value to cefotaxime, ceftazidime or meropenem was above the ECOFF, the isolate was further tested with the second panel. Epidemiological cut-off values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

6. Library preparation used

Not applicable

7. Version of the predictive tool

Not applicable

8. Results of investigation

In 2021, 27 salmonella isolates from cattle were tested for susceptibility. Isolates were sensitive to the tested antimicrobials except for two *S*. Kentucky (resistant to six antimicrobials) and three *S*. Typhimurium (resistant to five or six antimicrobials). Two *S*. Typhimurium isolates with colistin MIC >2 were subjected to whole-genome sequencing but no known resistance mechanisms for colistin were found. Within the Finnish *Salmonella* control programme, the number of *Salmonella* spp. isolated from bovine animals has been low each year. Taken account of the low salmonella prevalence and the

overall low resistance levels, the antimicrobial susceptibility situation continues to be favourable although in recent years, resistance has been detected more often.

Finland

59. 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.

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 (one serotype per epidemiological unit) are included in the antimicrobial 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 phenotypic susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Commission Implementing Decision (EU) 2020/1729. All *E. coli* isolates were tested with the first panel according to Decision (EU) 2020/1729. If a MIC value to cefotaxime, ceftazidime or meropenem was above the ECOFF, the isolate was further tested with the second panel. Epidemiological cut-off values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

6. Library preparation used

Not applicable

7. Version of the predictive tool

Not applicable

8. Results of investigation

In 2021, 16 salmonella isolates from pigs were tested for susceptibility. Resistance was found in two monophasic *S*. Typhimurium (resistant to ampicillin, sulfamethoxazole and tetracycline). Other salmonella isolates from pigs were susceptible to the tested antimicrobials. 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.

60. 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.

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 (one serotype per epidemiological unit) are included in the antimicrobial 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 phenotypic susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Commission Implementing Decision (EU) 2020/1729. All *E. coli* isolates were tested with the first panel according to Decision (EU) 2020/1729. If a MIC value to cefotaxime, ceftazidime or meropenem was above the ECOFF, the isolate was further tested with the second panel. Epidemiological cut-off values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

6. Library preparation used

Not applicable

7. Version of the predictive tool

Not applicable

8. Results of investigation

In 2021, seven salmonella isolates from *Gallus gallus* were tested for susceptibility. One *S.* Typhimurium was resistant to tetracycline, trimethoprim and tigecycline. Tigecycline MIC value 1 was just above the epidemiological cut-off value. 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 rarely detected. Therefore, the antimicrobial susceptibility situation continues to be very favourable.

61. General Description of Antimicrobial Resistance Monitoring; Escherichia coli – non-pathogenic – Pigs

1. General description of sampling design and strategy

Caecal samples were collected from animals originating from the three biggest slaughterhouses that accounted for >98% of all pigs slaughtered in Finland. Altogether, 307 caecal samples were collected at slaughter from healthy animals between February and December in 2021. Sampling was evenly distributed throughout the study period. From each epidemiological unit (slaughter batch), sample was taken from one animal. The samples were taken aseptically and transported refrigerated to the laboratory within 2 days. Samples were collected between Monday and Thursday.

2. Stratification procedure per animal population and food category

The number of randomly taken samples from each slaughterhouse was calculated using proportionate stratified sampling based on the production volumes of the slaghterhouses from the year 2020. The sampling was evenly distributed throughout the study period and the number of samples to be collected was allocated on a monthly basis. One slaughterhouse failed to deliver samples throughout the year according to the plan.

3. Randomisation procedure per animal population and food category

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

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

4. Analytical method used for detection and confirmation

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

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

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

5. Laboratory methodology used for detection of antimicrobial resistance

Altogether, 170 indicator *E. coli* isolates aa well as all isolates from the specific monitoring of ESBL/AmpC/carbapenemase producing *E. coli* (n=20) were tested for antimicrobial susceptibility.

The phenotypic susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Commission Implementing Decision (EU) 2020/1729. All *E. coli* isolates were tested with the first panel according to Decision (EU) 2020/1729. If a MIC value to cefotaxime, ceftazidime or meropenem was above the ECOFF, the isolate was further tested with the second panel. Epidemiological cut-off

values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

All presumptive ESBL/AmpC/carbapenemase producing *E. coli* (n=20) were also subjected to whole-genome sequencing. The guidelines of the EURL-AR protocol version 2.2 for whole-genome sequencing and bioinformatic analysis of bacterial isolates related to the EU monitoring of antimicrobial resistance were followed using an in-house equipment (Illumina MiSeq) and workflow. Analysis of the antimicrobial resistance genes were performed using EFSA AMR WGS pipeline in April or May 2022.

6. Library preparation used

Library was prepared using Illumina DNA Prep kit following manufacturer's instructions.

7. Version of the predictive tool

Genes conferring resistance to betalactams were analysed with EFSA AMR WGS gene detection service that uses ResFinder 4.1.

8. Results of investigation

Resistance among indicator *E. coli* from pigs was overall low or moderate. Resistance was detected against tetracycline (14.1%), sulfamethoxazole and trimethoprim (12.4%), and ampicillin (8.2%). Resistance to tetracycline has been decreasing since 2013 but was now at the same level as in 2019. Of all the isolates tested, 77.6% were susceptible to all antimicrobial classes tested.

From the specific monitoring, ESBL/AmpC-producing *E. coli* was found from 20 samples (6.5%). The prevalence of ESBL/AmpC-producing *E. coli* in broilers has increased compared to the previous study years in 2017 and 2019 when these bacteria were found in 2.7% and 2.4% of the samples, respectively. Two isolates that were phenotypically ESBL producers, had *bla*CTX-M-15 gene (100% identity and 100% coverage). Among the phenotypically determined AmpC producing *E. coli* (n=18), the majority (n=16) had a C42T mutation in *ampC* promoter region and one isolate had a T32A mutation. One AmpC isolate was confirmed having *bla*CMY-2 gene (100% identity and 100% coverage).

Finland

62. General Description of Antimicrobial Resistance Monitoring; Escherichia coli – non-pathogenic – Fur animals

1. General description of sampling design and strategy

A convenience sampling was performed from fur animals sent for pathological-anatomical diagnosis or for corona virus screening to the Finnish Food Authority laboratories. Altogether, 76 rectal swab samples originating from 59 different holdings (47 holdings with minks, two holdings with blue fox and ten holdings with raccoon dogs) were screened between January and April 2021.
One, one to two or one to three faecal samples were taken from blue foxes, raccoon dogs or minks, respectively, from animals originating from the same herd. Each sample was taken with one swab stick directly from rectum from one to five individual animals.

2. Stratification procedure per animal population and food category

Convenience sampling

3. Randomisation procedure per animal population and food category

All presumptive ESBL/AmpC *E. coli* were tested for susceptibility.

4. Analytical method used for detection and confirmation

The screening of ESBL/AmpC and carbapenemase producing *E. coli* was done following the latest EURL 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 following antimicrobials were included in the susceptibility testing: ampicillin, azithromycin, cefepime, ceftazidime, ceftazidime/clavulanic acid, cefotaxime, cefotaxime/clavulanic acid, cefoxitin, chloramphenicol, ciprofloxacin, colistin, gentamicin, ertapenem, imipenem, meropenem, nalidixic acid, sulfamethoxazole, temocillin, tetracycline, tigecycline and trimethoprim. Epidemiological cut-off values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

6. Library preparation used

Not applicable

7. Version of the predictive tool

Not applicable

8. Results of investigation

One phenotypically confirmed ESBL *E. coli* was found from minks.

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

1. General description of sampling design and strategy

In 2021, meat samples from bovines were collected from retail shops and border control posts.

Samples from retail shops

Altogether, 308 samples of packed fresh and chilled (not frozen) meat were collected at retail between January and December to represent the pig meat on market in Finland. Sampling was evenly distributed throughout the study period and was allocated according to meat batches.

The meat samples were sliced or diced and wrapped in vacuum or in a controlled atmosphere. The majority of the samples (97%) were of domestic origin. Samples were collected from Monday to Thursday except for the biggest NUTS-3 area, where samples were also collected on Fridays. The samples were transported refrigerated to the laboratory within 1 day and the temperature of the meat was measured at the laboratory at arrival.

Samples from border control posts (samples from third countries)

One meat sample including three packed, fresh, and chilled (not frozen) sub-samples from one consignment, was collected. The sample was transported refrigerated to the laboratory on the sampling day and the temperature of the meat was measured at the laboratory at arrival.

2. Stratification procedure per animal population and food category

Samples from retail shops

Samples collected from retail shops were from five different NUTS-3 areas, covering approximately 55% of the Finnish population. From the NUTS-3 areas included in the sampling, the number of samples to be collected was proportional to the inhabitant size. Because of the nature of the Finnish market (small size, only a few distributors) same batches of the product can be found throughout the country and at different retail outlets. The sampling was evenly distributed throughout the study period and the number of samples to be collected was allocated on a monthly basis.

Samples from border control posts

Import of bovine meat from third countries to Finland is very limited. Due to a small number of consignments from third countries, one consignment per country of origin per BCP was planned to be taken in 2021. In 2021, six consignments of fresh bovine meat were imported to Finland. All these consignments originated from same country, and imported through same border control post. Therefore, only one consignment was sampled and included in the resistance monitoring in 2021.

3. Randomisation procedure per animal population and food category

Samples from retail shops were randomly selected.

One isolate from each epidemiological unit (if available) was selected for susceptibility testing.

4. Analytical method used for detection and confirmation

All meat samples were screened for ESBL, AmpC and carbapenemase producing bacteria following the latest EURL protocol. From the sample from border control post, isolation of indicator *E. coli* was also performed.

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)

For the isolation of indicator *E. coli*, three sub samples were enriched in buffered peptone water (25g/225 ml) and after an overnight incubation at 37°C, 10 µl of the suspension was spread on Brilliance *E. coli*/coliform selective agar (Oxoid) and Harlequin tryptone bile glucuronide agar plates (Neogen). After an overnight incubation at 44°C, typical colonies were subsequently spread on blood agar plates and stored at -80°C until susceptibility testing.

5. Laboratory methodology used for detection of antimicrobial resistance

The phenotypic susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Commission Implementing Decision (EU) 2020/1729. All *E. coli* isolates were tested with the first panel according to Decision (EU) 2020/1729. If a MIC value to cefotaxime, ceftazidime or meropenem was above the ECOFF, the isolate was further tested with the second panel. Epidemiological cut-off values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

6. Library preparation used

Not applicable

7. Version of the predictive tool

Not applicable

8. Results of investigation

Samples from retail shops

ESBL, AmpC or carbapenemase producing *E. coli* was not found in any of the bovine meat samples collected at retail. The situation remains very favourable.

Samples from border control posts

ESBL, AmpC or carbapenemase producing *E. coli* was not found in the sample collected at border control post. One indicator *E. coli* was tested for susceptibility but resistance to any of the tested antimicrobials was not detected.

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

1. General description of sampling design and strategy

Altogether, 313 samples of packed fresh and chilled (not frozen) meat were collected at retail between January and December to represent the pig meat on market in Finland. Sampling was evenly distributed throughout the study period. Sampling was allocated according to meat batches.

The meat samples were sliced or diced and wrapped in vacuum or in a controlled atmosphere. The majority of the samples (97%) were of domestic origin. Samples were collected from Monday to Thursday except for the biggest NUTS-3 area, where samples were also collected on Fridays. The samples were transported refrigerated to the laboratory within 1 day and the temperature of the meat was measured at the laboratory at arrival.

2. Stratification procedure per animal population and food category

Samples collected from retail shops were from five different NUTS-3 areas, covering approximately 55% of the Finnish population. From the NUTS-3 areas included in the sampling, the number of samples to be collected was proportional to the inhabitant size. Because of the nature of the Finnish market (small size, only a few distributors) same batches of the product can be found throughout the country and at different retail outlets. The sampling was evenly distributed throughout the study period and the number of samples to be collected was allocated on a monthly basis.

3. Randomisation procedure per animal population and food category

Samples were randomly selected at retail shops.

One isolate from each epidemiological unit (if available) was selected for susceptibility testing.

4. Analytical method used for detection and confirmation

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

5. Laboratory methodology used for detection of antimicrobial resistance

The phenotypic susceptibility testing was performed with broth microdilution method according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Commission Implementing Decision (EU) 2020/1729. All *E. coli* isolates were tested with the first panel according to Decision (EU) 2020/1729. If a MIC value to cefotaxime, ceftazidime or meropenem was above the ECOFF, the isolate was further tested with the second panel. Epidemiological cut-off values used were published in EFSA manual for reporting 2021 antimicrobial resistance data (doi: 10.2903/sp.efsa.2021.EN-6652).

6. Library preparation used

Not applicable

7. Version of the predictive tool

Not applicable
8. Results of investigation
ESBL, AmpC or carbapenemase producing *E. coli* was not found in any of the pig meat samples collected at retail. The situation remains very favourable.

Finland